USDA Natural Resources Conservation Service

Ecological site F130BY006WV
Mesic Colluvium Warm Aspect

Last updated: 9/07/2018
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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): 130B–Southern Blue Ridge

This MLRA is in North Carolina (51 percent), Tennessee (18 percent), Georgia (17 percent), Virginia (10 percent), and South Carolina (4 percent). It makes up about 16,080 square miles (41,665 square kilometers). It is locally known as the Southern Appalachians. It includes Lenoir, Morganton, Marion, Hendersonville, Waynesville, and Asheville, North Carolina; Gatlinburg, Tennessee; Damascus and Galax, Virginia; Walhalla, South Carolina; and Cleveland, Dahlonega, and Ellijay, Georgia. Interstate 40 crosses the parts of the area in Tennessee and North Carolina. Interstate 77 crosses the part in Virginia. Many national forests are in the area, including the Jefferson, Cherokee, Nantahala, Pisgah, and Chattahoochee National Forests. The Appalachian Trail begins on Springer Mountain in Georgia, near Amicalola State Park. The Great Smoky Mountains National Park is in this MLRA. The Mount Rogers National Recreation Area is in the part of the MLRA in Virginia. The Cherokee Indian Reservation is west of Waynesville, North Carolina.

Ecological site concept

About half of this Provisional Ecological Site (PES) is in native woodland of mixed hardwoods such as northern red oak, yellow- poplar, white oak, black oak, hickory, red maple, scarlet oak, chestnut oak, and pitch pine. Some areas have been planted to Eastern white pine. In places, the acreage has been cleared and is used for cultivated crops and pasture. Vegetation analysis using SE-GAP vegetation data indicate that pasture/hay is the most common land-use outside of native woodland. Crops can also be important and include corn, small grain, some apple and peach orchards, berries, and vegetable crops.

This PES occurs on benches, fans and toe slopes, largely in coves in the Blue Ridge mountains.

Associated sites

F130BY005WV	**Mesic Colluvium Cool Aspect**

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This MLRA is mainly in the Southern Section of the Blue Ridge Province of the Appalachian Highlands. The southern tip of the MLRA and two protruding areas to the east are in the Piedmont Uplands Section of the Piedmont Province of the Appalachian Highlands. This MLRA consists of several distinct topographic areas, including the Blue

Ridge Escarpment on the eastern edge of the area, the New River Plateau on the northern end, interior low and intermediate mountains throughout the MLRA, intermountain basins between the major mountains, and the high mountains making up the bulk of the MLRA. Elevation ranges from about 900 feet (275 meters) at the south and southwest boundaries of the area to more than 6,600 feet (2,010 meters) at the crest of the Great Smoky and Black Mountain ranges.

The extent of the major Hydrologic Unit Areas (identified by four-digit numbers) that make up this MLRA is as follows: Upper Tennessee (0601), 46 percent; Kanawha (0505), 13 percent; Middle Tennessee-Hiwassee (0602), 12 percent; Edisto-Santee (0305), 9 percent; Alabama (0315), 8 percent; Ogeechee-Savannah (0306), 6 percent; Pee Dee (0304), 4 percent; Chowan-Roanoke (0301), 1 percent; and Apalachicola (0313), 1 percent. From north to south, the major rivers in this area are the New River in Virginia; the Yadkin, Catawba, French Broad, Little Tennessee, and Hiwassee Rivers in North Carolina; the Saluda, Seneca, Chattooga, and Tugaloo Rivers in South Carolina; and the Toccoa and Coosawattee Rivers in Georgia. The Tugaloo River is a headwater stream of the Savannah River, and the French Broad, Little Tennessee, Hiwassee, and Ocoee Rivers also flow into Tennessee in this area. The Hiwassee River in Tennessee and the Conasauga River in Georgia have been designated National Wild and Scenic Rivers in this area. The Chattooga River (made famous in the motion picture “Deliverance”) in South Carolina is a National Scenic River.

Table 2. Representative physiographic features

Landforms	(1) Cove (2) Mountain slope (3) Fan
Flooding frequency	None to very rare
Elevation	699–4,126 ft
Slope	2–70%
Water table depth	54–60 in
Aspect	W, S, SW

Climatic features

The average annual precipitation in this area generally is 36 to 60 inches (915 to 1,525 millimeters), generally increasing with elevation. It is 60 to 90 inches (1,525 to 2,285 millimeters) in southwestern North Carolina and northeastern Georgia and can be as much as 119 inches (3,025 millimeters) on the higher peaks in the MLRA. Much of the precipitation occurs as snow at the higher elevations. The amount of precipitation is lowest in the fall. The average annual temperature ranges from 46 to 60 degrees F (8 to 16 degrees C), decreasing with elevation. The freeze-free period averages 185 days and ranges from 135 to 235 days. The freeze-free period is shorter at high elevations and on valley floors because of cold air drainage. Microclimate differences resulting from aspect significantly affect the type and vigor of the plant communities in the area. South- and west-facing slopes are warmer and drier than north- and east-facing slopes and those shaded by the higher mountains.

Table 3. Representative climatic features

Frost-free period (average)	150 days
Freeze-free period (average)	176 days
Precipitation total (average)	59 in

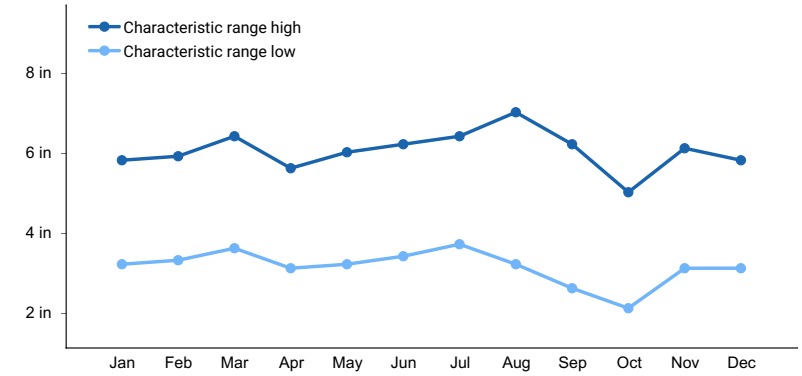


Figure 1. Monthly precipitation range

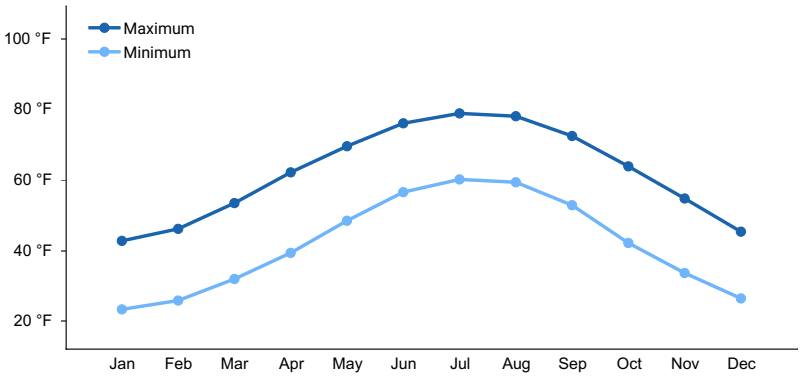


Figure 2. Monthly average minimum and maximum temperature

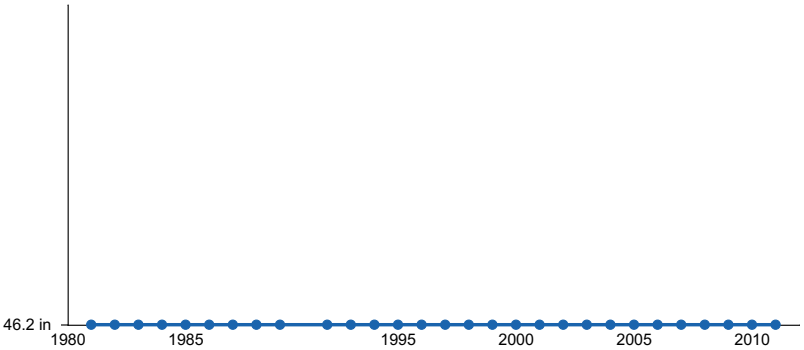


Figure 3. Annual precipitation pattern

Climate stations used

- (1) CANTON 1 SW [USC00311441], Canton, NC
- (2) GRANDFATHER MTN [USC00313565], Collettsville, NC
- (3) ANDREWS [USC00310184], Andrews, NC
- (4) JASPER 1 NNW [USC00094648], Jasper, GA
- (5) MT MITCHELL [USC00315923], Burnsville, NC
- (6) GALAX RADIO WBRF [USC00443267], Galax, VA

Influencing water features

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

Soil features

Soil series occurring in this PES include Tate, Greenlee, Lonon, Northcove, Thurmont, and Saunook. They are typically on benches, fans, and foot slopes in coves in the Southern Appalachian Mountains. They formed in colluvium and alluvium.

Table 4. Representative soil features

Parent material	(1) Alluvium–gneiss (2) Colluvium–granite
Surface texture	(1) Channery fine sandy loam (2) Cobbly loam (3) Extremely bouldery sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately slow to moderately rapid
Soil depth	80 in
Surface fragment cover <=3"	2–33%
Surface fragment cover >3"	0–33%
Available water capacity (0-40in)	2.7–7.1 in
Soil reaction (1:1 water) (0-40in)	4.8–5.8
Subsurface fragment volume <=3" (Depth not specified)	0–50%
Subsurface fragment volume >3" (Depth not specified)	0–45%

Ecological dynamics

The vegetation groupings described in this section are based on the terrestrial ecological system classification developed by NatureServe (Comer et al. 2003). Ecological systems represent recurring groups of biological communities that are found in similar physical environments and are influenced by similar dynamic ecological processes, such as fire or flooding. They are intended to provide a classification unit that is readily mappable, often from remote imagery, and readily identifiable by conservation and resource managers in the field.

Provisional Ecological Sites are intended to be very broad and should be considered first approximations based on existing available data. This PES covers multiple ecological systems. The ecological system defined by NatureServe that most likely approximates the reference community of this PES across the largest acreage based on spatial analysis is South-Central Interior Mesophytic Forest with Allegheny-Cumberland Dry Oak Forest and Woodland (Hardwood) occurring in drier, warmer positions. For the sake of simplicity, only South-Central Interior Mesophytic Forest is included in the State and Transition Model. However, to inform future projects a narrative description of dry oak forests is given below.

This (following) information is provided by NatureServe (www.natureserve.org) and its network of natural heritage member programs, a leading source of information about rare and endangered species, and threatened ecosystems.

South-Central Interior Mesophytic Forest : Summary - “These high-diversity, predominately deciduous forests occur on deep and enriched soils (in some cases due to, or enhanced by, the presence of limestone or related base-rich geology), in non-montane settings and usually in somewhat protected landscape positions such as coves or lower slopes. The core distribution of this system lies in the Cumberland and Allegheny plateaus, extending into the adjacent southern Ridge and Valley and portions of the Interior Low Plateau where it is located entirely south of the glacial boundary. Dominant species include *Acer saccharum*, *Fagus grandifolia*, *Liriodendron tulipifera*, *Tilia americana*, *Quercus rubra*, *Magnolia acuminata*, and *Juglans nigra*. The abundance of *Tsuga canadensis*, which may be a component of some stands, is being rapidly reduced by the hemlock woolly adelgid (Adelges tsugae). The canopy trees may grow very large in undisturbed areas. The herb layer is very rich, often with abundant spring ephemerals. Many examples may be bisected by small streams.” (Note: this is the best approximation based on the currently available spatial layer of SE-GAP vegetation characterization and probably is largely applicable. However, strictly speaking, this classification was developed primarily for the Cumberland and Allegheny plateaus and so

does not entirely apply to the mountains. Field investigations should be conducted to identify future project work that might help to refine and differentiate plant communities).

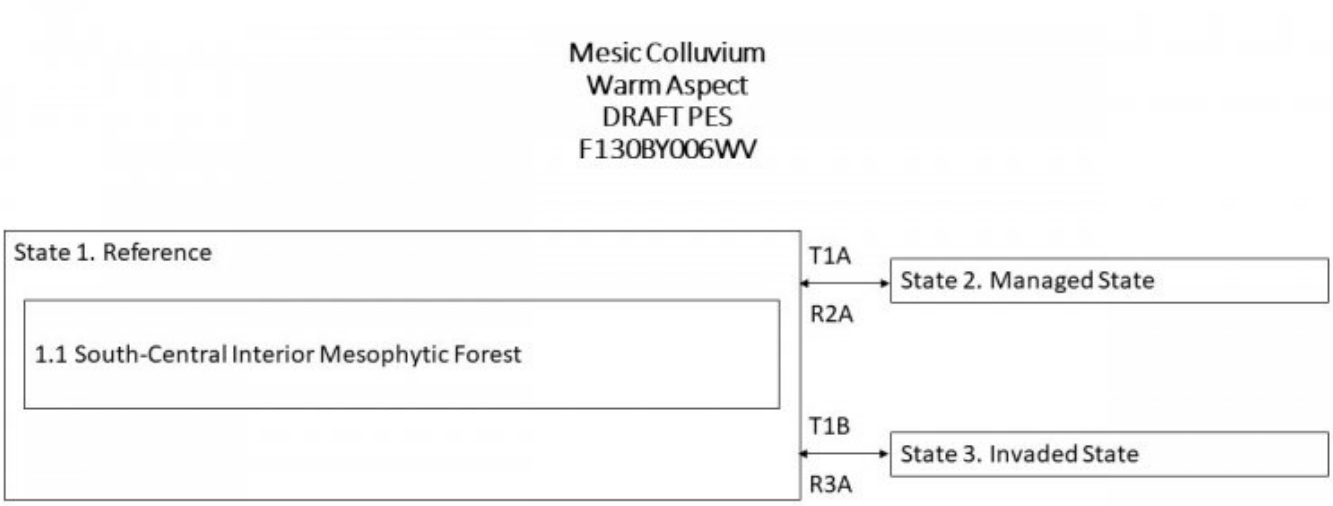
Description Author: M. Pyne and R. Evans Version: 20 Aug 2007

Allegheny-Cumberland Dry Oak Forest and Woodland: Summary – “This system encompasses dry hardwood forests on predominately acidic substrates in the Allegheny and Cumberland plateaus, as well as acidic sandstone 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, but also in less extreme sites. Sprouts of *Castanea dentata* can often be found where it was formerly a common tree.” (Note: this is the best approximation based on the currently available spatial layer of SE-GAP vegetation characterization and probably is largely applicable. However, strictly speaking, this classification was developed primarily for the Cumberland and Allegheny plateaus and so does not entirely apply to the mountains. Field investigations should be conducted to identify future project work that might help to refine and differentiate plant communities).

Description Author: R. Evans, M. Pyne, C. Nordman, J. Teague, S.C. Gawler Version: 05 May 2008

Spatial analysis indicates that at least half of this site has been converted to pasture/hay with a significant additional acreage in cropland. In some areas where agriculture has been abandoned, successional forests are developing. Where native forests exist, threats include invasive, non-native pests and pathogens such as the hemlock woolly adelgid and the chestnut blight. It is unclear what role fire has historically played in these systems based on the available information.

State and transition model



T1A Establishment of pasture/hay or cropland

R2A Abandonment (~100 years until reversion to forest); control of non-native plants and pests where needed

T1B Invasion by a number of non-native forest pests and plants

R3A Management of invasive species (mechanical, chemical, biological control, etc.)

State 1
Reference State - South-Central Interior Mesophytic Forest

The reference state for this site most likely includes elements of the NatureServe systems South-Central Interior Mesophytic Forest with Allegheny-Cumberland Dry Oak Forest and Woodland (Hardwood) occurring in drier, warmer positions.

State 2
Managed State

Pastureland/Hay and Cropland is important in this PES and constitute a significant amount of acreage across the MLRA. At the scale of PES, all managed land is covered under one descriptive state. However, they obviously differ widely. Further projects should identify and refine the importance of each land-use to the site.

State 3
Invaded State

Forest pests such as the hemlock woolly adelgid and the American chestnut blight could have a significant negative impact on this site. Management recommendations should be made only on a site-specific basis and should consider existing conditions. Exotic pest plants may also be an issue in places and should be considered in planning.

Transition T1A
State 1 to 2

Conversion from native forest to agricultural production (pasture/hay and cropland). Explicit inputs will vary widely based on the specific site, past history and future management goals.

Transition T1B
State 1 to 3

Invasion by any number of non-native forest pests and plants

Restoration pathway R2A
State 2 to 1

Abandonment (~100 years until reversion to forest); control of non-native plants and pests where needed

Restoration pathway R3A
State 3 to 1

Management of invasive species (mechanical, chemical, biological control, etc.)

Other references

Comer PJ, Faber-Langendoen D, Evans R, Gawler SC, Josse C, Kittel G, Menard S, Pyne M, Reid M, Schulz K, Snow K, and Teague J. 2003. Ecological Systems of the United States: A Working Classification of U.S. Terrestrial Systems. NatureServe, Arlington, Virginia.

Fleming, G. P., P. P. Coulling, K. D. Patterson, and K. Taverna. 2005. The natural communities of Virginia: Classification of ecological community groups. Second approximation. Version 2.1. Virginia Department of Conservation and Recreation, Division of Natural Heritage, Richmond, VA. [http://www.dcr.virginia.gov/dnh/ncintro.htm]

Jenkins, M.A. 2007. Vegetation Communities of the Great Smoky Mountains National Park. Southeastern Naturalist 1:35-56.

National Park Service. Center for Remote Sensing and Mapping Science/University of Georgia. 2009. Great Smoky Mountains National Park Vegetation Mapping Project - Spatial Vegetation Data. http://www1.usgs.gov/vip/grsm/grsmgeodata.zip.

NatureServe. 2009. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA, U.S.A. Data current as of 06 February 2009.

Natureserve. 2018. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.0. NatureServe, Arlington, VA. U.S.A. Available http://explorer.natureserve.org. Accessed [April 10, 2018].

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. 2006. Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin. Agricultural Handbook 296 digital maps and attributes. Available online. Accessed [5/7/2018].

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Official Soil Series Descriptions. Available online. Accessed [5/7/2018].

US Geological Survey, Gap Analysis Program (GAP). August 2011. National Land Cover, Version 2.

White, R.D., K.D. Patterson, A. Weakley, E.J. Ulrey, and J. Drake. 2003. Vegetation classification of Great Smoky Mountains National Park. Report submitted to BRD-NPS Vegetation Mapping Program. NatureServe, Durham, NC. 376 pp.

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Approval

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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	
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:**