USDA Natural Resources Conservation Service

Ecological site F125XY005WV
Low Stream Terrace Alluvium

Last updated: 9/27/2024
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): 125X–Cumberland Plateau and Mountains

This area is in Kentucky (43 percent), Tennessee (25 percent), West Virginia (20 percent), Virginia (9 percent), and Alabama (3 percent). It makes up about 20,330 square miles (52,685 square kilometers). The towns of Logan, Madison, Welch, and Williamson, West Virginia, and Norton and Wise, Virginia, are in the northeastern part of this area. The towns of Middlesboro, Williamsburg, Corbin, London, Hazard, and Pikeville, Kentucky, and La Follette and Crossville, Tennessee, are in the area. Chattanooga, Tennessee, and Huntsville, Alabama, are just outside the southeast and southwest corners, respectively.
Interstates 24, 64/77, 75, and 40/75 cross this area. The Cumberland Gap National Historic Park is in the part of this area along the Virginia and Kentucky border. The Daniel Boone and Jefferson National Forests occur in this area. Numerous State forests and parks are throughout the area (USDA-NRCS, 2006).

Classification relationships

Soils within this Provisional Ecological Site (PES) are associated with several Landtypes developed by the USDA-Forest Service for the Cumberland Mountains and the Northern Cumberland Plateau, including:
1. Mountain footslopes, fans, terraces, and streambottoms with good drainage
2. Mountain terraces and streambottoms with poor drainage
3. Footslopes, terraces, and flood plains with good drainage
4. Terraces and flood plains with poor drainage
(Smalley 1984 and 1988, respectively).

Ecological site concept

This site occurs on fans and low stream terraces as alluvium sourced from sandstone, siltstone and shale. This PES is largely used for crops, principally corn, burley tobacco, small grains, fruit, sorghum, and hay or pasture.

Reference conditions in this description are inferred due to the highly settled/disturbed nature of this PES. Examples of the reference state have not been discovered in literature searches and existing data resources. Further fieldwork will be required going forward to determine true reference conditions, if they exist on the landscape. From the information available, a naturalized forest is considered to be the reference state in lieu of data supporting true reference conditions. Where this exists, moisture tolerant mixed hardwoods dominate, with eastern hemlock and some pines occurring in small areas. Oaks are common in the overstory.

Associated sites

F125XY001WV	**Sandstone Residuum**
F125XY002WV	**Interbedded Sedimentary Colluvium**

F125XY003WV	**Interbedded Sedimentary Uplands**
F125XY004WV	**Floodplain Alluvium**

Similar sites

F125XY004WV	**Floodplain Alluvium**

Table 1. Dominant plant species

Tree	(1) *Quercus* (2) *Liriodendron tulipifera*
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This block diagram represents the typical pattern of soils, parent material, and topography in the Udorthents-Nelse-Allegheny and Shelocta-Hazleton-Blairton general soil map units. The Udorthents-Nelse-Allegheny general soil map unit is along the Tug and Lavista Forks of the Big Sandy River and their major tributaries, and the Shelocta-Hazleton-Blairton general soil map unit is on the mountains (Soil Survey of Lawrence and Martin Counties, Kentucky; 2005). This is very representative of this PES where Allegheny and Cotaco soils occur.

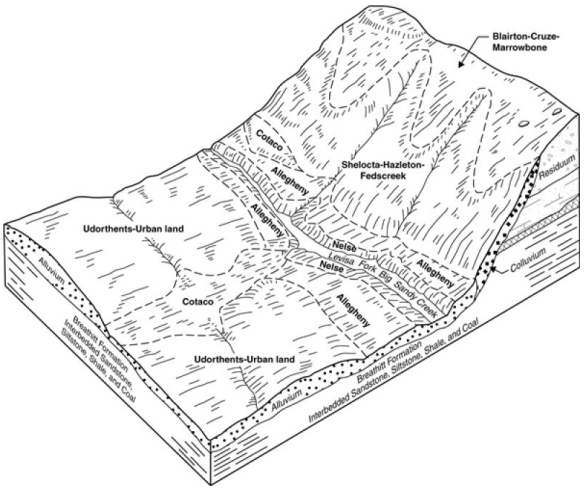

Figure 1. Typical pattern of soils, parent material, and top

Table 2. Representative physiographic features

Landforms	(1) Stream terrace (2) Fan

Climatic features

The average annual precipitation is mostly 37 to 45 inches
(940 to 1,145 millimeters) in the northern third of this area and 45 to 60 inches (1,145 to 1,525 millimeters) in the southern two-thirds. It is almost 60 inches (1,525 millimeters) at the higher elevations in the northern third of the area and is as much as 75 inches (1,905 millimeters) in the mountains in the southern two-thirds. Almost half of the annual precipitation falls during the growing season. Rainfall typically occurs during high-intensity, convective thunderstorms in summer. Snow may occur during winter in the northern part of the area
and at the higher elevations. The average annual temperature is 50 to 60 degrees F (10 to 15 degrees C). The freeze-free period averages 200 days and ranges from 170 to 225 days. The shorter freeze-free periods are at the higher elevations and in the more northerly parts of the area (USDA-NRCS, 2006).

Table 3. Representative climatic features

Frost-free period (average)	162 days
Freeze-free period (average)	189 days
Precipitation total (average)	51 in

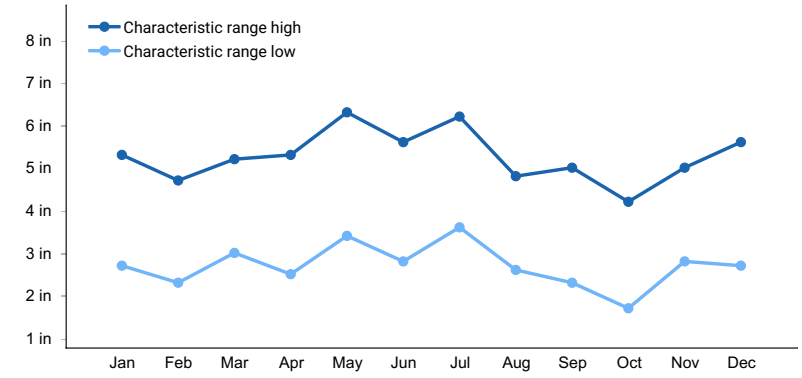

Figure 2. Monthly precipitation range

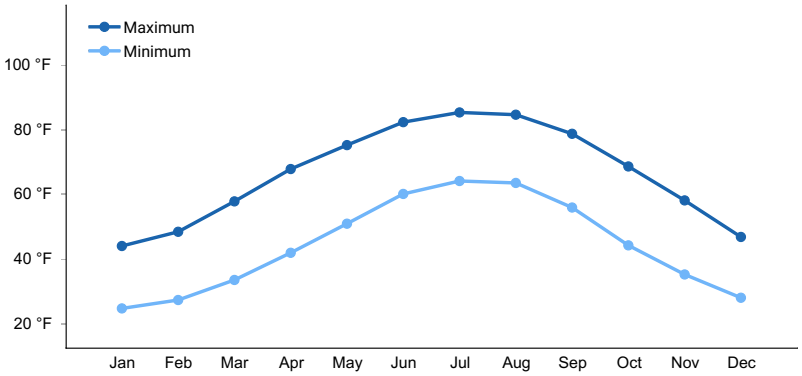

Figure 3. Monthly average minimum and maximum temperature

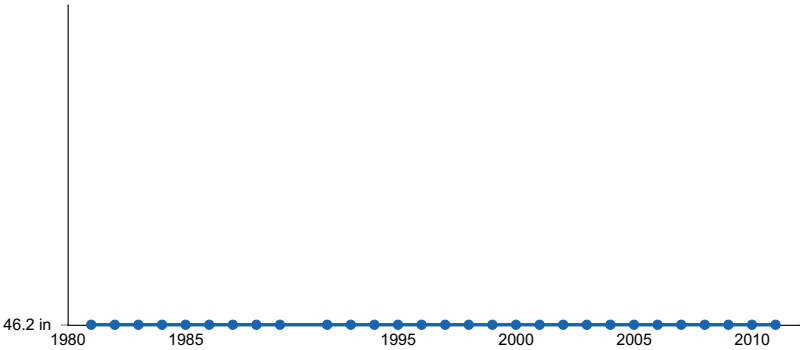

Figure 4. Annual precipitation pattern

Climate stations used

- (1) SODDY DAISY-MOWBRAY [USC00408445], Soddy Daisy, TN
- (2) BARBOURVILLE [USC00150381], Corbin, KY
- (3) GRUNDY [USC00443640], Grundy, VA
- (4) LONDON LOCKS [USC00465365], Cedar Grove, WV

Influencing water features

Soils in this PES can have a high water table and are subject to flash flooding in places, following short, high intensity and/or long, sustained rain storms.

Soil features

Soil series in this PES include Allegheny, Beason, Bonair, Bonnie, Captina, Combs, Cotaco, Cottonbend, Elk, Ezel, Grigsby, Kanawha, Knowlton, Monongahela, Morehead, Nicelytown, Riney, Rowdy, Shelbiana, Tilsit, Welchland, and Whitley. They typically formed from alluvium from sandstone, siltstone and shale and occur on fans and stream terraces.

Table 4. Representative soil features

Parent material	(1) Alluvium–sandstone and siltstone

Ecological dynamics

Information contained in this section was adapted from several sources. The information presented is representative of very complex vegetation communities. Key indicator plants, animals and ecological processes are described to help inform land management decisions. Plant communities will differ across the MLRA because of the naturally occurring variability in weather, soils, and aspect. The reference plant community is an approximation for this site, as very little is known about pre-European conditions and field studies have not been conducted. The species lists are representative and are not botanical descriptions of all species occurring, or potentially occurring, on this site. They are not intended to cover every situation or the full range of conditions, species, and responses for the site.

Native vegetation is primarily forests of oaks, hickory, elm, beech, sourwood, black gum, yellow poplar, cucumber tree, buckeye, dogwood and ironwood, and in places hemlock and pine. In lower landscape positions forested areas are in bottomland hardwoods such as sycamore, post oak, yellow-poplar, sweetgum, river birch, alder, and sedges in the understory.

Most areas have been cleared and are used for pasture or for crop or hay production. Crops include principally corn, tobacco, small grains, truck, fruit, and sorghum. Some areas have been developed for residential or urban uses. Other small areas have been planted to pine, or remain in their native vegetation.

If agricultural land is abandoned, often Virginia pine will colonize in thick stands as part of the natural succession of the site.

There is some question about the pre-European settlement condition of this site, as it may have been widely cultivated by Native Americans prior to European civilization.

State and transition model

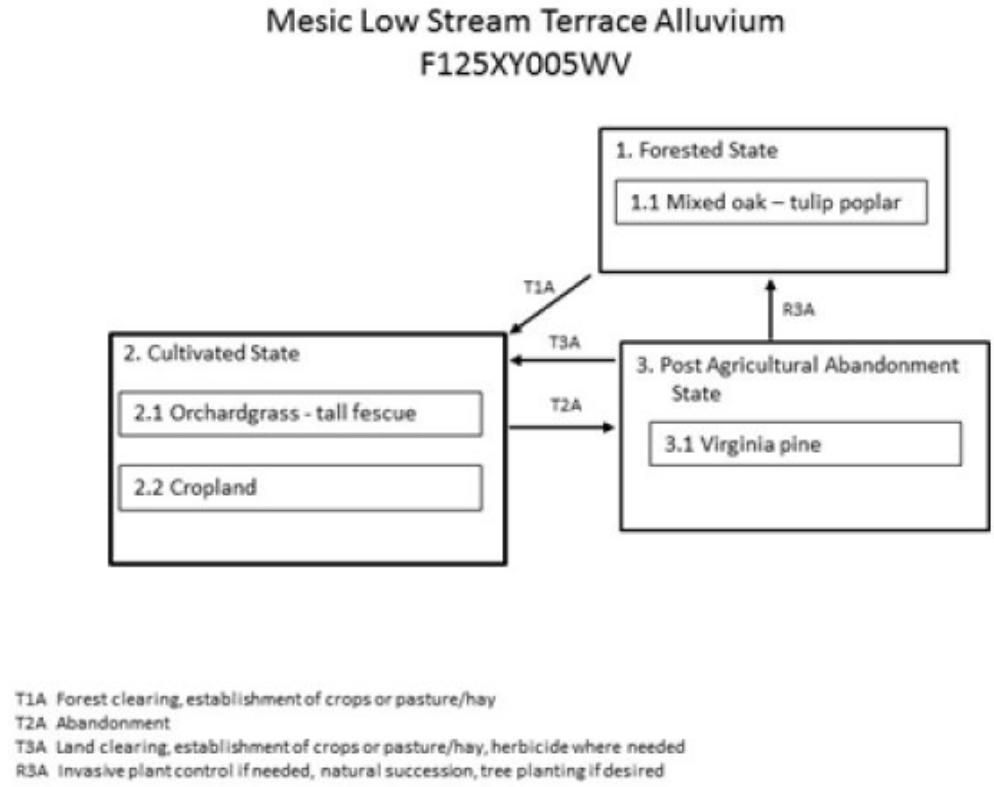

Figure 6. State and Transition Model

State 1
Forested State

This description is largely based on what might be considered a naturalized state after at least one disturbance due to lack of information on pre-European "reference" conditions. In fact, it is highly likely that a great extent of this site would have been under cultivation by Native Americans and so would have been under human influence long prior to European influence.

Community 1.1
Mixed oak-tulip poplar

The naturalized community on this site may loosely correlate with the NatureServe description for Interior Mid-to-Late-Successional Tuliptree-Hardwood Upland Forest (Acid Type) (CEGL7221). That is described as follows: "… this community is found in areas of very acidic soils that were once clearcuts or old fields and occasionally along heavily disturbed mesic stream terraces...this community is always dominated by tuliptree but can have high cover of bigleaf magnolia (*Magnolia macrophylla*), black birch, and northern red oak in some examples. Understory and herbaceous species tolerant of acidic conditions can be common or at least consistently present. These include mountain laurel, common greenbrier (*Smilax rotundifolia*), Christmas fern, blackgum, sassafras, Indian cucumber-root (*Medeola virginiana*), chestnut oak (Quercus prinus), pink lady's slipper (*Cypripedium acaule*), downy rattlesnake-plantain (*Goodyera pubescens*), and partridge-berry (*Mitchella repens*)," (NatureServe 2006). In places, the naturalized community (or perhaps even the reference community) might loosely correlate with the NatureServe description for Southern Appalachian Eastern Hemlock Forest (Typic Type) (CEGL007136), which is described as follows: "...this community exists in lower protected slopes and some terraces in and near streams at moderate to high elevations (one example was found at 3000 feet)...the canopy of this community contains at least 50% cover of hemlock (*Tsuga canadensis*) along with many other co-dominants (red maple, chestnut oak, Fraser magnolia,

blackgum, black oak). Understory species include Fraser magnolia, red maple, and umbrella magnolia (*Magnolia tripetala*), all at fairly low cover. The shrub layer is heavily dominated by great rhododendron but also with a component of mountain pepper-bush (*Clethra acuminata*). Where the shrub does not exist, some acid-loving herbs such as Indian cucumber root and spotted wintergreen are sometimes found at very low cover," (NatureServe 2006). Smalley (1984, 1988) describes a similar species composition for terrace communities. The type and extent of forest vegetation would vary depending on the location within this PES.

State 2
Cultivated State

Community 2.1
Orchardgrass - tall fescue

These areas are used for hay and pasture. Beef cattle farms are common.

Community 2.2
Cropland

Commonly grown crops include corn, sorghum, soybeans, vegetables and, in some areas, nursery crops. Much of this phase has been drained in the past.

State 3
Post Agricultural Abandonment State

The type and extent of effort needed to push this state back to the reference condition varies widely and is dependent on local factors. It could be as simple as allowing natural succession to happen or could require intensive intervention from removing drainage structures to controlling invasive plant species.

Community 3.1
Virginia pine

Vegetation responses after agricultural abandonment vary widely on this site and are dependent on a number of localized factors. Whether or not the site has been drained, surrounding land use, type and intensity of past disturbance and proximity to invasive exotic species could all be important drivers. However, Virginia pine has likely formed dense stands on much of this site on abandoned agricultural land. It can be considered natural selection. Disturbances that might impact this community would include wind throw, ice storms and the southern pine beetle.

Transition A
State 1 to 2

Forest clearing, establishment of crops or pasture/hay

Transition A
State 2 to 3

Abandonment

Restoration pathway A
State 3 to 1

Invasive plant control if needed, natural succession, tree planting if desired

Transition A
State 3 to 2

Land clearing, establishment of crops or pasture/hay, herbicide where needed

Additional community tables

Other references

National Park Service. Geology and History of the Cumberland Plateau [web application]. Available https://www.nps.gov/biso/planyourvisit/upload/webgeo.pdf (Accessed: April 11, 2017).

NatureServe. 2006. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA. U.S.A. Data current as of 2 February 2006.

NatureServe. 2006. International Ecological Classification Standard: Terrestrial Ecological Classifications. Cumberland Gap National Historical Park. NatureServe Central Databases. Arlington, VA. Data current as of 2 February 2006.

Smalley, Glendon W. 1982. Classification and evaluation of forest sites on the Mid-Cumberland Plateau. USDA-USFS., Gen. Tech. Rep. SO-38. Southern Forestry Experiment Station., New Orleans, LA. 58 p.

Smalley, Glendon W. 1984. Classification and evaluation of forest sites in the Cumberland Mountains. USDA-USFS., Gen. Tech. Rep. SO-50. Southern Forestry Experiment Station., New Orleans, LA. 85 p.

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.

Contributors

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Approval

Greg Schmidt, 9/27/2024

Acknowledgments

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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	05/12/2025
Approved by	Greg Schmidt
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

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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):**

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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:**
