USDA Natural Resources Conservation Service

Ecological site F122XY033TN
Well Drained Loamy 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.

(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

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

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. The NRCS county soil surveys list various hardwoods on site including northern red oak, white oak, cherrybark oak, tulip poplar, black walnut, and pines.
Ecological Dynamics:

State 1. Phase 1.1. (Reference): Forestland
Quercus rubra (northern red oak) - white oak (*Quercus alba*) / American hornbeam (*Carpinus caroliniana*) - paw paw (*Asimina triloba*) /
mayapple (*Podophyllum peltatum*)

State: 2. Phase 2.1. Pasture
Plant species dominant: *Schedonorus arundinaceus* (tall fescue)
Pasture plant species are dependent on management.

State: 3. Phase 3.1. Transitional Field
Plant species dominants: tulip poplar (*Liriodendron tulipifera*) – maples (Acer spp.) / berries (Rubus spp.) – Roses (Rosa spp.) / *Schedonorus arundinaceus* (tall fescue) –giant ironweed (Verona gigantea)
State 3 is typified by a variety of grasses, forbs, herbs, and young trees.

State 4: Phase 4.1. Abandoned Croplands
Plant species dominant:
henbit deadnettle (*Lamium amplexicaule*) – mouse-eared chickweed (Cerastium L.)
Many weeds, forbs, and grasses are possible in this state.

State 5.0. Phase 5.1. Cropland
Plant species dominants: dependent upon seeding and management. Most common crops are corn and soybeans.

Table 1. Dominant plant species

Tree	(1) *Quercus rubra* (2) *Quercus alba*
Shrub	(1) *Carpinus caroliniana* (2) *Asimina triloba*
Herbaceous	(1) *Podophyllum peltatum*

Physiographic features

These sites are located in floodplains in MLRA 122.

Table 2. Representative physiographic features

Landforms	(1) Flood plain
Flooding duration	Extremely brief (0.1 to 4 hours) to brief (2 to 7 days)
Flooding frequency	None to occasional
Ponding duration	Very brief (4 to 48 hours)
Ponding frequency	None to occasional
Elevation	116–305 m
Slope	0–6%
Ponding depth	0–97 cm
Water table depth	107–168 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

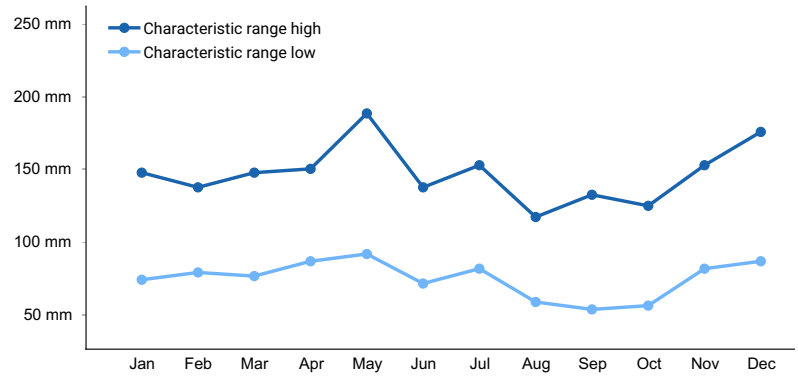

Figure 1. Monthly precipitation range

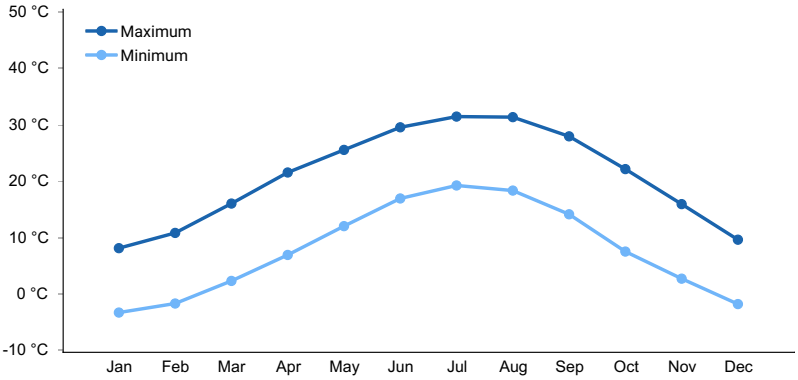

Figure 2. Monthly average minimum and maximum temperature

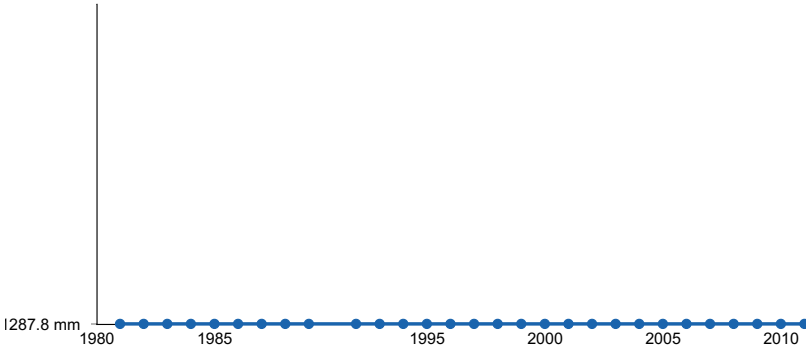

Figure 3. Annual precipitation pattern

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 in floodplains and may be influenced by periodic flooding and/or ponding.

Soil features

Soils in this group are loamy and well-drained.

Table 4. Representative soil features

Surface texture	(1) Loam (2) Silt loam (3) Fine sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderate to moderately rapid
Soil depth	203 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	14.73–19.05 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)	5.6–6.5
Subsurface fragment volume <=3" (Depth not specified)	0–10%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

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Well Drained Loamy Alluvium

Mapunits included in this project: Sullivan, Emory
Future field work may determine that this grouping be modified or split into multiple ecological site descriptions (ESDs). Soil mapunit may be added or removed 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, northern red oak, cherrybark oak, tulip poplar, black walnut, and pines.

The NRCS county soil surveys list various hardwoods on site: northern red oak, white oak, cherrybark oak, tulip poplar, black walnut, and pines.

Vegetation in the official soil series description (OSD):
Sullivan: Most of the areas are used for growing corn, hay, and pasture. The native vegetation is mixed hardwoods.
Emory: Areas large enough to crop or adjacent to other cropland are used for growing corn, cotton, tobacco, hay crops, and vegetable crops. The original vegetation was hardwood forest, including oak, maple, gum, yellow poplar, hickory, ash, beech, and sycamore.

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 21: Footslopes, Terraces, and Stream bottoms With Good
Drainage in Coves
Dominant soils include Sullivan
Vegetation- white oak, yellow-poplar, northern red oak, blackgum, hickories, sweetgum, red maple, and American sycamore. Occasional trees: cottonwood, elms, American beech, hackberry, black oak, eastern redcedar, black walnut, black cherry, white ash, sugar maple, loblolly pine, shortleaf pine southern red oak, boxelder, and Virginia pine. Flowering dogwood, cane, persimmon, American hornbeam, eastern redbud, vacciniums, sassafras, sourwood, pawpaw, euonymuses, hawthorns, and hydrangeas are common in the understory.

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 it will vary depending on aspect, soil depth, seed sources, management, and disturbance history.

Ecological Dynamics:

State 1. Phase 1.1. (Reference): Forestland
Quercus rubra (northern red oak) - white oak (*Quercus alba*) / American hornbeam (*Carpinus caroliniana*) - paw paw (*Asimina triloba*) / mayapple (*Podophyllum peltatum*)

Trees on these sites will vary depending on age of stand, previous disturbances, on-going levels of disturbance (such as grazing or logging), aspect, and soil depth. Other trees possible for these sites include: *Acer saccharum* (sugar maple), *Acer rubrum* (red maple), *Liriodendron tulipifera* (tulip poplar), Fraxinus spp. (ash), *Juglans nigra* (black walnut), *Tilia americana* (basswood), *Carya cordiformis* (bitternut hickory), Carya tomentosa (mockernut hickory), and *Ulmus americana* (American elm).

Without disturbances, a rich herb and forb layer would be present. Dozens of native species would occur. Spring wildflowers would be prolific on undisturbed, old-growth locations.

State: 2. Phase 2.1. Pasture
Plant species dominant: *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. Phase 3.1. Transitional Field
Plant species dominants: tulip poplar (*Liriodendron tulipifera*) – maples (Acer spp.) / berries (Rubus spp.) – Roses (Rosa spp.) / *Schedonorus arundinaceus* (tall fescue) –giant ironweed (Verona gigantea)

State 3 is a successional state that would occur after pasture management ceases. Typified by a variety of grasses, forbs, herbs, and young trees, these sites are usually wildlife friendly, pollinator beneficial, and are often maintained by landowners to maximize wildlife habitat.

Trees found on site are a mix depending on seed sources and age of the site. Hardwood seedlings and saplings are abundant depending on seed sources. Multiflora rose, briars, berries and brambles a frequent component. Common species included Queen Anne's lace (*Daucus carota*), mullein (Verbascum spp.) thistles (Cirsium spp.), lespedeza (Lespedeza spp.), lambs quarters (*Chenopodium album*), horse nettle (*Solanum carolinense*) and pigweed (*Amaranthus albus*). Other native herbaceous species possible are giant ironweed (*Vernonia gigantea*), common milkweed (*Asclepias syriaca*), goldenrods (Solidago spp.), sunflowers (Helianthus spp.). White crownbeard (*Verbesina virginica*), yellow crownbeard (*V. occidentalis*) and common lowland wingstem (*Verbesina alternifolia*) may be present.

Transitioning this state to a reference condition will require management inputs including timber stand improvement practices and control of non-native vegetation.

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.

State 5.0. Phase 5.1. Cropland

Plant species dominants: dependent upon seeding and management. Most common crops are corn and soybeans.

This state can be transitioned to any of the other states with sufficient management inputs: forest restoration and timber stand management, pasture plantings, long-term weed control, etc.

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

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

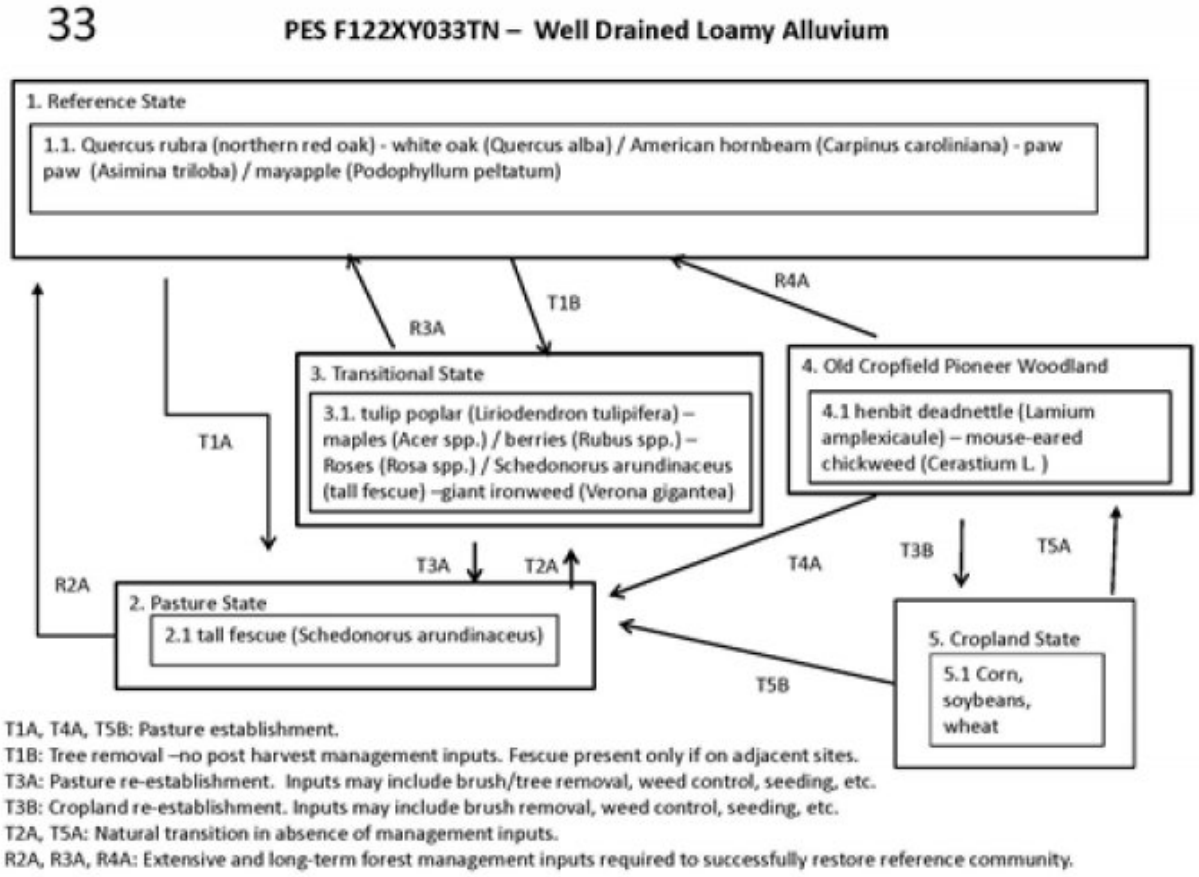

Figure 5. Well Drained Loamy Floodplains

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):**

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:**