Ecological site F122XY024TN
Loess Veneered Depressional Uplands

Accessed: 05/12/2025

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

Central Interior Highlands and Appalachian Sinkhole and Depression Pond (CES202.018)

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.

24-Loess Veneered Depressional Uplands
thermic
MLRA 122
Mapunits included in this initial PES grouping include: Dekoven, Guthrie, and Taft.
Future ESD development may result in mapunits being added or removed from this preliminary grouping.

State 1. Phase 1.1.
willow oak (*Quercus phellos*) – sweetgum (*Liquidambar styraciflua*) / willows (Salix spp.)- alder (Alnus spp.) / giant cane (*Arundinaria gigantea*)

State: 2. Pasture
Phase 2.1: Managed Pasture. Plant species dominants: *Schedonorus arundinaceus* (tall fescue)
Many other species of grass, both warm and cool season, are available for these sites.

State: 3 – Transitional (Abandoned Field)
Phases 3.1: Plant species dominants: *Juniperus virginiana*/ Rubus spp. - *Rosa multiflora*/ *Vernonia gigantea* -*Schedonorus arundinaceus*
Eastern red cedar /blackberry – multiflora rose/ ironweed- tall fescue

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

It would require years of management, plantings, and weed control to successfully transition to a reference community. Hydrology may also need to be restored if the site has been ditched or tiled.

Table 1. Dominant plant species

Tree	(1) *Quercus phellos* (2) *Liquidambar styraciflua*
Shrub	(1) *Salix* (2) *Alnus*
Herbaceous	(1) *Arundinaria gigantea*

Physiographic features

These sites are generally found on uplands in depressions.

Table 2. Representative physiographic features

Landforms	(1) Flat (2) Plain
Flooding frequency	None
Ponding duration	Brief (2 to 7 days) to long (7 to 30 days)
Ponding frequency	None to occasional
Elevation	350–1,400 ft

Slope	0–3%
Water table depth	0–20 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

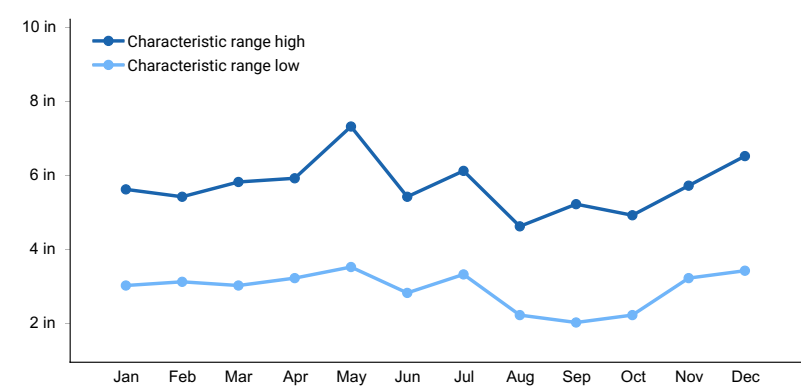| Frost-free period (average)	183 days
Freeze-free period (average)	202 days
Precipitation total (average)	56 in

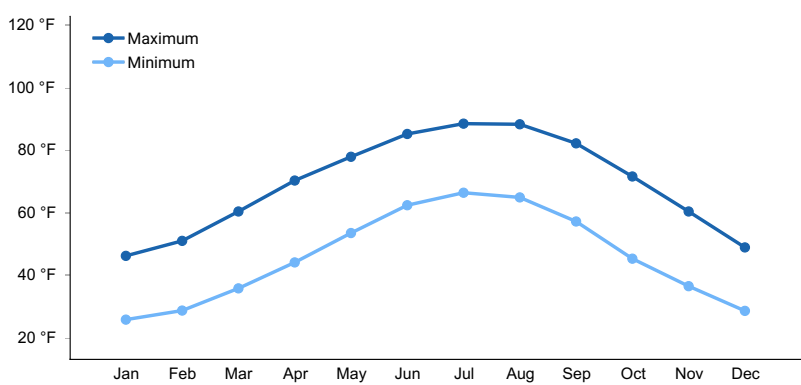**Figure 1. Monthly precipitation range**

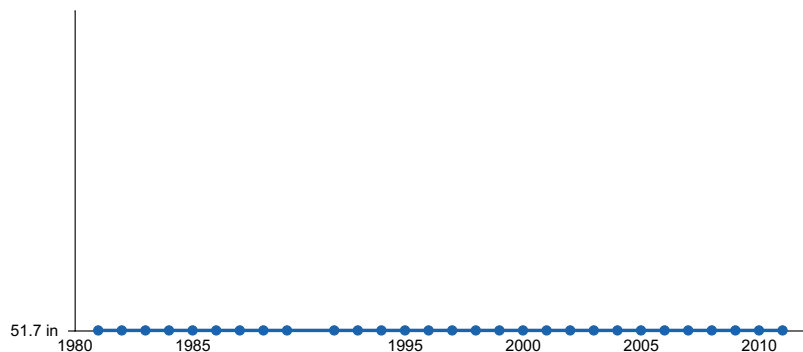**Figure 2. Monthly average minimum and maximum temperature**

Figure 3. Annual precipitation pattern

Climate stations used

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

Influencing water features

These sites have a high water table.

Soil features

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

Table 4. Representative soil features

Parent material	(1) Loess–cherty limestone (2) Alluvium–limestone
Surface texture	(1) Silt loam
Family particle size	(1) Loamy
Drainage class	Somewhat poorly drained to poorly drained
Soil depth	21–36 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	5–7.2 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)	4.5–5
Subsurface fragment volume <=3" (Depth not specified)	0–5%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

24-Loess Veneered Depressional Uplands
MLRA 122
Mapunits included in this initial PES grouping include: Dekoven, Guthrie, and Taft.
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, 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."

Forest vegetation as listed in Official Soil Series Description (OSD):
Dekoven: Hardwoods - chiefly oaks, beech, maple, ash, hickory, gum, elm, sycamore, willow, and cypress. Most areas are cleared and used for crops and pasture.
Guthrie: Areas in forest consist chiefly of bottom land oaks, sweetgum, sycamore, and maple.
Taft: The native vegetation is hardwood forest of maple, elm, water oak, post oak, gum, beech, sycamore, and cottonwood.

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. Phase 1.1. (Reference) Forest
willow oak (*Quercus phellos*) – sweetgum (*Liquidambar styraciflua*) / willows (Salix spp.)- alder (Alnus spp.) / giant cane (*Arundinaria gigantea*)

NASIS and county soil surveys also have the following trees on site:
water oak, cherrybark oak, blackgum, sweetgum, red maple, American sycamore, southern red oak, white oak, boxelder, green ash, black willow, cottonwood, yellow poplar, loblolly pine, and "lowland oaks".

The OSD for Dekoven lists the vegetation and land uses as:
Hardwoods - chiefly oaks, beech, maple, ash, hickory, gum, elm, sycamore, willow, and cypress. Most areas are cleared and used for crops and pasture. Principal crops are corn, soybeans, cotton and hay. Yields generally are high.

The OSD for Guthrie list the vegetation and land uses as:
Cleared areas are used for pasture. In a few areas soybeans are grown. Areas in forest consist chiefly of bottom land oaks, sweetgum, sycamore, and maple.

The OSD for Taft lists the vegetation and land uses as:
About two-thirds of the acreage is cleared and used chiefly for growing pasture, hay, soybeans, and some corn. The native vegetation is hardwood forest of maple, elm, water oak, post oak, gum, beech, sycamore, and cottonwood. Other shrubs and vines on these sites may include pawpaw, spicebush, hydrangeas, Virginia creeper and grapes.

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 available and suitable for these sites.

State: 3 – Transitional (Abandoned Field)
Phases 3.1: Plant species dominants: *Juniperus virginiana*/ Rubus spp. - *Rosa multiflora*/ *Vernonia gigantea* -*Schedonorus arundinaceus*
Eastern red cedar /blackberry – multiflora rose/ ironweed- tall fescue
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. It would require years of management, plantings, and weed control to establish successional communities that could transition to a reference community.

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.

State 5: Phase 5.1. Cropland
Dependent upon seeding and management. Most common crops are corn and soybeans.

It would require years of management, plantings, and weed control to successfully transition to a reference community. Hydrology may also need to be restored if the site has been ditched or tiled.

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."

Landtype 19: Upland Flats, Depressions, and Sinkholes with Poor Drainage
Dominant soils include Guthrie.
Dominant trees: Willow oak, water oak, blackgum, sweetgum, red maple, pin oak and elms; Occasional trees: hickories, American sycamore, northern red oak, Shumard oak, swamp white oak, southern red oak, white oak, boxelder, green ash, black willow, cottonwood, yellow-poplar, and loblolly pine.
Common understory: dogwoods, alder, willows, euonymuses, and cane.

TO VALIDATE THE INFORMATION IN THIS PROVISIONAL ECOLOGICAL SITE DESCRIPTION FUTURE FIELD WORK IS NEEDED. This will include field inspection and data collection including medium to high intensity sampling, soil correlations, and analysis of that 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 on-site conservation planning.
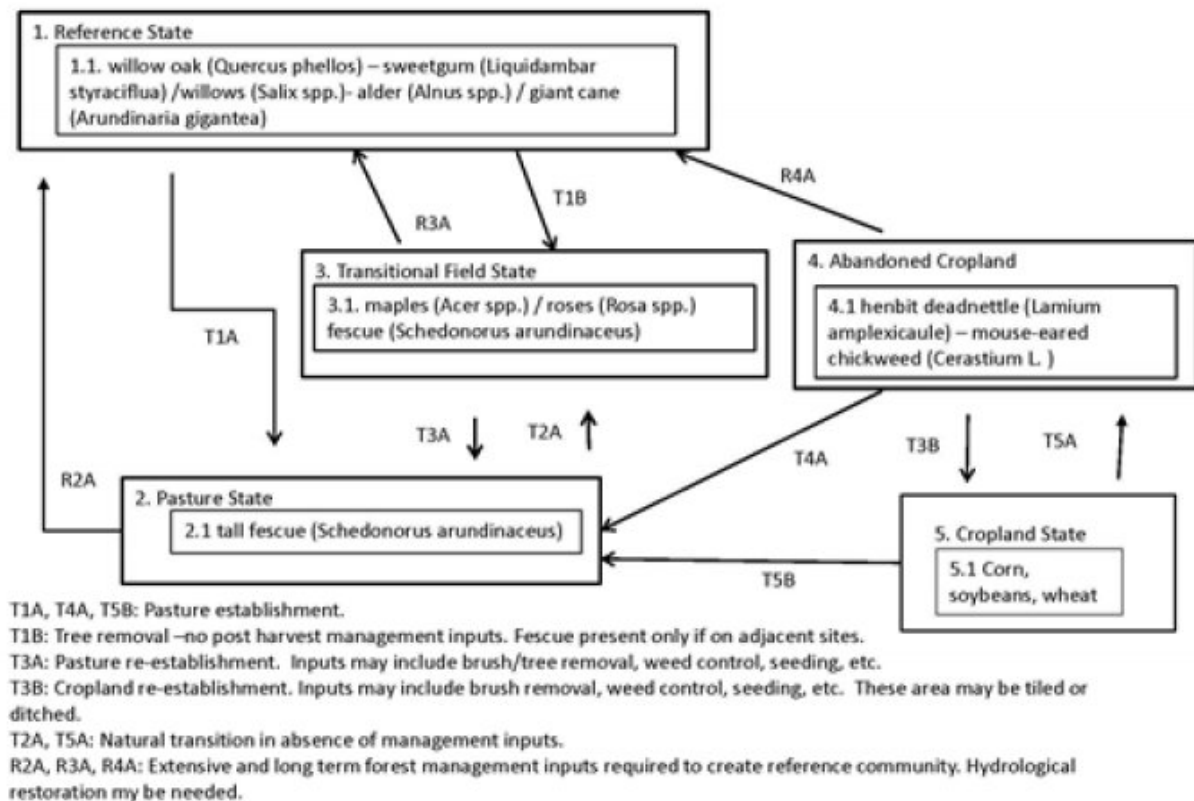
State and transition model

1. Reference State

1.1. willow oak (Quercus phellos) – sweetgum (Liquidambar styraciflua) /willows (Salix spp.)- alder (Alnus spp.) / giant cane (Arundinaria gigantea)

3. Transitional Field State

3.1. maples (Acer spp.) / roses (Rosa spp.) fescue (Schedonorus arundinaceus)

4. Abandoned Cropland

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

2. Pasture State

2.1 tall fescue (Schedonorus arundinaceus)

5. Cropland State

5.1 Corn, soybeans, wheat

T1A, T4A, T5B: Pasture establishment.
T1B: Tree removal –no post harvest management inputs. Fescue present only if on adjacent sites.
T3A: Pasture re-establishment. Inputs may include brush/tree removal, weed control, seeding, etc.
T3B: Cropland re-establishment. Inputs may include brush removal, weed control, seeding, etc. These area may be tiled or ditched.
T2A, T5A: Natural transition in absence of management inputs.
R2A, R3A, R4A: Extensive and long term forest management inputs required to create reference community. Hydrological restoration my be needed.

Figure 5. 24-LoessVenDepUplands

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:**