Ecological site F122XY034TN
Well Drained Gravelly Alluvium

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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.

(Excerpts 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

NatureServe Scientific Name: South-Central Interior Large Floodplain -Unique Identifier: CES202.705
NatureServe Scientific Name: South-Central Interior Small Stream and Riparian- Unique Identifier: CES202.706

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 of many different scales and sources and has not been developed utilizing site-specific ecological field monitoring. This PES 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 for these sites.

Ecological Dynamics
State 1. Phase 1.1: Forestland.
Plant species dominant: Quercus spp. (oaks) – *Liquidambar styraciflua* (sweetgum) / *Lindera benzoin* (spicebush) - paw paw (*Asimina triloba*) /*Hydrangea arborescens* (wild hydrangea)
Depending on previous management and past and present disturbances, these sites will have a mix of oak, hickory, and other hardwood species.

State 2, Phase 2.1: Pastureland.
Plant species dominant: *Schedonorus arundinaceus* (tall fescue).
Species present are dependent upon management.
State: 3. Phase 3.1: Transitional (Abandoned Field)
Plant species dominant: maple (Acer spp.) – tulip poplar (*Liriodendron tulipifera*) / roses (Rubus spp.) - berries (Rubus spp.)/ fescue (*Schedonorus arundinaceus*)
This phase is best described as an old field habitat with a mixture of native and non-native herbs, forbs, grasses, seedlings, and saplings.

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

State 5. Phase 5.1: Cropland. Plant species dominants: dependent upon seeding and management. Most common crops are corn and soybeans.

Restoration of states 2-5 to the reference community would require long-term, intensive management inputs.

Table 1. Dominant plant species

Tree	(1) *Quercus* (2) *Liquidambar styraciflua*
Shrub	(1) *Lindera benzoin* (2) *Asimina triloba*
Herbaceous	(1) *Hydrangea arborescens*

Physiographic features

These sites are in floodplains and may be influenced by occasional to frequent flooding.

Ecological site description (ESD) development may result in mapunits being added or removed from this group.

Table 2. Representative physiographic features

Landforms	(1) Flood plain
Flooding duration	Extremely brief (0.1 to 4 hours) to long (7 to 30 days)
Flooding frequency	None to frequent
Ponding frequency	None
Elevation	107–396 m
Slope	0–7%
Water table depth	102–168 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

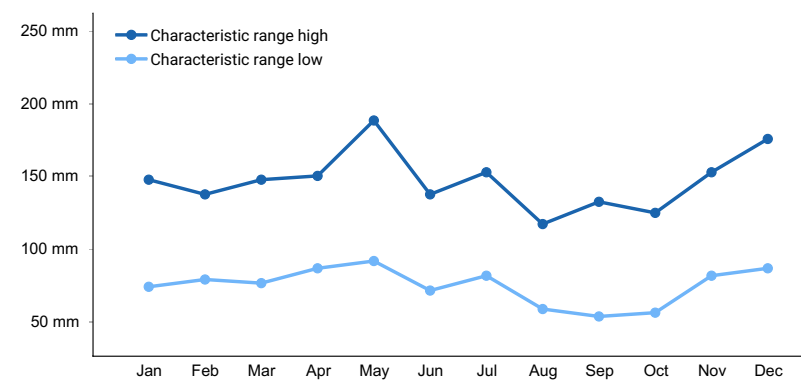| Frost-free period (average)	185 days
Freeze-free period (average)	206 days
Precipitation total (average)	1,422 mm

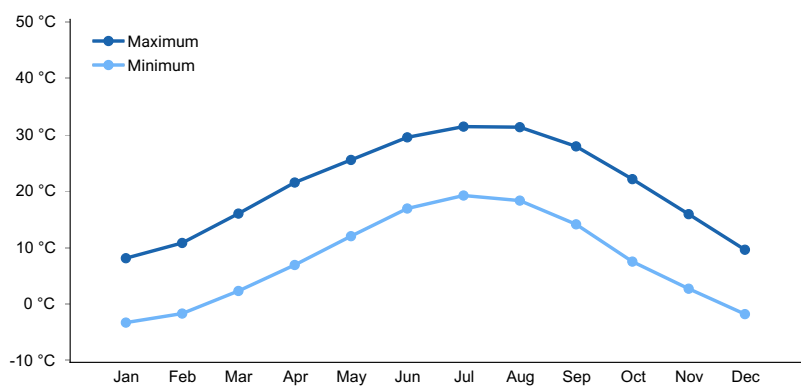**Figure 1. Monthly precipitation range**

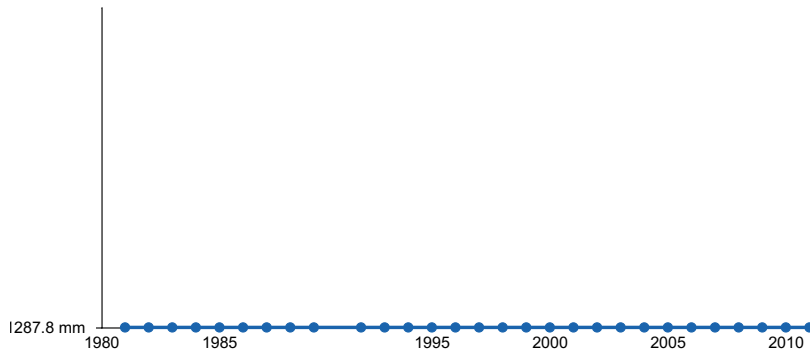**Figure 2. Monthly average minimum and maximum temperature**

Figure 3. Annual precipitation pattern

Climate stations used

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

Influencing water features

These sites are located within a floodplain and may be periodically influenced by flooding.

Soil features

These soils are well drained to excessively drained and gravelly in texture.

Future ESD development may result in soils being added or removed to this group.

Table 4. Representative soil features

Surface texture	(1) Loam (2) Sandy loam (3) Silt loam
Family particle size	(1) Loamy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderate to rapid
Soil depth	203 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	5.08–12.7 cm
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	5.3–6.2
Subsurface fragment volume <=3" (Depth not specified)	1–50%
Subsurface fragment volume >3" (Depth not specified)	0–20%

Ecological dynamics

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Soil series included in this preliminary grouping: Ennis, Pruitton, Riverby

Future field work may determine that this grouping be modified or split into multiple ecological site descriptions (ESD). Additional soils may be added pending field verification.

The natural vegetation of these sites will vary in relationship to the setting, patterns of drainage, disturbances, and previous vegetation communities. Individual sites deserve a detailed understanding before conservation and restoration practices are implemented. The provisional ecological site (PES) communities described in this document reflect plant communities that are likely to be found but do not encompass the entire complexity or diversity of these sites. Future field work is required develop a full ESD which can be utilized for conservation planning purposes.

NASIS data list trees on site for mapunits in this group include: white oak, tulip poplar, American sycamore, sweetgum, common hackberry, and pines.

The NRCS county soil surveys list various hardwoods on site, including white oak, southern red oak, northern red oak, black oak, YP, black walnut, loblolly pine, shortleaf pine, Virginia pine, white ash, and black cherry.

Vegetation in the official soil series description (OSD):
Ennis: Most areas are cleared and used for growing corn, cotton, tobacco, soybeans, small grains, hay and pasture. The native vegetation was bottomland hardwoods, consisting chiefly of oak, hickory, maple, elm, yellow-poplar, and sycamore.
Pruitton: Most areas are cleared and used for growing corn, cotton, soybeans, small grain, grain sorghum, and pasture. The native vegetation was mixed bottomland hardwoods.
Riverby: Areas of this soil are used mainly for woodland and pasture. A few small areas are used as cropland. Native vegetation is woodland consisting of sycamore, sweetgum, hackberry, maple, walnut, poplar, and ironwood.

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 With Good Drainage
Dominant soils include Pruitton, Ennis
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

State 1. Phase 1.1: Forestland.
Plant species dominant: Quercus spp. (oaks) – *Liquidambar styraciflua* (sweetgum) / *Lindera benzoin* (spicebush) - paw paw (*Asimina triloba*) /*Hydrangea arborescens* (wild hydrangea)

Depending on previous management and past and present disturbances, these sites will have a mix of oak, hickory, and other hardwood species. Common trees could include white oak, northern red oak, red maple, sugar maple, tulip poplar, white ash, American sycamore, American elm, blackgum, sweetgum, black cherry and cottonwood.

State 2, Phase 2.1: Pastureland.
Plant species dominant: *Schedonorus arundinaceus* (tall fescue).
Species present are dependent upon management in this State.
Pasture plant species present will depend 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. 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 forbs, herbs, and 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. Phase 3.1: Transitional (Abandoned Field)
Plant species dominant: maple (Acer spp.) – tulip poplar (*Liriodendron tulipifera*) / roses (Rubus spp.) - berries (Rubus spp.)/ fescue (*Schedonorus arundinaceus*)

This phase is best described as an old field habitat with a mixture of native and introduced grasses and a variety of native and non-native herbs, forbs, seedlings, and saplings. Species will depend on seed sources and ongoing disturbance levels.

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

State 5. Phase 5.1: Cropland. Plant species dominants: dependent upon seeding and management. Most common crops are corn and soybeans.

Restoration of states 2-5 to the reference community would require long-term, intensive management inputs.

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.
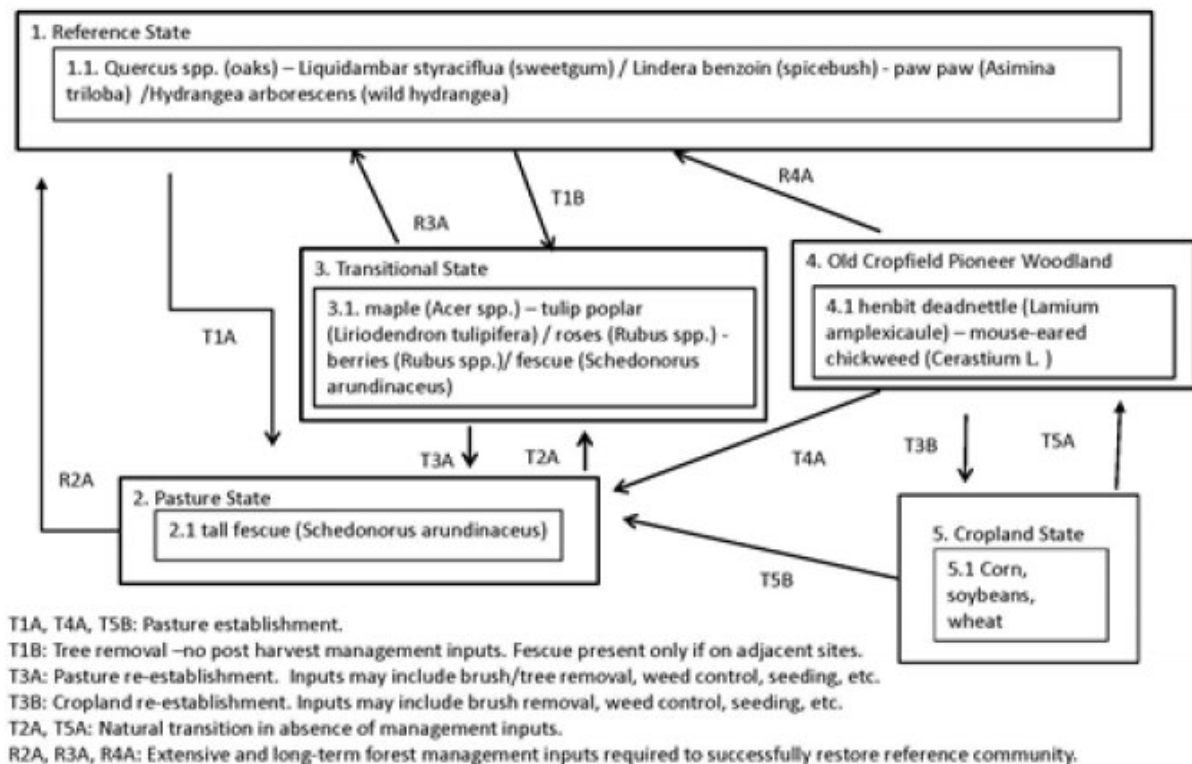

State and transition model

1. Reference State

1.1. Quercus spp. (oaks) – Liquidambar styraciflua (sweetgum) / Lindera benzoin (spicebush) - paw paw (Asimina triloba) /Hydrangea arborescens (wild hydrangea)

3. Transitional State

3.1. maple (Acer spp.) – tulip poplar (Liriodendron tulipifera) / roses (Rubus spp.) - berries (Rubus spp.)/ fescue (Schedonorus arundinaceus)

4. Old Cropfield Pioneer Woodland

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.
T2A, T5A: Natural transition in absence of management inputs.
R2A, R3A, R4A: Extensive and long-term forest management inputs required to successfully restore reference community.

Figure 5. 34- WD Gravelly Alluvium

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:**