

Ecological site F127XY012WV Convergent Uplands

Accessed: 04/17/2024

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.



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): 127X–Eastern Allegheny Plateau and Mountains

This ecosite is found in mountains, plateau in MLRA 127: Eastern Allegheny Plateau and Mountains. This site occupies the Allegheny Mountain Section of the Appalachian Highlands of the Appalachian Plateau Province. The deeply dissected plateau in this area terminates in a high escarpment, the Allegheny Front, in the eastern part of the area. Steep slopes are dominant, but level to gently rolling plateau remnants are conspicuous in the northern part of the area. The area is dominantly forest, containing large blocks of state forest, game lands, and national forest. Less than one-tenth of the MLRA consists of urban areas.

This narrative was created from the Landfire Biophysical Setting (BpS) description

Classification relationships

This site crosswalks to Landfire biophysical setting (BpS) South-Central Interior Mesophytic Forest

NatureServe's description (2007) for the equivalent ecological system CES 202.887 South-Central Interior Mesophytic Forest & CES 202.373 Southern and Central Appalachian Cove Forest

South-Central Interior Mesophytic Forest
Component Associations

Association Unique ID Association Name

- CEGL002411 *Fagus grandifolia* - *Acer saccharum* - *Liriodendron tulipifera* Unglaciaded Forest
- CEGL004741 *Acer saccharum* - *Carya ovata* - *Juglans nigra* / *Symphoricarpos orbiculatus* / *Galium circaeans* Forest
- CEGL004767 *Tsuga canadensis* - (*Liriodendron tulipifera*, *Fagus grandifolia*) / (*Magnolia macrophylla*, *Ilex opaca*) / *Polystichum acrostichoides* Forest
- CEGL005043 *Tsuga canadensis* - *Fagus grandifolia* - *Acer saccharum* / (*Hamamelis virginiana*, *Kalmia latifolia*) Forest
- CEGL005222 *Liriodendron tulipifera* - *Tilia americana* var. *heterophylla* - *Aesculus flava* - *Acer saccharum* / (*Magnolia tripetala*) Forest
- CEGL006144 *Quercus alba* - *Fagus grandifolia* Western Allegheny Plateau Forest
- CEGL006201 *Acer saccharum* - *Liriodendron tulipifera* - *Fraxinus americana* / *Staphylea trifolia* Forest
- CEGL006237 *Acer saccharum* - *Fraxinus americana* - *Tilia americana* - *Liriodendron tulipifera* / *Actaea racemosa* Forest
- CEGL007200 *Fagus grandifolia* Ridge and Valley Forest
- CEGL007201 *Fagus grandifolia* - *Liriodendron tulipifera* / *Euonymus americanus* / *Athyrium filix-femina* ssp. *asplenioides* Forest
- CEGL007213 *Quercus alba* - *Fagus grandifolia* / *Hydrangea quercifolia* - *Viburnum acerifolium* / *Carex picta* - *Polystichum acrostichoides* Forest
- CEGL007220 *Liriodendron tulipifera* / (*Cercis canadensis*) / (*Lindera benzoin*) Ruderal Forest
- CEGL007233 *Quercus alba* - *Quercus rubra* - *Carya ovalis* / *Acer saccharum* / *Polystichum acrostichoides* Forest
- CEGL007698 *Quercus rubra* - *Acer saccharum* - *Tilia americana* var. *heterophylla* - *Aesculus flava* - (*Cladrastis kentukea*) Forest
- CEGL007879 *Juglans nigra* / *Verbesina alternifolia* Ruderal Forest
- CEGL007881 *Fagus grandifolia* - *Quercus alba* / *Cornus florida* Forest
- CEGL008428 *Quercus alba* - (*Liriodendron tulipifera*, *Liquidambar styraciflua*) / *Calycanthus floridus* / *Athyrium filix-femina* Forest
- CEGL008488 *Quercus rubra* - *Tilia americana* var. *heterophylla* - *Carya carolinae-septentrionalis* / *Acer* (*barbatum*, *leucoderme*) / *Hydrangea quercifolia* Forest

Southern and Central Appalachian Cove Forest

Component Associations

Association Unique ID Association Name

- CEGL004293 *Impatiens* (*capensis*, *pallida*) - *Monarda didyma* - *Rudbeckia laciniata* var. *humilis* Herbaceous Vegetation
- CEGL004296 *Diphylleia cymosa* - *Saxifraga micranthidifolia* - *Laportea canadensis* Herbaceous Vegetation
- CEGL004982 *Betula alleghaniensis* - *Tilia americana* var. *heterophylla* / *Acer spicatum* / *Ribes cynosbati* / *Dryopteris marginalis* Forest
- CEGL006186 *Liriodendron tulipifera* - *Quercus rubra* - *Fraxinus americana* / *Asimina triloba* / *Actaea racemosa* - *Uvularia perfoliata* Forest
- CEGL006237 *Acer saccharum* - *Fraxinus americana* - *Tilia americana* - *Liriodendron tulipifera* / *Actaea racemosa* Forest
- CEGL006304 *Liriodendron tulipifera* - *Pinus strobus* - *Tsuga canadensis* - *Quercus* (*rubra*, *alba*) / *Polystichum acrostichoides* Forest
- CEGL006472 *Tilia americana* var. *heterophylla* - *Aesculus flava* - *Acer saccharum* / *Cystopteris bulbifera* - *Asarum canadense* Forest
- CEGL007102 *Pinus strobus* - *Tsuga canadensis* / *Rhododendron maximum* - (*Leucothoe fontanesiana*) Forest
- CEGL007136 *Tsuga canadensis* / *Rhododendron maximum* - (*Clethra acuminata*, *Leucothoe fontanesiana*) Forest
- CEGL007220 *Liriodendron tulipifera* / (*Cercis canadensis*) / (*Lindera benzoin*) Ruderal Forest
- CEGL007233 *Quercus alba* - *Quercus rubra* - *Carya ovalis* / *Acer saccharum* / *Polystichum acrostichoides* Forest
- CEGL007291 *Liriodendron tulipifera* - *Tilia americana* var. *heterophylla* - (*Aesculus flava*) / *Actaea racemosa* Forest
- CEGL007543 *Liriodendron tulipifera* - *Betula lenta* - *Tsuga canadensis* / *Rhododendron maximum* Forest
- CEGL007693 *Tsuga canadensis* - *Halesia tetraptera* - (*Fagus grandifolia*, *Magnolia fraseri*) / *Rhododendron maximum* / *Dryopteris intermedia* Forest
- CEGL007695 *Aesculus flava* - *Acer saccharum* - (*Fraxinus americana*, *Tilia americana* var. *heterophylla*) / *Hydrophyllum canadense* - *Solidago flexicaulis* Forest
- CEGL007710 *Liriodendron tulipifera* - *Fraxinus americana* - (*Tilia americana*, *Aesculus flava*) / *Actaea racemosa* - *Laportea canadensis* Forest

CEGL007711 *Tilia americana* var. *heterophylla* - *Fraxinus americana* - (*Ulmus rubra*) / *Sanguinaria canadensis* - (*Aquilegia canadensis*, *Asplenium rhizophyllum*) Forest
 CEGLO07878 *Quercus rubra* - *Tilia americana* var. *heterophylla* - (*Halesia tetraptera* var. *monticola*) / *Collinsonia canadensis* - *Prosartes lanuginosa* Forest
 CEGLO08407 *Tsuga canadensis* - (*Fagus grandifolia*, *Tilia americana* var. *heterophylla*) / *Magnolia tripetala* Forest
 CEGLO08412 *Acer* (*nigrum*, *saccharum*) - *Tilia americana* / *Asimina triloba* / *Jeffersonia diphylla* - *Caulophyllum thalictroides* Forest
 CEGLO08510 *Liriodendron tulipifera* - *Quercus rubra* - *Magnolia acuminata* / *Cornus florida* Forest
 CEGLO08512 *Tsuga canadensis* - *Quercus prinus* - *Liriodendron tulipifera* / *Kalmia latifolia* - (*Rhododendron catawbiense*) Forest

Ecological site concept

These sites generally occur on uplands with MAAT > 45 degree F and median elevation <= 1042m. These lands are typically concave

From Landfire <http://www.landfire.gov/index.php>:

Geographic Range

The mixed-mesophytic forest region (Küchler 1964) is located in two of Bailey's ecoregion sections (McNab and Avers 1994). It includes the southern portion of the Southern Unglaciaded Allegheny Plateau Section (southeastern OH, western West VA, northeastern KY). It also covers the Northern Cumberland Plateau Section (eastern KY and east-central TN; and southern Blue Ridge ecoregion, and a very small portion in northeast AL and northwest GA). There are also scattered occurrences in northwestern and central PA (C.E. Williams, G. Nowacki personal communication). In the southern limits of this forest type, one might find this more restricted to more northerly aspects.

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), 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.

Biophysical Site Description

Mixed mesophytic forests occur on moist, topographically protected areas (e.g. coves, v-shaped valleys, N and E facing toe slopes) within highly dissected hills and mountains. On slopes it forms a mosaic with pyrogenic oak-hickory forests, whereby mixed mesophytic forests are restricted to the most protected coves and oak-hickory occurs on the interfluves. These Plateaus are mature and dissected, most of the landscape consisting of high hills and narrow valleys. Elevations range from 650 to 1,300ft in the Allegheny Plateau and from 1,270 to 2,000ft in the Cumberland Plateau (McNab and Avers 1994). The dissected topography creates strong gradients in microclimate and soil moisture and fertility at the local (watershed) scale (Hutchins et al. 1976, Iverson et al. 1997, Morris and Boerner 1998). In the absence of frequent or catastrophic disturbance, these environmental gradients determine forest composition (Hutchins et al. 1976, Muller 1982, Iverson et al. 1997, Dyer 2001).

These forests occupy the transition zone from the oak-hickory forest to the northern hardwood forest. They are among the most diverse in the US containing more than 30 canopy tree species. This type lies west of the Appalachians and transitions from the more northern sugar maple-beech-birch forest in northern West VA, southwestern PA (lesser extent in northwestern and central PA), and southern OH southward down the Allegheny Mountains, across the Allegheny Plateau including all of the Cumberland Plateau, and into northern AL where it transitions to the oak-hickory-pine type of the Southern Mixed Hardwood Forest (Brown et al. 2000). Two major and distinct forest types within this BpS are typically recognized: mixed-oak and mixed-mesophytic. This model focuses on the mixed-mesophytic type.

Table 1. Dominant plant species

Tree	(1) <i>Acer</i>
Shrub	Not specified
Herbaceous	(1) <i>Actaea racemosa</i>

Physiographic features

Climatic features

Influencing water features

Soil features

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 not necessarily the management goal. 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.

From Landfire [http://www.landfire.gov/index.php:Vegetation Description](http://www.landfire.gov/index.php:Vegetation%20Description)

A diverse closed-canopy forest with dominant species including: beech (*Fagus grandifolia*), tulip-poplar (*Liriodendron tulipifera*), American basswood (*Tilia americana* var. *heterophylla*), sugar maple (*Acer saccharum*), yellow buckeye (*Aesculus flava*), *Magnolia acuminata*, and *Juglans nigra*, red oak (*Quercus rubra*), white oak (*Q. alba*) and formerly American chestnut (*Castanea dentata*) (Braun 1950, Muller 1982). The oak component tends to grade from white oaks in the southern areas to red and black oaks in the northern geographic range of this forest type. *Tsuga canadensis* may be a minor component of some stands. Trees may grow very large in undisturbed areas. In the northern areas, both white (*Fraxinus americana*) and green ash (*Fraxinus pennsylvanica*) can be up to 10-15% of forest type (C. Emanuel, personal communication). This forest type developed primarily on mesic, sheltered landscapes positions (e.g., lower slopes, coves, ravines) but also occurred on some dry-mesic slopes, where presumably fire was infrequent (Wade et al. 2000).

Adjacency or Identification Concerns

Mapping mixed mesophytic forests would likely focus on specific topographic positions, such as coves, valley bottoms typically v-shaped (excluding broad u-shaped floodplains), lower north and east facing slopes; sometimes west and south facing lower slopes where moisture permits; wet-mesic to mesic conditions on the landscape; rich fertile conditions/sites; shaded topographic positions (Nowacki personal communication). On side slopes, mixed mesophytic forest interbraid with oak-hickory forests, with mixed-mesophytic occurring in v-notches and coves (drainages) and oak-hickory on interfluves.

Uncharacteristic types (structure/composition/etc.) that may frequently occur today in this BpS include: non-native invasive species (plants, animals, insects, pathogens, etc.), deer herbivory (limiting species composition and structure), and historical fire suppression.

This forest type grades into Northeastern Interior Dry-Mesic Oak Forest (1303) - where this forest type grades into northern sites when soils are drier (shallower soils, sandier parent material), and as elevation is increased. In contrast the South-Central Interior Mesophytic Forest (1320) has gentler slopes with soils featuring a higher water holding capacity.

Issues or Problems

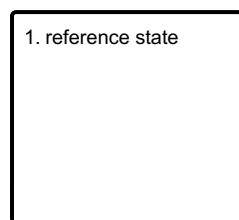
Though Küchler (1964) mapped and described this region as mixed-mesophytic, witness tree data (from early land surveys) and studies of old-growth forests suggest that mixed-oak forests were more abundant than mixed-mesophytic forests in many areas prior to European settlement (Beatley 1959, McCarthy et al. 1987, Abrams et al. 1995, Dyer 2001, McCarthy et al. 2001, Rentch et al. 2003). Delineating the potential boundaries of 'mixed-mesophytic' forest type today should recognize that this boundary is influenced by human management interactions: historic logging and high-grading, the absence of fire, deer populations (herbivory), and non-native invasive species (plants, animals, insects and disease).

Native Uncharacteristic Conditions

Tree of Heaven (*Ailanthus altissima*) is a significant invader in these sites, due to its ability to persist in fairly intact canopy as well as its high water demand (K. Brown, personal communication).

State and transition model

Ecosystem states



State 1 reference state

BpS Dominant and Indicator Species Symbol Scientific Name Common Name FAGR *Fagus grandifolia* American beech LITU *Liriodendron tulipifera* Tuliptree ACSA3 *Acer saccharum* Sugar maple TIAMH *Tilia americana* var. heterophylla American basswood QURU *Quercus rubra* Northern red oak JUNI *Juglans nigra* Black walnut CADE12 *Castanea dentata* American chestnut TSCA *Tsuga canadensis* Eastern hemlock Disturbance Description The mixed-mesophytic forest type is fire regime class III, surface fires with return intervals 30-100yrs+ (Wade et al. 2000). Mixed severity fires will occur approximately every 500yrs opening the canopy with increased mortality. This effect may also be achieved by recurrent, severe insect defoliations or droughts. Straight-line winds or microbursts may cause blow-downs on a scale of 1 to 100ac. Due to the mesic nature of these forests, stand replacement fires happen very infrequently. Ice storm damage is a more common disturbance than fire in this system, and yet ice storm frequency directly feeds into fuel loading at these sites. The oaks found within this forest type are susceptible to Gypsy Moth, but these effects are not included in this model since it is a recent invasive. Another prominent current issue is Oak Decline, but its impact on reference conditions is not known.

Other references

NatureServe. 2007. International Ecological classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA, USA. Data current as of 08 June 2007.

From Landfire <http://www.landfire.gov/index.php>:

References

Abrams, M.D., D.A. Orwig and T.E. DeMeo. 1995. Dendroecological analysis of successional dynamics for a presettlement-origin white-pine-mixed-oak forest in the southern Appalachians, USA. *J. Ecol.* 83: 123-133.

Beatley, J.C. 1959. The primeval forests of a periglacial area in the Allegheny Plateau (Vinton and Jackson Counties, Ohio). *Bulletin of the Ohio Biological Survey* 1: 1-166.

Braun, E.L. 1950. *Deciduous forests of eastern North America*. Blakiston Co., PA. 596 pp.

Brown, J.K. and J. Kapler-Smith, eds. 2000. *Wildland fire in ecosystems: effects of fire on flora*. Gen. Tech. Rep. RMRS-GTR-42-vol.2. Ogden, UT: USDA Forest Service, Rocky Mountain Research Station. 257 pp.

Davis, M.B., ed. 1993. *Eastern Old-Growth Forests: Prospects for Rediscovery and Recovery*. 412 pp.

Delcourt, P.A., H.R. Delcourt, C.R. Ison, W.E. Sharp and K.J. Gremillion. 1998. Prehistoric human use of fire, the eastern agricultural complex, and Appalachian oak-chestnut forests: paleoecology of Cliff Palace Pond, Kentucky. *American Antiquity* 63: 263-278.

Dyer, J.M. 2001. Using witness trees to assess forest change in southeastern Ohio. *Canadian Journal of Forest Research*. 31: 1708-1718.

- Frost, C.C. 1998. Presettlement fire frequency regimes of the United States: a first approximation. In: Proceedings of the 20th Tall Timbers fire ecology conference--fire in ecosystem management: shifting the paradigm from suppression to prescription. Pruden, T.L. and L.A. Brennan, eds. Tall Timbers Research Station, Tallahassee, FL. 70-81.
- Guyette, R.P., D.C. Dey and M.C. Stambaugh. 2003. Fire and human history of a barren-forest mosaic in southern Indiana. *American Midland Naturalist* 149: 21-34.
- Hutchins, R.B., R.L. Blevins, J.D. Hill and E.H. White. 1976. The influence of soils and microclimate on vegetation of forested slopes in eastern Kentucky. *Soil Science* 121: 234-241.
- Iverson, L.R., M.E. Dale, C.T. Scott and A. Prasad. 1997. A GIS-derived integrated moisture index to predict forest composition and productivity of Ohio forests (U.S.A.). *Landscape Ecology* 12: 331-348.
- Küchler, A.W. 1964. Potential natural vegetation of the conterminous United States (map). Special Publication 36. American Geographic Society, NY.
- McCarthy, B.C., C.J. Small and D.L. Rubino. 2001. Composition, structure and dynamics of Dysart Woods, an old-growth mixed mesophytic forest of southeastern Ohio. *Forest Ecology and Management* 140: 193-213.
- McNab, W.H. and P.E. Avers. 1994. Ecological subregions of the United States: section descriptions. USDA Forest Service Administrative Publication WO-WSA-5.
- Morris, S.J. and R. Boerner. 1998. Landscape patterns of nitrogen mineralization and nitrification in southern Ohio hardwood forests. *Landscape Ecology* 13: 215-224.
- Muller, R.N. 1982. Vegetation patterns in the mixed mesophytic forest of eastern Kentucky. *Ecology* 63: 1901-1917.
- Rentch, J.S., M.A. Fajvan and R.R. Hicks, Jr. 2003. Spatial and temporal disturbance characteristics of oak-dominated old-growth stands in the central hardwood forest region. *Forest Science* 49: 778-789.
- Schmidt, K.M., J.P. Menakis, C.C. Hardy, W.J. Hann and D.L. Bunnell. 2002. Development of coarse-scale spatial data for wildland fire and fuel management. USDA Forest Service GTR-RMRS-87. Fort Collins, CO: USDA Forest Service, Rocky Mountain Research Station. 41 pp. + CD.
- Wade, D.D., B.L. Brock, P.H. Brose, J.B. Grace, G.A. Hock and W.A. Patterson III. 2000. Fire in eastern ecosystems. In: *Wildland fire in ecosystems: effects of fire on flora*. Brown, J.K. and J. Kepler-Smith, eds. USDA Forest Service GTR-RMRS-42-vol. 2. 53-96.
- Personal Communications
- Davenport, B. February 15, 2005.
- Nowacki, Greg. 2005. LANDFIRE Northeast modeling workshop.
- Williams, C.E. 2004. Landtype mapping challenge-cost share agreement.

Contributors

Jason Teets

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:**
-