Ecological site F125XY003WV
Interbedded Sedimentary Uplands

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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.

Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

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

This MLRA falls into the following Forest Service Sections: Northern Cumberland Mountains, Northern Cumberland Plateau. It falls into the following EPA Level III Ecoregions: Central Appalachians, Southwestern Appalachians, Central Appalachians (USDA-NRCS, 2006).

Ecological site concept

These are mixed upland oak sites where pines, hickories and eastern hemlock are also important. Dogwood, blackgum and red maple are commonly noted in the tree regeneration. Amphicarpaea bracteata, asters, panicums and violets are most commonly noted understory species.

There may be potential habitat in this PES for the golden-winged warbler, listed as a high conservation concern and prioritized by NRCS, among other agencies and organizations.

Associated sites

F125XY001WV	**Sandstone Residuum**
F125XY002WV	**Interbedded Sedimentary Colluvium**
F125XY004WV	**Floodplain Alluvium**
F125XY005WV	**Low Stream Terrace Alluvium**

Similar sites

| F125XY001WV | **Sandstone Residuum** |

Table 1. Dominant plant species

Tree	(1) *Quercus alba* (2) *Quercus prinus*
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Mountain (3) Plateau
Elevation	551–3,444 ft
Slope	2–80%
Water table depth	18–43 in

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

Climate stations used

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

Influencing water features

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

Soil features

These are deep and very deep, well drained, moderately permeable soils. They formed in a silty mantle 1 to 3 feet thick and the underlying residuum of weathered shale and sandstone. These soils are on broad undulating and rolling plateaus of the Cumberland Mountains. Soil series included in this PES are as follows: Alticrest, Berks, Blairton, Bledsoe, Bouldin, Calvin, Caneyville, Clarkrange, Clifftop, Cruze, Cynthiana, Dekalb, Dormont, Faywood, Fedscreek, Gilpin, Guyandotte, Hendon, Highsplint, Kimper, Latham, Lehew, Lily, Lonewood, Marrowbone, Matewan, Monteagle, Muskingum, Nallen, Petros, Pineville, Ramsey, Rarden, Rayne, Renox, Rough, Sequoia, Sharondale, Shelocta, Standingstone, Tilsit, Upshur, Weikert, Wellston, Wernock, Westbend, and Wharton.

Table 4. Representative soil features

Parent material	(1) Colluvium–acid shale (2) Residuum–sandstone and shale
Surface texture	(1) Channery clay (2) Cobbly clay loam (3) Extremely channery fine sandy loam
Family particle size	(1) Loamy
Drainage class	Somewhat poorly drained to excessively drained
Permeability class	Rapid
Soil depth	10–86 in
Surface fragment cover <=3"	0–10%
Surface fragment cover >3"	0–10%
Available water capacity (0-40in)	0.8–7.6 in
Soil reaction (1:1 water) (0-40in)	4.5–5.9
Subsurface fragment volume <=3" (Depth not specified)	0–47%
Subsurface fragment volume >3" (Depth not specified)	0–75%

Ecological dynamics

This PES is can include the NatureServe Association "Allegheny-Cumberland Dry Oak Forest and Woodland" classification. Pasture and Hay may be more important on this site than on others. Row crops can be important but mostly consist of small individual acreages and so are not being covered in the State and Transition Model. Some areas have been converted to pine plantations and that is an important land use. The most common species planted is loblolly pine, although this PES occurs north of it's native range. In the northern extent of this PES (largely in Kentucky) white pine plantations have been historically common. Interest in shortleaf pine restoration has become a

conservation concern recently and this site would be conducive to that land-use. Evergreen pine plantations or managed pine can include dense successional regrowth. In places, the southern pine beetle may have extensive effects on the pine forests of this site. Clear-cuts are a part of the dynamics of this site, especially in pine plantations. Fire can be an important natural disturbance and will influence vegetation composition.

DeSelm classified the overstory as scarlett oak-white oak, mixed oak-white oak, white oak-mixed oak and white oak-pine. He noted that the ground cover was tree regeneration, smilax, vaccinium and ericads were present.

This PES can be loosely correlated with Smalley's (1982) landtype classification 1: Broad, Undulating Sandstone Uplands, which covers Linker and Lonewood soil series. Vegetation: white oak, scarlet oak, SRO, CO, Hic, BO, blackgum, red maple, SLP, VP, and LP. Shrub and small trees include dogwood, sassafras, sourwood, serviceberry, persimmon, sumac, hawthorns, viburnums, vacciniums, azaleas, American holly, and smilax (understory). Landtype 2 (Broad Sandstone Ridges - north) and Landtype 3 (Broad SSR - south) might also have some overlap with this PES. However, the species composition does not change.
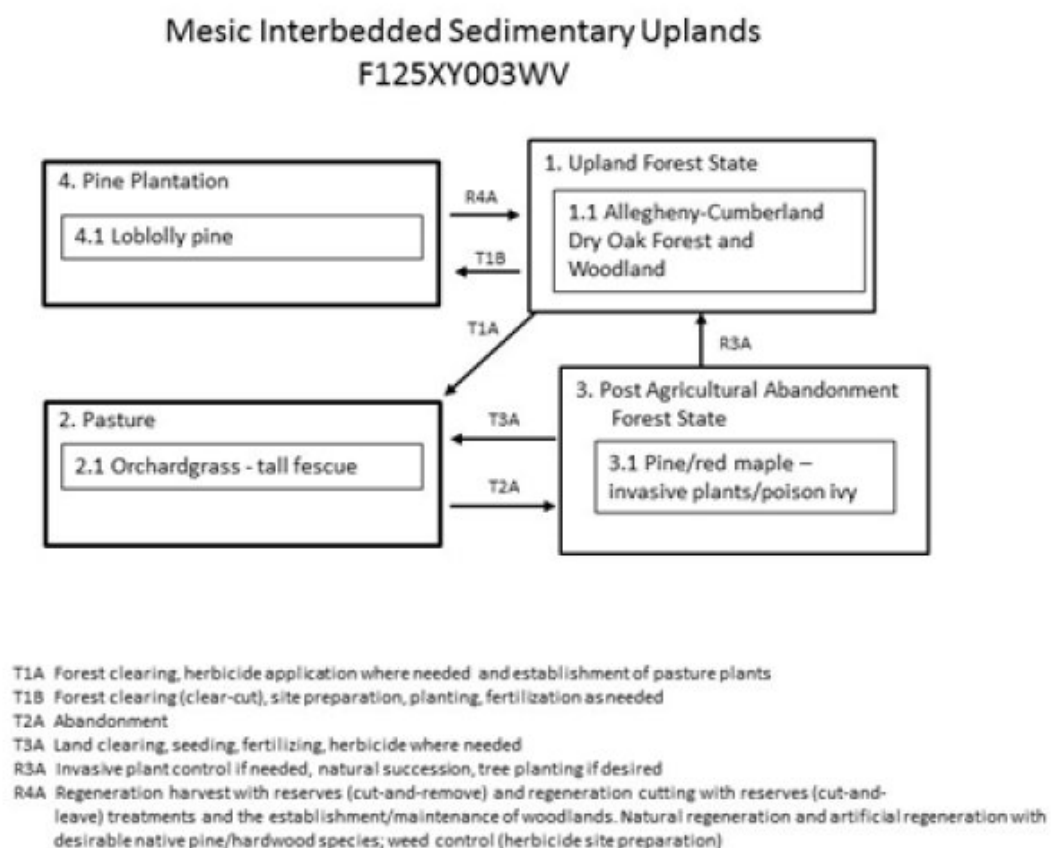
State and transition model

Mesic Interbedded Sedimentary Uplands
F125XY003WV

T1A Forest clearing, herbicide application where needed and establishment of pasture plants
T1B Forest clearing (clear-cut), site preparation, planting, fertilization as needed
T2A Abandonment
T3A Land clearing, seeding, fertilizing, herbicide where needed
R3A Invasive plant control if needed, natural succession, tree planting if desired
R4A Regeneration harvest with reserves (cut-and-remove) and regeneration cutting with reserves (cut-and-leave) treatments and the establishment/maintenance of woodlands. Natural regeneration and artificial regeneration with desirable native pine/hardwood species; weed control (herbicide site preparation)

Figure 6. State and Transition Model

State 1
Upland Forest State

According to NatureServe classification, this PES loosely corresponds to the following description: This system encompasses dry hardwood forests on predominately acidic substrates in the Allegheny and Cumberland plateaus, and ridges in the southern Ridge and Valley. Its range is more or less consistent with the "Mixed Mesophytic Forest Region" of Braun (1950) and Greller (1988), although it is not a mesic forest type. These forests are typically dominated by *Quercus alba*, *Quercus falcata*, Quercus prinus, *Quercus coccinea*, with lesser amounts of *Acer*

rubrum, *Carya glabra*, and Carya alba. Small inclusions of *Pinus echinata* and/or *Pinus virginiana* may occur, particularly adjacent to escarpments or following fire. In addition, *Pinus strobus* may be prominent in some stands in the absence of fire. It occurs in a variety of situations, including on nutrient-poor or acidic soils. Sprouts of *Castanea dentata* can often be found where it was formerly a common tree.

Community 1.1
Allegheny-Cumberland Dry Oak Forest and Woodland

State 2
Pasture

Managed pasture for a variety of livestock is a typical land-use on this site. Species composition and productivity are largely dependent on local conditions and management strategies.

Community 2.1
Orchardgrass - tall fescue

Under ideal circumstances these grass species will dominate. Without proper management such as rotational grazing, fertilizing and weed control, less desirable grass species and weeds will invade.

State 3
Post Agricultural Abandonment Forest State

This state results when land has been put in crops or pasture and abandoned. Pine and weedy species usually colonize. Depending on the rate and intensity of invasion, it may naturally return to an upland forest or it might need management.

Community 3.1
Pine species/invasive plants/poison ivy

Depending on the severity of past land use and the availability of seed sources locally, this site will most likely require some management to return to the reference state, including invasive plant control. If desirable to re-establish pasture, herbicide use and re-seeding will be required. Common early successional species tend to include the maples, pine, blackberry, raspberry, multiflora rose, poison ivy and Japanese honeysuckle but that can vary widely based on local.

State 4
Pine Plantation

These plantations are chiefly loblolly pine, which has been planted north of it's native range. Many of these stands have experienced significant damage from the southern pine beetle. They are in various age classes and would have to be approached on an individual basis but to restore to a condition resembling the reference state, a suite of forestry practices would need to be employed, potentially including regeneration harvest with reserves (cut-and-remove) and regeneration cutting with reserves (cut-and-leave) treatments and the establishment/maintenance of native woodlands. A professional forester would need to make management recommendations at the stand level.

Community 4.1
Loblolly pine

Transition A
State 1 to 2

Forest clearing, herbicide application where needed and establishment of pasture plants

Transition B
State 1 to 4

Forest clearing (clear-cut), site preparation, planting, fertilization as needed

Transition A
State 2 to 3

Abandonment

Restoration pathway 3
State 3 to 1

Natural succession, management (invasive plant control, tree planting in some cases)

Transition 3
State 3 to 2

Weed control, seeding, fertilization

Restoration pathway A
State 4 to 1

Regeneration harvest with reserves (cut-and-remove) and regeneration cutting with reserves (cut-and-leave) treatments and the establishment/maintenance of woodlands. Natural regeneration and artificial regeneration with desirable native pine/hardwood species; weed control (herbicide site preparation)

Additional community tables

Other references

http://www.tnbirds.org/MigrantOnline/V074/V074p061-082.pdf

http://www.tnwatchablewildlife.org/details.cfm?
displayhabitat=grassland&sort=aounumber&typename=GRASSLAND%20AND%20SHRUB&uid=09041619331163
947&commonname=Golden-winged%20Warbler

https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcseprd1303489.pdf

Hal DeSelm papers: http://treeimprovement.utk.edu/DeSelmData/DataDSC.htm

Smalley, Glendon W. 1982. United States Department of Agriculture, General Technical Report SO-38.

USNVC [United States National Vegetation Classification]. 2016. United States National Vegetation Classification Database, V2.0. Federal Geographic Data Committee, Vegetation Subcommittee, Washington DC. [usnvc.org] (accessed [18] [November] [2016])

Contributors

Belinda E. Ferro

Approval

Greg Schmidt, 9/27/2024

Acknowledgments

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:**

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:**