Ecological site F122XY021TN
Cobbly Valley Alluvium

Accessed: 05/19/2024

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

This provisional ecological site (PES) is a conceptual grouping of soil map units within a major land resource area (MLRA) based on similar soil characteristics. This PES has not been field verified and is a hypothetical description

based on available existing information. Data sources include USFS reports, LANDFIRE, NatureServe Explorer, county soil surveys, and NRCS databases. ESD development is needed prior to conservation planning uses.

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

State 1. Reference community
Phase 1.1: Plant species dominants:

White oak (*Quercus alba*) - hickories (Carya spp.) / paw paw (*Asimina triloba*) - American hornbeam (*Carpinus caroliniana*) /bladdernut (*Staphylea trifolia*) - grape (Vitis spp.)

According to the official soil series description (OSD) for Sequatchie, most of these soils are now cleared and used for growing hay, pasture, corn, tobacco, small grains, and vegetables. Therefore, few intact old-growth, reference communities likely exist. Undisturbed, mature forest would be a mixed oak or oak-hickory forest with interspersed hardwoods such as maples, tulip poplar, pines, and cedar. In areas with more topography, the north and east slopes may show an increase in mesic, shade-tolerant, hardwood species. Understory communities would contain a diverse array of herbs and forbs.

Additional ecological information is under the community phase data section.

Table 1. Dominant plant species

Tree	(1) *Quercus alba* (2) *Carya*
Shrub	(1) *Asimina triloba* (2) *Carpinus caroliniana*
Herbaceous	(1) *Staphylea trifolia* (2) *Vitis*

Physiographic features

These sites are found on low terraces, foot slopes, and benches in MLRA 122.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Terrace
Flooding duration	Very brief (4 to 48 hours)
Flooding frequency	None to occasional
Ponding frequency	None
Elevation	183–457 m
Slope	0–12%
Water table depth	152 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

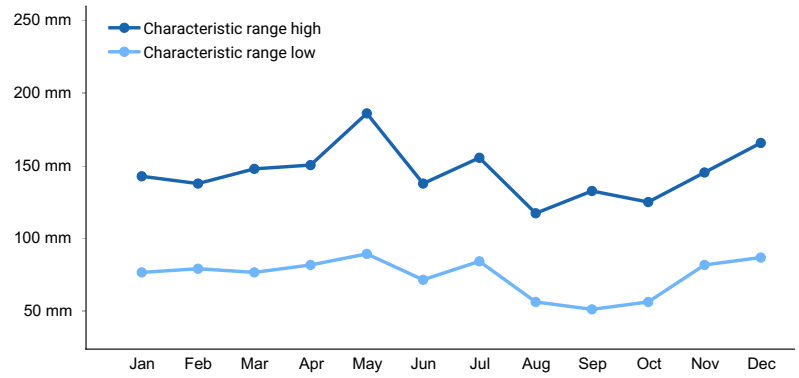

Figure 1. Monthly precipitation range

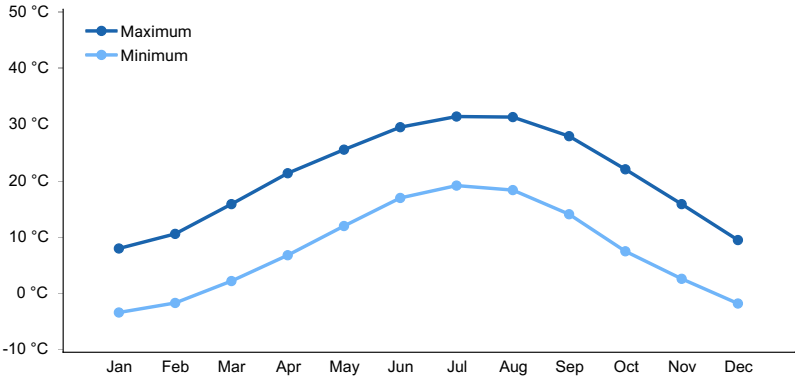

Figure 2. Monthly average minimum and maximum temperature

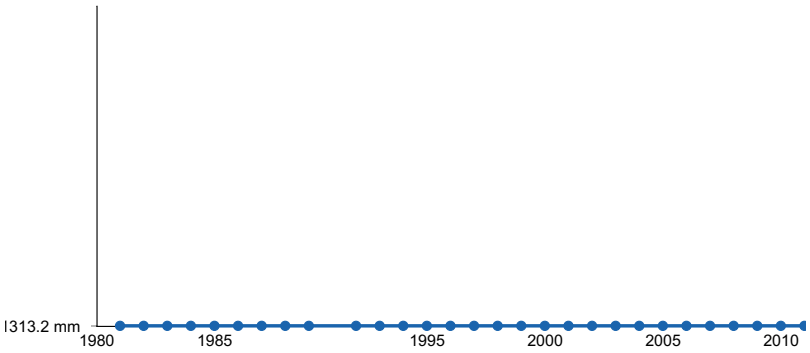

Figure 3. Annual precipitation pattern

Climate stations used

- (1) GREENSBURG [USC00153430], Greensburg, KY
- (2) SCOTTSVILLE [USC00157215], Scottsville, KY
- (3) WAYNESBORO [USC00409502], Waynesboro, TN

- (4) CLARKSVILLE WWTP [USC00401790], Clarksville, TN
- (5) COOKEVILLE [USC00402009], Cookeville, TN

Influencing water features

Some mapunits in this group may have brief, occasional flooding. Most mapunits have no influencing water features. Multiple ESDs may be developed from this initial group.

Soil features

There is currently one soil series in this PES: Sequatchie.

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)	17.27–17.53 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
Subsurface fragment volume <=3" (Depth not specified)	0–4%
Subsurface fragment volume >3" (Depth not specified)	0–1%

Ecological dynamics

21- Cobbly Valley Alluvium (Terraces)
MLRA 122 Thermic
Mapunits included in this initial PES grouping include: Sequatchie

Individual sites deserve a detailed understanding before conservation or 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 ESD 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 county soil surveys listed trees on site as southern red oak, white oak, black oak, yellow poplar, black walnut white ash, and pines.

NASIS data for these mapunit listed white oak, southern red oak, tulip poplar, loblolly pine.

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 44: Terraces and Floodplains with Good Drainage
Dominant soils include Sequatchie on floodplains.
Dominant trees species: White oak, southern red oak, sweetgum, yellow-poplar, blackgum, elms, red maple, and hickories; occasional willow oak, water oak, river birch, American sycamore, American beech, silver maple, black willow, hackberry, sugarberry, boxelder, black oak, Shumard oak, cherrybark oak, cottonwood, northern red oak, black cherry, white ash, black walnut, white basswood, loblolly pine, honey locust, persimmon, and sassafras.
Common in understory: dogwoods, cane, hawthorns, sumacs, American hornbeam, eastern hophornbeam, American holly, vacciniums, grape, pawpaw, euonymuses, bladdernut, willows, and red mulberry.

Landtype 21: Footslopes, Terraces and Stream bottoms with Good Drainage in Coves.
Dominant soils include Sequatchie on footslopes and terraces.
Dominant tree species: white oak, northern red oak, yellow-poplar, blackgum, hickories, sweetgum, red maple, and American sycamore;
Occasional tree species: southern red oak, cottonwood, elms, American beech, hackberry, black oak, eastern redcedar, black walnut, black cherry, white ash, sugar maple, loblolly pine, shortleaf pine, boxelder, and Virginia pine.
Common in understory: Flowering dogwood, cane, persimmon, American hornbeam, eastern redbud, vacciniums, sassafras, sourwood, pawpaw, euonymus, hawthorns, and hydrangeas.

Landtype 8: Footslopes, Terraces, and Stream bottoms with Good Drainage.
Dominant soils include Sequatchie on footslopes and terraces.
Dominant trees: white oak, northern red oak, yellow-poplar, blackgum, hickories, sweetgum, red maple, and American sycamore.
Occasional species: 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.
Common understory species: Dogwoods, cane, persimmon, American hornbeam, spicebush, eastern redbud, vacciniums, sassafras, boxelder, pawpaw, euonymuses, hawthorns, and hydrangea.

Ecological Dynamics:
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State 1. Reference community
Phase 1.1: Plant species dominants:

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According to the official soil series description (OSD) for Sequatchie, most of these soils are now cleared and used for growing hay, pasture, corn, tobacco, small grains, and vegetables. Therefore, few intact old-growth, reference communities likely exist. Undisturbed, mature forest would be a mixed oak or oak-hickory forest with interspersed hardwoods such as maples, tulip poplar, pines, and cedar. In areas with more topography, the north and east slopes may show an increase in mesic, shade-tolerant, hardwood species. Understory communities would contain a diverse array of herbs and forbs.

The shrub layer would be sparse in older, reference type communities but may be quite dense in successional

stages. Understory trees, shrubs, and vines on these sites would include flowering dogwood, sassafras, American hornbeam, spicebush, paw paw, hawthorns, euonymuses, hydrangea, Virginia creeper, grape, and poison ivy. Blue Ridge blueberry (*Vaccinium pallidum*) may be prominent along with deerberry (*Vaccinium stamineum*) and *Viburnum acerifolium*.

Understory plant dominance may vary greatly based on aspect and micro-topography. Species are likely to include sedges (Carex spp.), Christmas fern (*Polystichum acrostichoides*), slender toothwort (*Cardamine angustata*), wild comfrey (*Cynoglossum virginianum* var. virginianum), Sanicula spp. and ebony spleenwort (*Asplenium platyneuron*).

State: 2. Pasture
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)
Phases 3.1: Plant species dominants: 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, available seed sources, post-disturbance management inputs, and presence or absence of continued site disturbances such as grazing. A wide range of hardwood species may be found on transitional sites along with an array of annual and perennial grasses, forbs and herbs.

Restoring this state to a reference condition would 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 weed species taking over the site. Dozens of weed species are possible depending on seed sources. Initially, annual weeds would predominate followed by annual and perennial grasses, shrubs and finally, pioneers tree species such as maple, ash, locust, tulip poplar, elm, cedar, pines, etc.

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
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 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

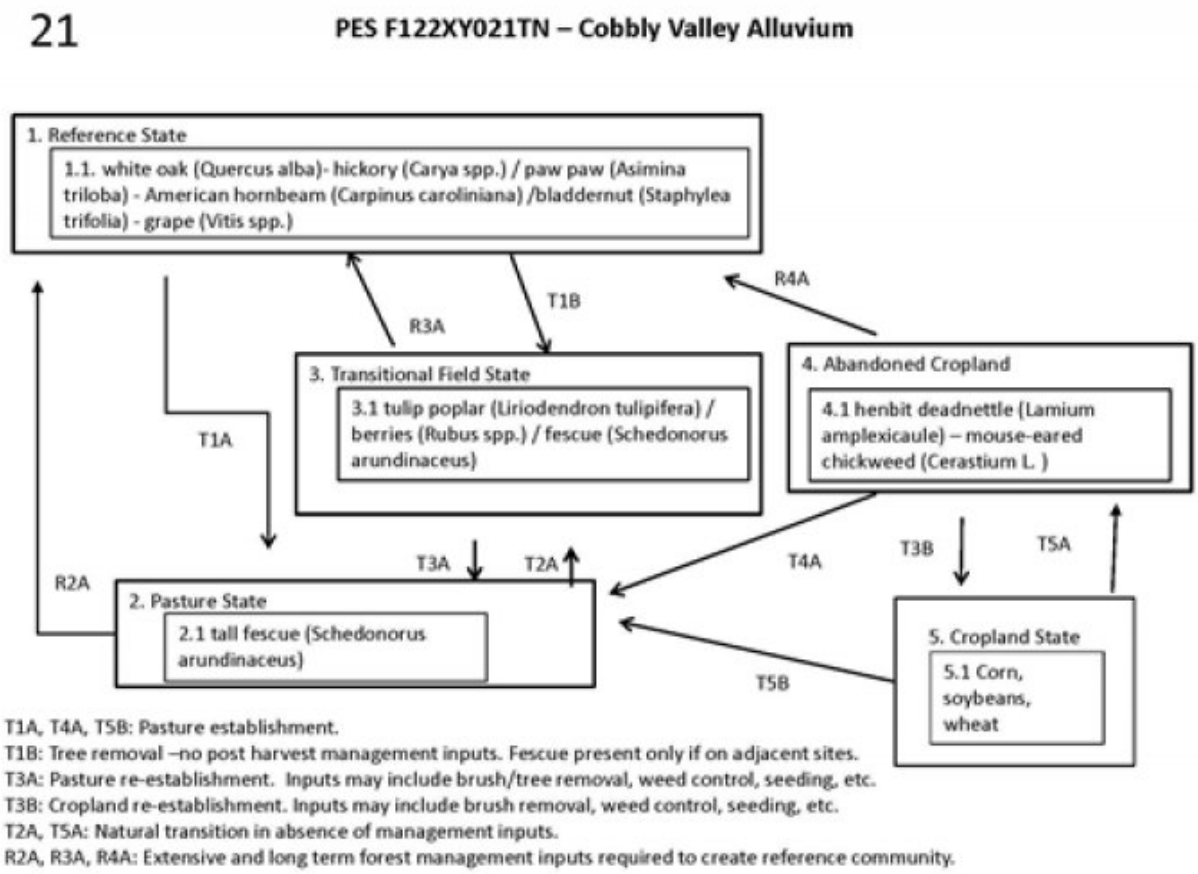

Figure 5. 21-cobblyvalley

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):

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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:**
