

# Ecological site F122XY022TN

## Gravelly Colluvial Footslopes

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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): 122X–Highland Rim and Pennyroyal

MLRA 122 is in Tennessee (47 percent), Kentucky (43 percent), Indiana (7 percent), and Alabama (3 percent). It makes up about 21,530 square miles (55,790 square kilometers).

#### SOILS:

Many of the soils in this MLRA are Udalfs. The moderately deep to very deep, well drained, clayey soils formed in limestone residuum. They are dominantly in rolling to steep areas of the “Outer Basin” (Mimosa, Braxton, Gladdice, and Hampshire series) and the undulating to hilly areas of the “Inner Basin” (Talbot and Bradyville series). The most agriculturally productive soils are the very deep, well drained, clayey or loamy soils that formed in alluvium and/or loess over alluvium or limestone residuum in nearly level to undulating areas (Armour, Cumberland, Harpeth, Lomond, and Maury series). The less extensive soils generally are moderately well drained to somewhat poorly drained and formed in loamy or clayey alluvium and/or residuum (Byler, Capshaw, Colbert, and Tupelo series). This MLRA has a significant acreage of Mollisols. Shallow or moderately deep, well drained, clayey Udolls (Ashwood and Barfield series) formed in limestone residuum dominantly in rolling to steep areas. Very shallow, well drained, clayey Rendolls (Gladeville series) formed in limestone residuum dominantly in undulating to rolling areas of the “Inner Basin.” Very deep, well drained or moderately well drained Udolls (Arrington, Egam, Lynnvill, and Staser series) and somewhat poorly drained or poorly drained Aquolls (Agee, Godwin, and Lanton series) formed in loamy or clayey alluvium derived from limestone on flood plains. Most of the remaining soils on flood plains are moderately well drained or well drained Udepts (Lindell and Ocana series). Udupts are of small extent in this area. Most are very deep, well drained, and loamy and formed in gravelly colluvium or colluvium and the underlying residuum on steep hillsides (Dellrose soils). Rock outcrops are common on uplands.

#### BIOLOGICAL RESOURCES:

This area supports mixed oak forest vegetation. White oak, black oak, northern red oak, and some scarlet oak are the dominant tree species. Shagbark hickory, bitternut hickory, pignut hickory, and mockernut hickory also occur. Oak, blackgum, flowering dogwood, sassafras, Virginia pine, pitch pine, and shortleaf pine grow mostly on ridgetops.

(Excerpt from 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.)

### Classification relationships

Scientific Name: Southern Interior Low Plateau Dry-Mesic Oak Forest, Unique Identifier: CES202.898

### Ecological site concept

The communities described in this provisional document reflect plant communities that are likely to be found on these soils and have not been field verified. This PES describes hypotheses based on available data and has not

been developed utilizing ecological field monitoring and does not encompass the entire complexity or diversity of these sites. Field studies would be required for detailed conservation planning or to develop a comprehensive and science-based restoration plan.

#### Ecological Dynamics:

State 1. Phase 1.1. (Reference) Forestland

Plant species dominants: southern red oak (*Quercus falcata*) - white oak (*Quercus alba*) / flowering dogwood (*Cornus florida*) / euonymus (*Euonymus* spp.)

Various oak species may dominant on these sites. Other trees may include hickories, tulip poplar, black gum, maples, black cherry, ashes, dogwoods, sassafras, and elms. Additional field work is needed to better understand the composition and co-dominance of tree species on these sites. Shrubs and vines on these sites may include spicebush, various grapes, Virginia creeper, hydrangeas, euonymuses, vacciniums, and poison ivy. The understory would contain an array of native herbs and forbs. The shrub layer would be sparse in older, reference type communities but may be very dense in successional stages.

Additional ecological information is under the community phase data section.

**Table 1. Dominant plant species**

Tree	(1) <i>Quercus falcata</i> (2) <i>Quercus alba</i>
Shrub	(1) <i>Cornus florida</i>
Herbaceous	(1) <i>Euonymus</i>

### Physiographic features

These sites are found on the uplands in MLRA 122, mainly on footslopes.

**Table 2. Representative physiographic features**

Landforms	(1) Hill
Flooding frequency	None
Ponding frequency	None
Elevation	500–1,700 ft
Slope	2–30%
Water table depth	60 in

### Climatic features

#### Climate

The average annual precipitation in this area is 43 to 63 inches (1,090 to 1,600 millimeters), increasing to the south. The maximum precipitation occurs in winter and early in spring, and the minimum occurs in fall. Most of the rainfall occurs as high-intensity, convective thunderstorms. Snowfall may occur in winter. The average annual temperature is 52 to 60 degrees F (11 to 16 degrees C), increasing to the south. The freeze-free period averages 210 days and ranges from 185 to 235 days. The longer freeze-free periods occur in the more southerly parts of the area.

(Excerpt from 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.)

**Table 3. Representative climatic features**

Frost-free period (average)	183 days
Freeze-free period (average)	202 days
Precipitation total (average)	56 in

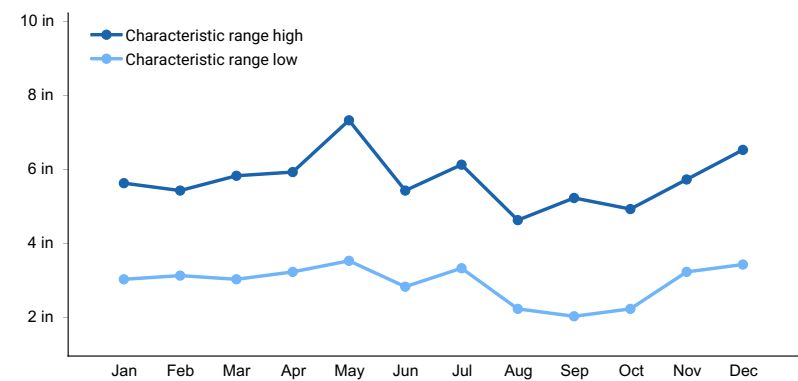


Figure 1. Monthly precipitation range

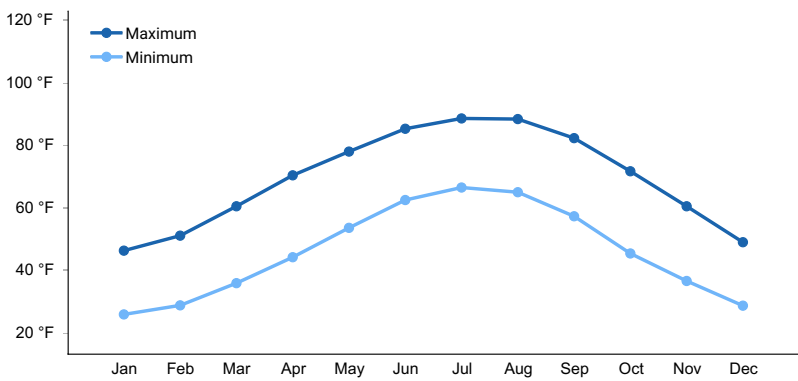


Figure 2. Monthly average minimum and maximum temperature

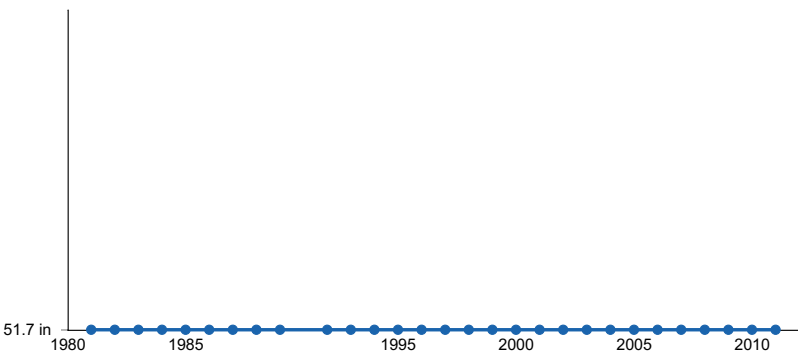


Figure 3. Annual precipitation pattern

### Climate stations used

- (1) SCOTTSVILLE [USC00157215], Scottsville, KY
- (2) GREENSBURG [USC00153430], Greensburg, KY
- (3) COOKEVILLE [USC00402009], Cookeville, TN
- (4) WAYNESBORO [USC00409502], Waynesboro, TN
- (5) CLARKSVILLE WWTP [USC00401790], Clarksville, TN

### Influencing water features

These sites have no influencing water features.

## Soil features

These sites are soils formed from colluvium.

**Table 4. Representative soil features**

Parent material	(1) Complex landslide deposits–cherty limestone
Surface texture	(1) Cobbly silt loam (2) Gravelly loam (3) Stony sandy clay loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderate to moderately rapid
Soil depth	80 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	4.4–7.1 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)	5–6.1
Subsurface fragment volume <=3" (Depth not specified)	1–23%
Subsurface fragment volume >3" (Depth not specified)	0–16%

## Ecological dynamics

MLRA 122-Thermic

22-Gravelly Colluvial Footslopes

Mapunits included in this initial provisional ecological site (PES) grouping include: Algood, Allen, Minvale, Nella, Standingstone-Hayter.

Future ESD development may result in mapunits being added or removed from this preliminary grouping.

Individual sites deserve a detailed understanding before conservation and restoration practices are implemented; therefore, it should be noted that the communities described in this provisional document reflect plant communities that are likely to be found on these soils and have not been field verified. Therefore, this PES describes hypotheses based on available data of many different scales and sources and has not been developed utilizing site-specific ecological field monitoring. This PES also does not encompass the entire complexity or diversity of these sites. Field studies would be required to develop a comprehensive and science-based native plant restoration plan for these sites.

The PES reference community was determined by information gathered from NASIS, NRCS county soil surveys (trees on site, common trees) and Glendon Smalley's U.S. Forest Service technical report SO-43 entitled, "Classification and Evaluation of Forest Sites on the Eastern Highland Rim and Pennyroyal."

NRCS Official Soil Series Descriptions (OSD) vegetation:

Algood: Gently sloping or sloping areas are mostly cleared and used for growing corn, small grains, mixed hay, burley tobacco, and assorted truck crops. Steeper areas are in pasture or woodland. Native vegetation consists mainly of secondary growth yellow poplar. Oak, walnut, cherry, and sassafras are other common species.

Allen: About one-fourth is in forest consisting chiefly of oaks, hickories, yellow poplar, beech and shortleaf and Virginia pine. Cleared areas are used chiefly for pasture, but some areas are cropped to tobacco, corn, truck, and small grain.

Minvale: Most of the soil is cleared and used for growing hay, pasture, vegetables, corn, cotton, tobacco, and small grains. The native vegetation was mixed hardwoods.

Nella: Most of the soil is cleared and used for growing hay, pasture, vegetables, corn, cotton, tobacco, and small grains. The native vegetation was mixed hardwoods.

NASIS and Soil Surveys:

Trees on site recorded in soil surveys and NASIS include: southern red oak, white oak, black oak, northern red oak, black walnut, tulip poplar, and pines.

The following information is from Glendon Smalley's U.S. Forest Service technical report SO-43 entitled, "Classification and Evaluation of Forest Sites on the Eastern Highland Rim and Pennyroyal."

Description of Landtype 8: Footslopes, Terraces, and Stream bottoms- Good Drainage

Dominant soils include cherty Etowah

Vegetation - white oak, yellow-poplar, northern red oak, blackgum, hickories, sweetgum, red maple, and American sycamore; occasional cottonwood, elms, American beech, hackberry, black oak, eastern redcedar, black walnut, black cherry, white ash, sugar maple, loblolly pine, river birch, shortleaf pine, and Virginia pine. Dogwoods, cane, persimmon, American hornbeam, spicebush, eastern redbud, vacciniums, sassafras, boxelder, pawpaw, euonymuses, hawthorns, and hydrangea are common in the understory.

Ecological Dynamics:

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State: 2. Pasture

Phase 2.1: Managed Pasture. Plant species dominants: *Schedonorus arundinaceus* (tall fescue)

Narrative: Plant species within all of these pasture phases is dependent on seeding, weed control, concurrent land uses, on-going levels of disturbance, and landowner goals. Individual site and soil characteristics, along with management activities, will influence production levels.

Many other species of grass, both warm and cool season, are possible for these sites.

Transitioning this state to a reference condition will likely require timber stand improvement practices to control non-native vegetation and manage for desired hardwood species.

State: 3 – Transitional (Abandoned Field)

Phases 3.1:

tulip poplar (*Liriodendron tulipifera*) / berries (*Rubus* spp.) / fescue (*Schedonorus arundinaceus*)

Narrative: Tree species regeneration on these sites will depend on the severity and duration of disturbance, soil characteristics, adjacent plant communities and seed sources, post-disturbance management inputs, presence or

absence of continued site disturbances (grazing), slope, and aspect.

Transitioning this state to a reference condition will likely require timber stand improvement practices to control non-native vegetation and manage for desired hardwood species.

#### State 4: Phase 4.1. Abandoned Croplands

Plant species dominant:

henbit deadnettle (*Lamium amplexicaule*) – mouse-eared chickweed (*Cerastium L.* )

Abandonment of cropland would result in many weed species taking over the site. Initially, annual weeds would be predominate followed by grasses, shrubs and finally, pioneers trees.

It would require years of management, plantings, and weed control to establish successional communities that could transition to a reference community.

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#### State: 5: Phase 5.1. Cropland

Dependent upon seeding and management. Most common crops are corn and soybeans.

TO VALIDATE THE INFORMATION IN THIS PROVISIONAL ECOLOGICAL SITE DESCRIPTION FUTURE FIELD WORK IS NEEDED. This will include detail field inspections and monitoring and multi-site data collection including medium to high intensity vegetation sampling, soil correlations, and an in-depth analysis of gathered data. A final field review, peer review, quality control, and quality assurance reviews of the ESD will be needed to produce a document to be utilized for accurate on-site conservation planning.

### State and transition model

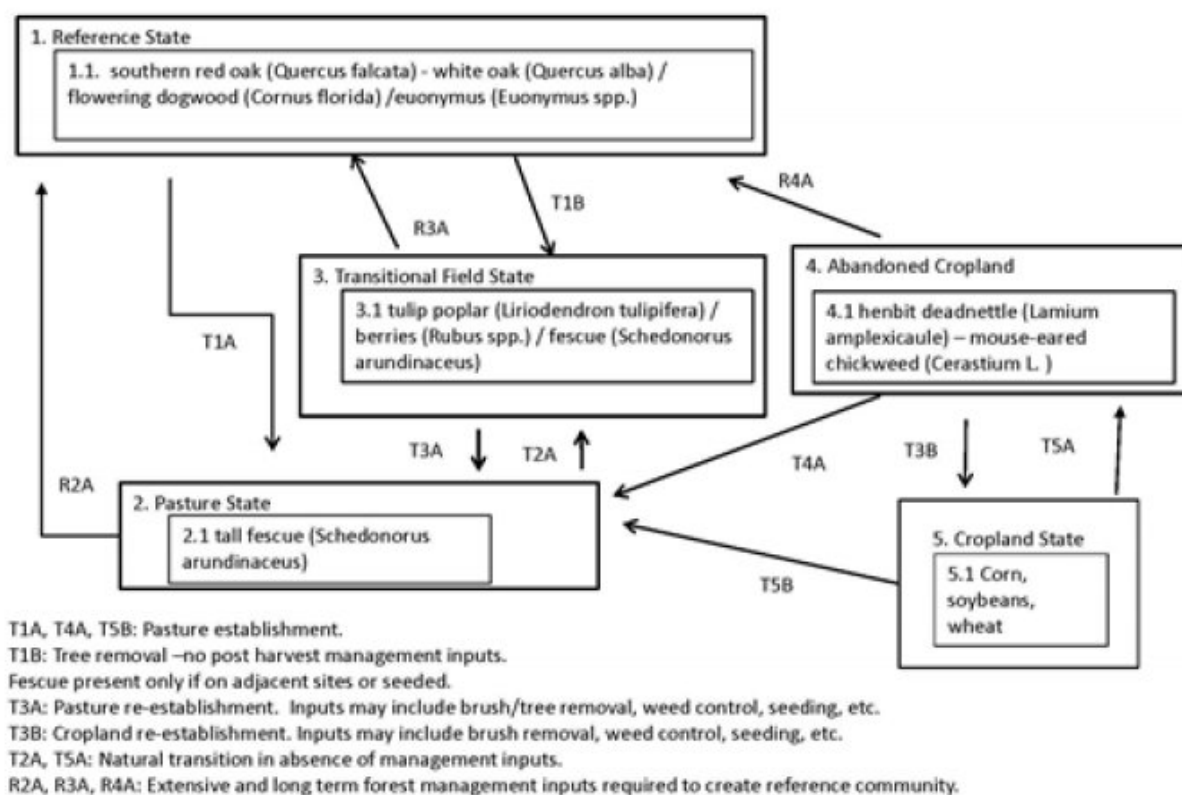


Figure 5. 22-gravelly colluvial

## 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:**

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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):**

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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:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**



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14. **Average percent litter cover (%) and depth ( in):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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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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