Ecological site F122XY023TN
Loess Veneered Thermic Uplands

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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" (Talbott 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, Lynnville, 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). Udults 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.

State 1, Phase 1.1: (Reference): Forestland
Plant species dominants:
white oak (*Quercus alba*) - southern red oak (*Quercus falcata*) / flowering dogwood (*Cornus florida*) / Virginia creeper (*Parthenocissus quinquefolia*) – tick-trefoil (Desmodium spp.)

White oak and southern red oak are the two predominant trees found on site according to NRCS county soil surveys and NASIS. Dozens of understory herbaceous species are found on these sites. High quality forests will have an array of native wildflower species on site.

State: 2. Pasture
State 2, Phase 2.1: Managed Pasture. Plant species dominants: *Schedonorus arundinaceus* (tall fescue)

Pasture plant species are 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.

State: 3 – Transitional (Abandoned) Field
State 3, Phases 3.1: eastern red cedar (*Juniperus virginiana*) – tulip poplar (*Liriodendron tulipifera*) / berries (Rubus spp.) / fescue (*Schedonorus arundinaceus*)

Tree species regeneration on these sites will depend on the severity and duration of disturbance, adjacent plant communities (seed sources), post-disturbance management inputs, presence or absence of continued site disturbances, slope, and aspect.

State 4: Phase 4.1. Abandoned Croplands
Plant species dominant:
henbit deadnettle (*Lamium amplexicaule*) – mouse-eared chickweed (Cerastium L.)

State 5: Phase 5.1. Cropland
Phase 4.1: Plant species dominants: Zea spp. – Glycine spp.
Plants on these sites will be dependent upon seeding and management. Most common crops are corn and soybeans.

Table 1. Dominant plant species

Tree	(1) *Quercus alba* (2) *Quercus falcata*
Shrub	(1) *Cornus florida*
Herbaceous	(1) *Parthenocissus quinquefolia* (2) *Desmodium*

Physiographic features

These sites are on upland areas in MLRA 122.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Flat (3) Interfluve
Flooding frequency	None

Ponding frequency	None
Elevation	107–427 m
Slope	0–12%
Water table depth	28–46 cm

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

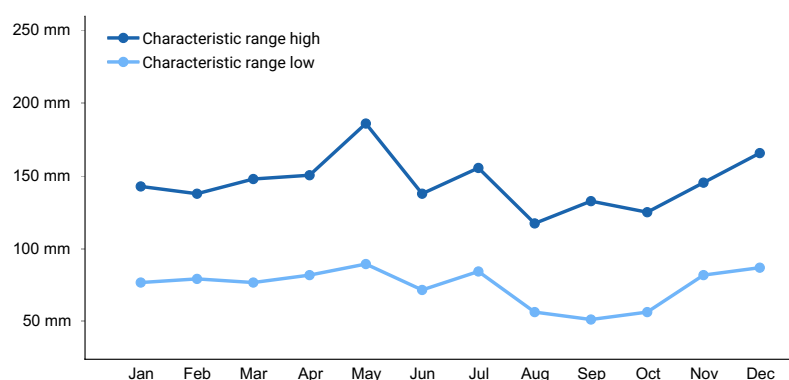|	
Frost-free period (average)	183 days
Freeze-free period (average)	202 days
Precipitation total (average)	1,422 mm

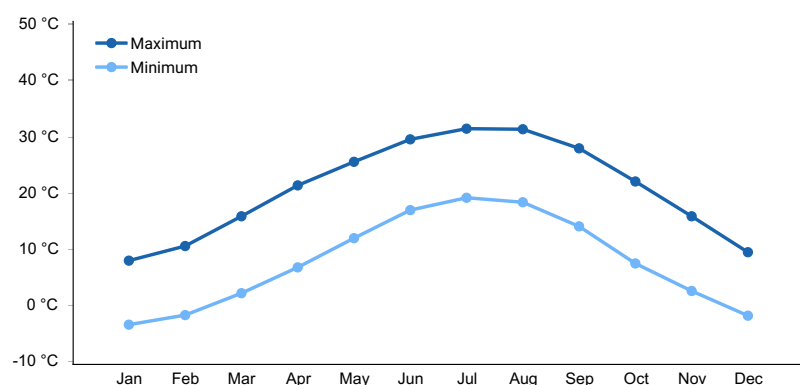**Figure 1. Monthly precipitation range**

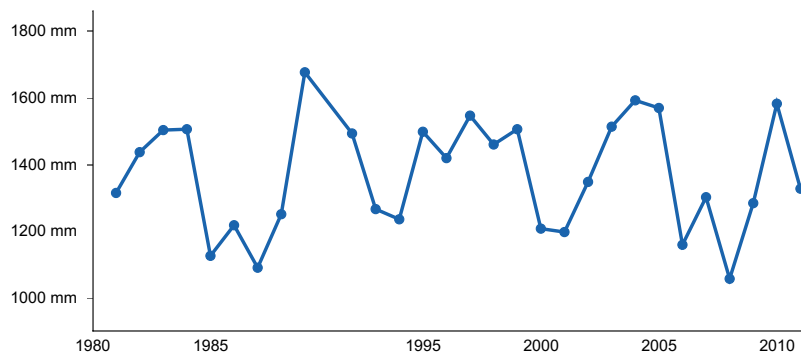**Figure 2. Monthly average minimum and maximum temperature**

Figure 3. Annual precipitation pattern

Climate stations used

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

Influencing water features

These sites have no influencing water features.

Soil features

These soils have a silty mantle of loess on the surface. Multiple soils in this group are deep or very deep but have a fragipan layer.

Table 4. Representative soil features

Parent material	(1) Loess–cherty limestone
Surface texture	(1) Gravelly silt loam (2) Silty clay loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Very slow to moderately rapid
Soil depth	41–183 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	8.89–19.05 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)	4.9–5.5
Subsurface fragment volume <=3" (Depth not specified)	0–60%

Subsurface fragment volume >3" (Depth not specified)	0–11%

Ecological dynamics

Loess Veneered Uplands
MLRA 122
Soil mapunits in this preliminary grouping: Dickson, Ironcity, Lax, Mountview, Sango.

Future ecological site description (ESD) development will likely result in mapunits being added and removed from this initial group.

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 the National Soil Information System (NASIS), county soil surveys, 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."

Vegetation as listed in Official Soil Series Description (OSD):
Dickson: Most areas are cleared and used for growing hay, pasture, small grains, corn, soybeans, and tobacco. Some areas are in forest chiefly of oaks, yellow-poplar, hickories, gums, and maples.
Ironcity: Most areas of this soil are used for pasture and woodland. Some areas are used to produce corn and hay. The native vegetation was mixed hardwoods.
Lax: … used for growing corn, tobacco, small grains, soybeans, hay, and pasture. The remainder is in mixed hardwood forest consisting chiefly of oaks, hickories, and beech.
Mountview: Most areas are used for growing hay, pasture, small grains, cotton, corn, and tobacco. Some areas are in woodland consisting chiefly of oak, hickory, gum, and maple.
Sango: The native vegetation was forest of oaks, maples, and gums.

NRCS county soil surveys listed trees on site as predominately southern red oak and white oak. Chestnut oak, black oak, yellow poplar, hickories, and pines were also found.

NASIS data for these mapunit listed white oak, southern red oak, chestnut oak, 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 2: Broad Ridges-North Aspect
Dominant soils include Mountview and Dickson
White oak, southern red oak, black oak, northern red oak, hickories, blackgum, shortleaf pine, and loblolly pine; occasional eastern redcedar, chestnut oak, post oak, yellow-poplar, red maple, black walnut, white ash, black cherry, and Virginia pine. Flowering dogwood, scarlet oak, sassafras, persimmon, vacciniums, and winged elm are common in the understory.

Description of Landtype 3: Broad Ridge South Aspect
Dominant soils include Mountview and Dickson
Southern red oak, scarlet oak, post oak, white oak, chestnut oak, hickories, blackgum, shortleaf pine, loblolly pine, and Virginia pine; Occasional species include black oak, red maple, yellow-poplar, and eastern redcedar. Sassafras, flowering dogwood, vacciniums, persimmon, and winged elm are common in the understory.

Description of Landtype 12: Broad Silty Uplands
Dominant soils include Mountview and Dickson

Southern red oak, post oak, scarlet oak, blackjack oak, hickories, white oak, and blackgum; occasional chestnut oak, black oak, eastern redcedar, black cherry, elms, shortleaf pine, Virginia pine, loblolly pine, yellow-poplar, sweetgum, water oak, and red maple. Flowering dogwood, vacciniums, sourwood, sassafras, Carolina buckthorn, and winged elm are common in the understory.

Description of Landtype 18: Upland Flats, Depressions, and Sinkholes -Good Drainage
Dominant soils list included Sango.
White oak, black oak, hickories, red maple, northern red oak, sweetgum, yellow-poplar,
and elms; occasional black cherry, black walnut, white ash, sugar maple, American sycamore, southern red oak, scarlet oak, hackberry, sugarberry, American beech, loblolly pine, shortleaf pine, and eastern redcedar. Dogwoods, euonymuses, vacciniums, sassafras, and elms are common in the understory.

Ecological Dynamics:
Only two tree species can be selected for entry into the ESIS/EDIT database as dominants; however, multiple tree species may be co-dominant on these sites and species distribution will vary depending on aspect, soil depth, seed sources, management, and disturbance history.

State 1. (Reference): Forestland
State 1, Phase 1.1: Plant species dominants:
white oak (*Quercus alba*) - southern red oak (*Quercus falcata*) / flowering dogwood (*Cornus florida*) / Virginia creeper (*Parthenocissus quinquefolia*) – tick-trefoil (Desmodium spp.)

White oak and southern red oak are the two predominant trees found on site according to NRCS county soil surveys and NASIS.

State: 2. Pasture
State 2, Phase 2.1: Managed Pasture. Plant species dominants: *Schedonorus arundinaceus* (tall fescue)

Pasture plant species are 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 species of grass, both warm and cool season, are available and suitable for these sites. Common forage species include tall fescue, orchard grass, Kentucky bluegrass, Johnson grass, timothy, and various species of clover. Depending on levels of management, dozens of weed species may be present.

Management of pasture sites should follow conservation planning standards and protocols which include watershed protection, soil health, and adequate forage species.

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

State: 3 – Transitional (Abandoned) Field
State 3, Phases 3.1: eastern red cedar (*Juniperus virginiana*) – tulip poplar (*Liriodendron tulipifera*) / berries (Rubus spp.) / fescue (*Schedonorus arundinaceus*)

Tree species regeneration on these sites will depend on the severity and duration of disturbance, adjacent plant communities (seed sources), post-disturbance management inputs, presence or absence of continued site disturbances, slope, and aspect. Other successional tree species may include red maple, hackberry, boxelder, white ash, elm, cottonwood, and locusts. A wide array of weed species and native forbs and herbs are possible depending upon seed sources.

Transitioning this state to a reference condition would require timber stand improvement practices.

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 and grasses would be predominate followed by perennial weeds, 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.

State 5: Phase 5.1. Cropland
Phase 4.1: Plant species dominants: Zea spp. – Glycine spp.

Plants on these sites will be dependent upon seeding and management. Most common crops are corn and soybeans.

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

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.

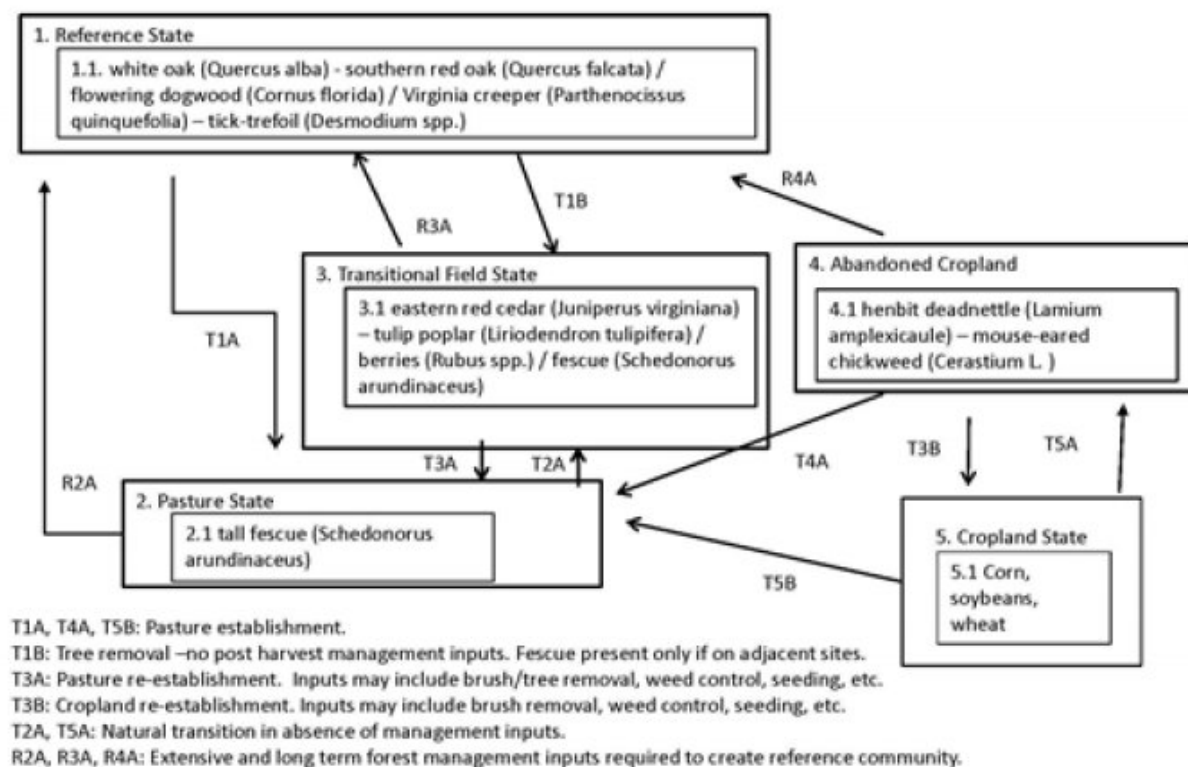## State and transition model

Figure 5. Loess Veneered Uplands Thermic 122

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:**