

## **Ecological site F130BY011WV Hydric Floodplains**

Last updated: 9/07/2018  
Accessed: 05/17/2024

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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.

### **Classification relationships**

This ecosite is found in mountains in MLRA 130B: Southern Blue Ridge

This is a complex system that encompasses a matrix of co-occurring vegetation communities. Data and maps produced by the SE GAP Analysis Project were queried (USGS 2001). At the most detailed level natural vegetation is represented by NatureServe's Ecological System classification (NatureServe 2017). Data has been cross-walked with NVC classification levels (Class, Subclass, Formation, Division, Macrogroup, Ecological System). The classification approach used was the International Terrestrial Ecological Systems Classification (ITESC) (NatureServe 2007 and White 2003). Ecological Systems were cross-checked with the Vegetation Classification System developed for the Great Smoky Mountains National Park (GRSM) in 2009.

### **Ecological site concept**

This Provisional Ecological Site (PES) occurs on nearly level to gently sloping floodplains in the southern Blue Ridge mountains. Slope ranges from 0 – 3%. Soils are classified as hydric. Land-use is variable. A good deal of this site has been cleared, drained and used for cultivated crops, pasture, and hay. Much of the Nikwasi series, included in this PES, is in idle open land that was cleared for cropland but abandoned because of wetness and flooding. These areas have come back in alders, sedges, rushes, and weeds. This PES is partially developed/open space. Where forested, common trees are yellow poplar, sycamore, red maple, yellow birch, river birch, eastern hemlock and in some places, pine species (pitch pine, shortleaf pine, Virginia pine). A few areas have been planted to eastern white pine. Rhododendron is a common understory plant and can influence soil formation in places, such as the hanging coves of the Great Smoky Mountains National Park (GRSM) where Wesser soils are mapped. These areas are also considered critical habitat for amphibians, especially salamanders. Drainage class is the primary ecological driver in this system.

## Associated sites

|             |                        |
|-------------|------------------------|
| F130BY012WV | Non-Hydric Floodplains |
|-------------|------------------------|

## Similar sites

|             |                        |
|-------------|------------------------|
| F130BY012WV | Non-Hydric Floodplains |
|-------------|------------------------|

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) Flood plain<br>(2) Stream terrace<br>(3) Drainageway |
| Flooding duration  | Brief (2 to 7 days)                                      |
| Flooding frequency | None to frequent   |
| Ponding duration   | Brief (2 to 7 days) to long (7 to 30 days)               |
| Ponding frequency  | None to frequent   |
| Elevation          | 61–1,010 m   |
| Slope              | 0–3%   |
| Ponding depth      | 0–41 cm  |
| Water table depth  | 0–107 cm   |
| Aspect             | Aspect is not a significant factor                       |

## 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)   | 166 days |
| Freeze-free period (average)  | 193 days |
| Precipitation total (average) | 1,372 mm |

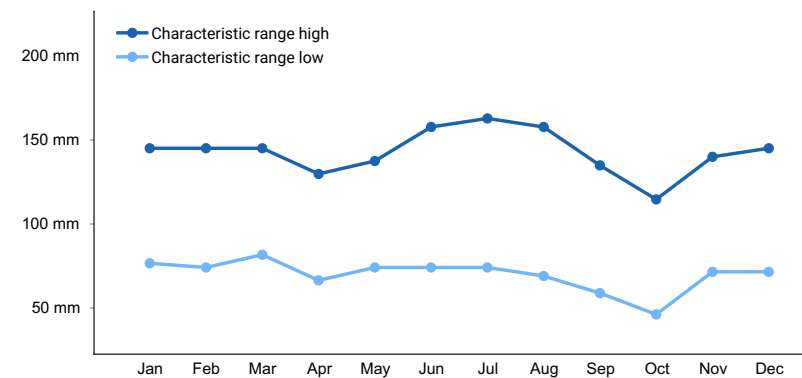


Figure 1. Monthly precipitation range

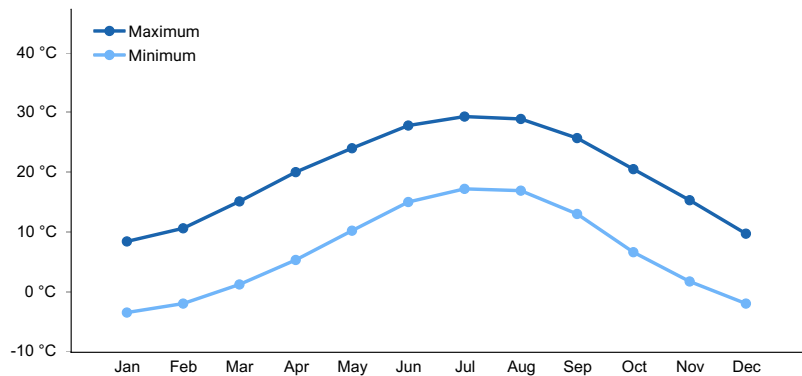


Figure 2. Monthly average minimum and maximum temperature

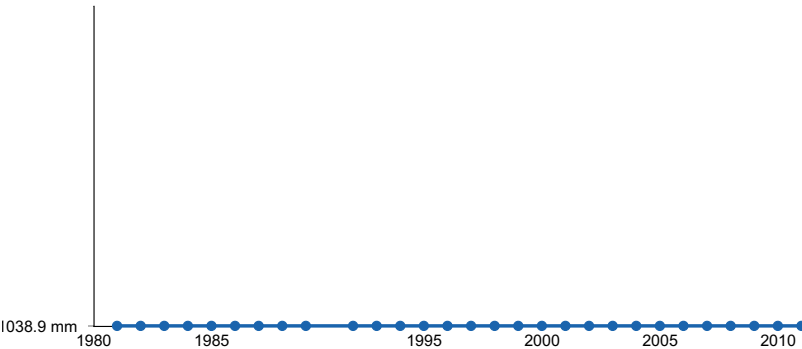


Figure 3. Annual precipitation pattern

Climate stations used

- (1) CLAYTON 1 SSW [USC00091982], Clayton, GA
- (2) MURPHY [USC00316001], Murphy, NC
- (3) ASHEVILLE RGNL AP [USW00003812], Arden, NC
- (4) JASPER 1 NNW [USC00094648], Jasper, GA
- (5) MARSHALL [USC00315356], Marshall, NC
- (6) GALAX RADIO WBRF [USC00443267], Galax, VA

## Influencing water features

The vegetation that occurs on this site is influenced by water tolerance. This site is subject to flooding and ponding. Ponding is most likely the most important factor influencing vegetation and should be further investigated.

## Soil features

The soil series associated with this site are: Nikwasi, Hatboro, Iotla, Toxaway, Hemphill, Smokemont, Ela, and Wesser. They are shallow to moderately deep and are derived primarily from alluvium.

**Table 4. Representative soil features**

|   |  |
|---|--|
| Parent material   | (1) Alluvium–metasedimentary rock                |
| Surface texture   | (1) Clay loam<br>(2) Fine sandy loam<br>(3) Loam |
| Family particle size                                    | (1) Loamy  |
| Drainage class  | Very poorly drained to somewhat poorly drained   |
| Permeability class                                      | Slow to rapid                                    |
| Soil depth  | 48–91 cm   |
| Surface fragment cover ≤3"                              | 0%   |
| Surface fragment cover >3"                              | 0%   |
| Available water capacity<br>(0–101.6cm)                 | 11.18–34.29 cm                                   |
| Soil reaction (1:1 water)<br>(0–101.6cm)                | 4.3–6.2  |
| Subsurface fragment volume ≤3"<br>(Depth not specified) | 0–53%  |
| Subsurface fragment volume >3"<br>(Depth not specified) | 0–30%  |

## 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, including human-created environments. The ecological system defined by NatureServe that most likely approximates the reference community of this PES is South-Central Interior Small Stream and Riparian. However, further investigation in the field is required to confirm this assumption.

This (following) information is provided by NatureServe ([www.natureserve.org](http://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 Small Stream and Riparian: Summary – “This system is found throughout the Interior Low Plateau, Southern Ridge and Valley and Cumberland Plateau, Western Allegheny Plateau, lower elevations of the Southern Blue Ridge, and parts of the Cumberlands. Examples occur along small streams and floodplains with low to moderately high gradients. There may be little to moderate floodplain development. Flooding and scouring both influence this system, and the nature of the landscape prevents the kind of floodplain development found on larger rivers. This system may contain cobble bars with adjacent wooded vegetation and rarely have any marsh development, except through occasional beaver impoundments. The vegetation is a mosaic of forests, woodlands, shrublands, and herbaceous communities. Canopy cover can vary within examples of this system, but typical tree species may include *Platanus occidentalis*, *Acer rubrum* var. *trilobum*, *Betula nigra*, *Liquidambar styraciflua*, and *Quercus* spp. Shrubs and herbaceous layers can vary in richness and cover. Some characteristic shrubs may include *Hypericum densiflorum*, *Salix* spp., and *Alnus* spp. Small seeps dominated by sedges (*Carex* spp.), cinnamon and royal ferns (*Osmunda* spp.), and other herbaceous species can often be found within this system, especially at the headwaters and terraces of streams.”

Element Description Author(s): S. Menard, M. Pyne, R. Evans, R. White, D. Faber-Langendoen, S.C. Gawler, J. Drake June 30, 2016

Much of this PES has been cleared for either development or agriculture (pasture, hay and some crops). Some has been abandoned and is in a successional phase dominated by alders, sedges, rushes and weeds. In some cases, control of weeds may be necessary for this site to return to the supposed reference condition.

State and transition model

Hydric Floodplains  
DRAFT PES  
F130BY011WV



T1A Establishment of pastureland or agricultural crops

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**

### **South-Central Interior Small Stream and Riparian**

The reference state includes one major NatureServe ecological systems as described previously, South-Central Interior Small Stream and Riparian. Other systems may also be included but this requires further investigation. The USDA-NRCS Official Series Description (OSD) for one soil series included in this site, Wesser, specifies that in the GRSM these areas are mapped on hanging coves that provide critical habitat to amphibians, especially salamanders. In these areas, rhododendron thickets are dominant, along with eastern hemlock, white pine, and red spruce. This will likely need to be separated into an individual ecological site in the future as it differs from most of the rest of this PES.

## **State 2**

### **Managed State**

For the purpose of PES, all managed land was lumped into one state. This includes cropland, pasture and hay as well as white pine plantations. All of these will likely need to be separated as future projects are refined.

## **State 3**

### **Invaded State**

Perhaps the greatest challenge to the integrity of this ecological site is the presence of invasive, non-native pests, pathogens and plants. The impact and response vary by species (both of the host and the invader) but often will include combinations of mechanical, biological, chemical and cultural control. Tree breeding programs for genetic resistance and germplasm conservation may be important considerations, especially in front an incoming invasion if reforestation is planned after it passes. It is always best if local genetic material can be used if restoration efforts are attempted.

## **Transition T1A**

### **State 1 to 2**

Conversion to agricultural production. Pasture and hay are the most common. Practices vary based on site-specific conditions. White pine plantations were mentioned in several of the OSDs for soils included in this PES. In future projects, if prolific enough based on field investigation, it should likely be separated into its own state as management approaches will be quite different.

## **Transition T1B**

### **State 1 to 3**

Invasion by a number of non-native forest pests and pathogens and/or weedy plants. Of particular concern on this PES is the hemlock woolly adelgid, which has decimated eastern hemlock populations throughout the southern Blue Ridge mountains and may impact stream temperatures and aquatic ecology.

## **Restoration pathway R2A**

### **State 2 to 1**

Restoration pathways should be determined in individual approved level ESD projects, as they will differ greatly based on current land-use. In some cases where land has been drained, there may be no way to truly restore critical hydrological processes. Some potential restoration methods might include controlling invasive, exotic species, tree planting, restoring natural drainage patterns where possible, etc. but these practices should be determined on a site-by-site basis.

## **Restoration pathway R3A**

### **State 3 to 1**

Management of invasive species (mechanical, chemical, biological control, etc.) and planting where merited. Germplasm conservation of native tree species like the eastern hemlock could be considered.

## **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.

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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:**

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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:**



- 
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:

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17. **Perennial plant reproductive capability:**

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