

# **Ecological site F122XY014KY**

## **Deep Well Drained Cherty Uplands**

Last updated: 5/14/2025

Accessed: 05/21/2025

---

### **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): 122X–Highland Rim and Pennyroyal

MLRA 122 is in Tennessee (47 percent), Kentucky (43 percent), Indiana (7 percent), and Alabama (3 percent). It makes up about 21,530 square miles (55,790 square kilometers).

#### **SOILS:**

Many of the soils in this MLRA are Udalfs. The moderately deep to very deep, well drained, clayey soils formed in limestone residuum. They are dominantly in rolling to steep areas of the “Outer Basin” (Mimosa, Braxton, Gladdice, and Hampshire series) and the undulating to hilly areas of the “Inner Basin” (Talbot and Bradyville series). The most agriculturally productive soils are the very deep, well drained, clayey or loamy soils that formed in alluvium and/or loess over alluvium or limestone residuum in nearly level to undulating areas (Armour, Cumberland, Harpeth, Lomond, and Maury series). The less extensive soils generally are moderately well drained to somewhat poorly drained and formed in loamy or clayey alluvium and/or residuum (Byler, Capshaw, Colbert, and Tupelo series). This MLRA has a significant acreage of Mollisols. Shallow or moderately deep, well drained, clayey Udolls (Ashwood and Barfield series) formed in limestone residuum dominantly in rolling to steep areas. Very shallow, well drained, clayey Rendolls (Gladeville series) formed in limestone residuum dominantly in undulating to rolling areas of the “Inner Basin.” Very deep, well drained or moderately well drained Udolls (Arrington, Egam, Lynnville, and Staser series) and somewhat poorly drained or poorly drained Aquolls (Agee, Godwin, and Lanton series) formed in loamy or clayey alluvium derived from limestone on flood plains. Most of the remaining soils on flood plains are moderately well drained or well drained Udepts (Lindell and Ocana series). Udufts are of small extent in this area. Most are very deep, well drained, and loamy and formed in gravelly colluvium or colluvium and the underlying residuum on steep hillsides (Dellrose soils). Rock outcrops

are common on uplands.

#### BIOLOGICAL RESOURCES:

This area supports mixed oak forest vegetation. White oak, black oak, northern red oak, and some scarlet oak are the dominant tree species. Shagbark hickory, bitternut hickory, pignut hickory, and mockernut hickory also occur. Oak, blackgum, flowering dogwood, sassafras, Virginia pine, pitch pine, and shortleaf pine grow mostly on ridgetops.

(Excerpt from 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.)

### Classification relationships

Scientific Name: Southern Interior Low Plateau Dry-Mesic Oak Forest, Unique Identifier: CES202.898

Possible Association:

*Quercus falcata* - *Quercus alba* - *Carya alba* / *Oxydendrum arboreum* / *Vaccinium stamineum* Forest

Translated Name: Southern Red Oak - White Oak - Mockernut Hickory / Sourwood / Deerberry Forest

Common Name: Interior Southern Red Oak - White Oak Forest

Unique Identifier: CEGLO07244

Classification Approach: International Vegetation Classification (IVC)

### Ecological site concept

Only two tree species can be selected for entry into the database as dominants; however, multiple tree species may be dominant on these sites depending on aspect, soil depth, seed sources, management, and disturbance history.

State 1. Forestland.

Phase 1.1: Plant species dominants:

White oak – southern red oak/ blueberry – smilax / Virginia snakeroot – licorice bedstraw. (*Quercus alba* - *Quercus falcata* / *Vaccinium* spp. - *Smilax* spp. / *Aristolochia serpentaria* – *Galium circaezans*)

State: 2. Pasture

Phase 2.1: Managed Pasture. Plant species dominants: *Schedonorus arundinaceus* (tall fescue)

Pasture plant species are dependent on seeding, weed control, concurrent land uses, on-going levels of disturbance, and landowner goals. Individual site and soil characteristics, along with management activities, will influence production levels.

State: 3 – Transitional (Abandoned Field)

Phases 3.1: Plant species dominants: *Juniperus virginiana*/ *Rubus* spp.- *Rosa multiflora*/  
*Vernonia gigantea* -*Schedonorus arundinaceus*

Eastern red cedar /blackberry – multiflora rose/ ironweed- tall fescue

Tree species regeneration on these sites will depend on disturbance, soil characteristics, adjacent plant communities and seed sources, post-disturbance management inputs, presence or absence of continued site disturbances(grazing), slope, and aspect.

State 4: Phase 4.1. Abandoned Croplands

Plant species dominant:

henbit deadnettle (*Lamium amplexicaule*) – mouse-eared chickweed (*Cerastium* L.)

Abandonment of cropland would result in many weed species taking over the site. Initially, annual weeds would be predominate followed by grasses, shrubs and finally, pioneers trees.

State 5: Phase 5.1. Cropland

Dependent upon seeding and management. Most common crops are corn and soybeans. It would require years of management, plantings, and weed control to establish successional communities that could transition to a reference community

## Associated sites

F122XY016KY	<b>Riverbank Loamy Alluvium</b> Riverbank Loamy Alluvium
-------------	---

**Table 1. Dominant plant species**

Tree	(1) <i>Quercus alba</i> (2) <i>Quercus falcata</i>
Shrub	(1) <i>Vaccinium</i> (2) <i>Smilax</i>
Herbaceous	(1) <i>Aristolochia serpentaria</i> (2) <i>Euphorbia corollata</i>

## Physiographic features

These sites are located in headwaters of streams.

**Table 2. Representative physiographic features**

Landforms	(1) Alluvial fan (2) Flood plain (3) Flood-plain step
-----------	---

Runoff class	Very low to medium
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	None to frequent
Ponding frequency	None
Elevation	107–305 m
Slope	0–6%
Water table depth	76–203 cm
Aspect	Aspect is not a significant factor

## Climatic features

### Climate

The average annual precipitation in this area is 43 to 63 inches (1,090 to 1,600 millimeters), increasing to the south. The maximum precipitation occurs in winter and early in spring, and the minimum occurs in fall. Most of the rainfall occurs as high-intensity, convective thunderstorms. Snowfall may occur in winter. The average annual temperature is 52 to 60 degrees F (11 to 16 degrees C), increasing to the south. The freeze-free period averages 210 days and ranges from 185 to 235 days. The longer freeze-free periods occur in the more southerly parts of the area.

(Excerpt from 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.)

**Table 3. Representative climatic features**

Frost-free period (characteristic range)	157-165 days
Freeze-free period (characteristic range)	185-196 days
Precipitation total (characteristic range)	1,270-1,448 mm
Frost-free period (actual range)	153-168 days
Freeze-free period (actual range)	180-204 days
Precipitation total (actual range)	1,194-1,499 mm
Frost-free period (average)	161 days
Freeze-free period (average)	192 days
Precipitation total (average)	1,346 mm

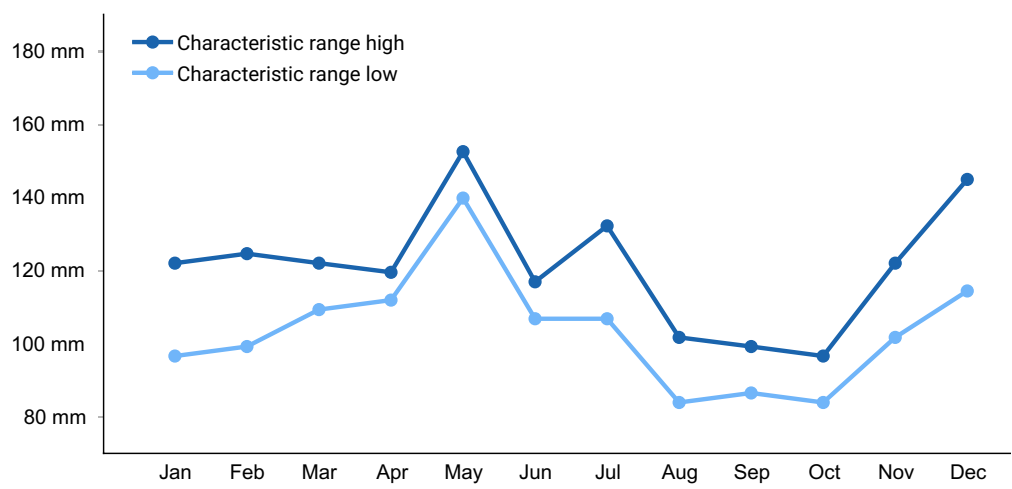


Figure 1. Monthly precipitation range

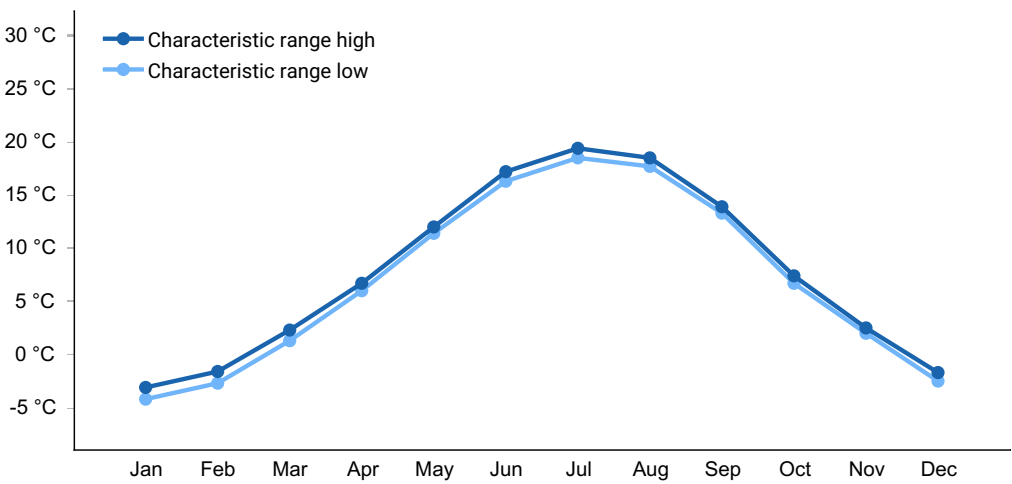


Figure 2. Monthly minimum temperature range

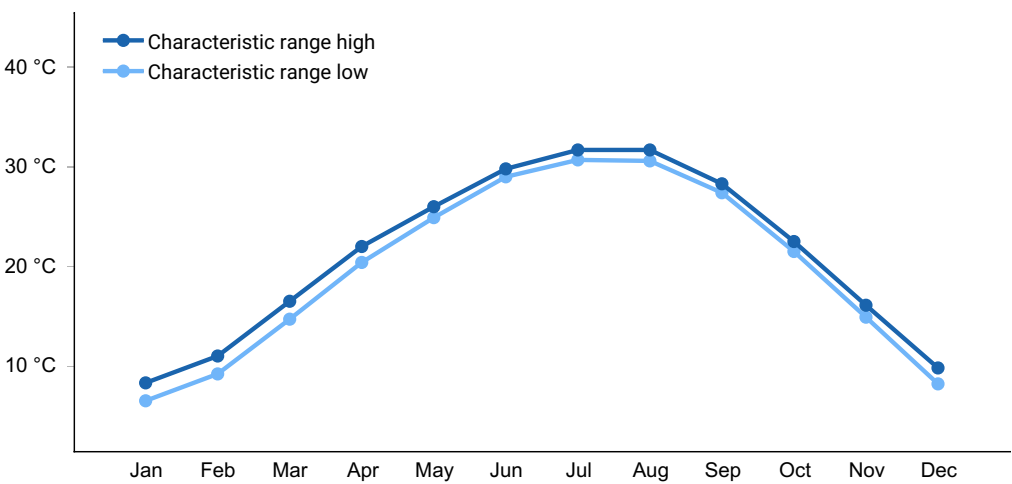
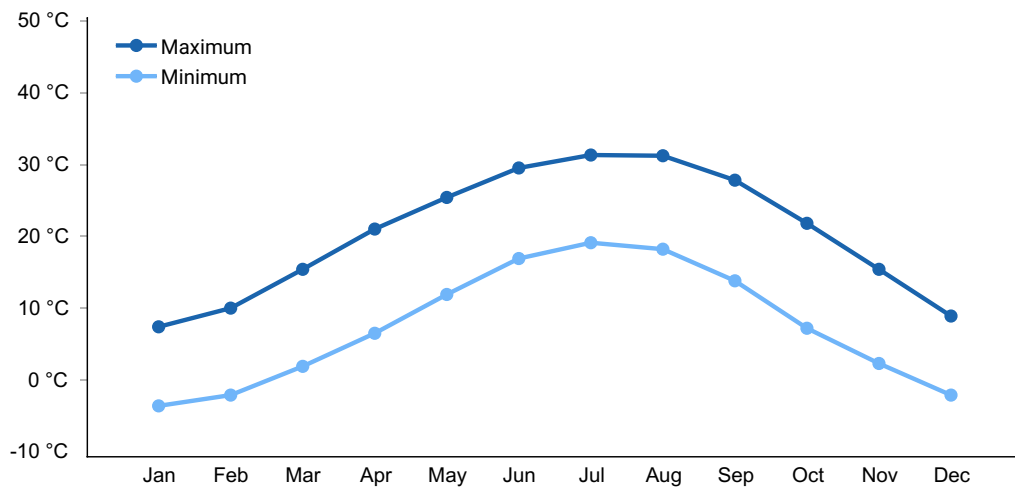
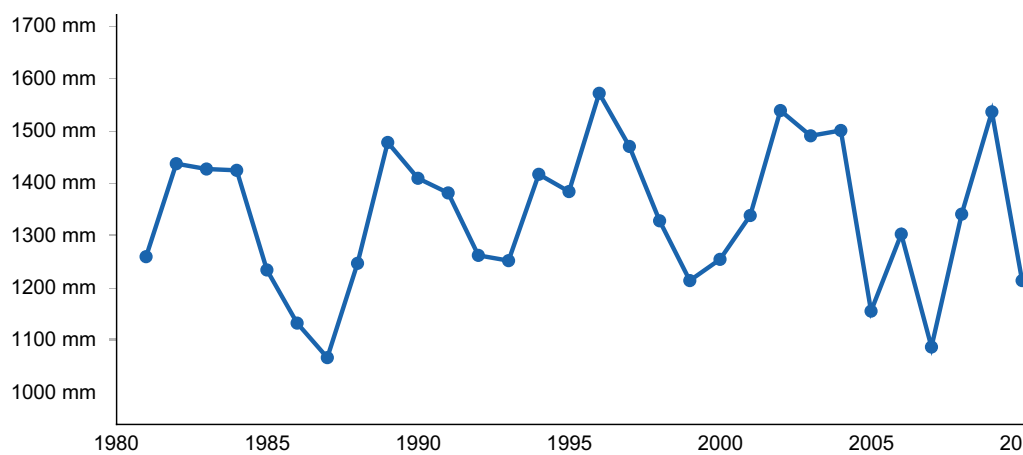


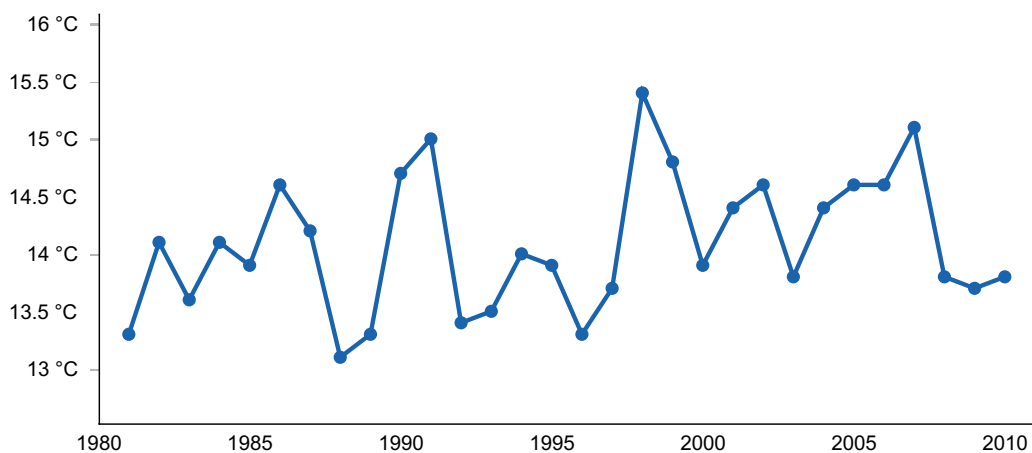
Figure 3. Monthly maximum temperature range



**Figure 4. Monthly average minimum and maximum temperature**



**Figure 5. Annual precipitation pattern**



**Figure 6. Annual average temperature pattern**

## Climate stations used

- (1) WAYNESBORO [USC00409502], Waynesboro, TN
- (2) COOKEVILLE [USC00402009], Cookeville, TN
- (3) GREENSBURG [USC00153430], Greensburg, KY
- (4) CLARKSVILLE WWTP [USC00401790], Clarksville, TN

- (5) SALEM [USC00127755], Salem, IN

## Influencing water features

Mapunits in this group may be occasionally to frequently flooded for a short duration.

## Soil features

These soils are loamy, formed in alluvium, and generally well drained.

**Table 4. Representative soil features**

Surface texture	(1) Gravelly loam (2) Silt loam (3) Fine sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderate to moderately rapid
Soil depth	102–203 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	12.7–17.78 cm
Calcium carbonate equivalent (0-101.6cm)	0–1%
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	4.5–7
Subsurface fragment volume <=3" (Depth not specified)	0–47%
Subsurface fragment volume >3" (Depth not specified)	0–10%

## Ecological dynamics

14-Loamy Alluvial Headwaters  
MLRA 122

Communities described in this provisional document reflect plant communities that are likely to be found on these soils and have not been extensively field verified. This PES describes hypotheses based on available data of many different scales and sources and has not been developed utilizing site-specific ecological field monitoring. This PES does not encompass the entire complexity or diversity of these sites. Additional field studies are needed prior to restoration and/or detailed conservation planning.

Soil series and/or mapunits may be removed or added pending field inspections.

Forest Vegetation as listed in Official Soil Series Description:

Chagrin: Native vegetation is hardwood forest which consists chiefly of beech, hickory, sugar maple, ash, and sycamore.

Kintner: Native vegetation is mixed, deciduous hardwood forest.

Pope: Native vegetation is mixed, deciduous hardwood forests of mainly tulip poplar, white oak, river birch, sycamore, beech and hickory.

Sensabaugh: The native vegetation is mixed hardwood forest.

Skidmore: Native forests have oaks, yellow-poplar, sycamore, birch, beech, and hickory as the dominant species.

Depending on previous management and past and present disturbances, these sites will have a mix of oak-hardwood species. Trees on site as found in NASIS include white oak, northern red oak, sugar maple, tulip poplar, white ash, American beech, American elm, red maple, flowering dogwood, and pines.

Only two tree species can be selected for entry into the database as dominants; however, multiple tree species may be dominant on these sites and it will vary depending on aspect, soil depth, seed sources, management, and disturbance history.

State 1,

Phase 1.1: Forestland.

Plant species dominant: white oak (*Quercus alba*) – American beech (*Fagus grandifolia*) / common serviceberry (*Amelanchier arborea*) - spicebush (*Lindera benzoin*) / American strawberry bush (*Euonymus americanus*) - Christmas fern (*Polystichum acrostichoides*)

State 2, Phase 2.1: Pastureland.

Plant species dominant:

*Schedonorus arundinaceus* (tall fescue). Species present are dependent upon seeding and management.

Pasture plant species are dependent on seeding, weed control, concurrent land uses, on-going levels of disturbance, and landowner goals. Individual site and soil characteristics, along with management activities, will influence production levels.

Many species of grass, both warm and cool season, are available and suitable for these sites. Common forage species include tall fescue, orchard grass, Kentucky bluegrass,



Johnson grass, timothy, and various species of clover.

Management of pasture sites should follow conservation planning standards and protocols which include watershed protection, soil health, and adequate forage species.

Transitioning this state to a reference condition would require long-term timber stand improvement practices to control non-native vegetation and manage for desired hardwood species.

State: 3. Phase 3.1: Transitional (Abandoned Field)

Plant species dominant: maple (*Acer* spp.) – tulip poplar (*Liriodendron tulipifera*) / berries (*Rubus* spp.) / fescue (*Schedonorus arundinaceus*)

This phase is best described as an old field habitat with a mixture of native and introduced grasses and a variety of native and non-native herbs, forbs, seedlings, and saplings. Tree species regeneration on these sites will depend on the severity and duration of disturbance, soil characteristics, adjacent plant communities and seed sources, post-disturbance management inputs, presence or absence of continued site disturbances (grazing), slope, and aspect.

State 4, Phase 4.1: Abandoned cropland

Plant species dominant: henbit deadnettle (*Lamium amplexicaule*) – mouse-eared chickweed (*Cerastium* L.)

State 5. Phase 5.1: Cropland. Plant species dominants: dependent upon seeding and management. Most common crops are corn and soybeans.

Restoration of states 2-5 to the reference community would require intensive management inputs. Transitioning pasture or cropland to a reference condition would require long-term timber stand improvement practices to control non-native vegetation and manage for desired hardwood species.

## **State and transition model**

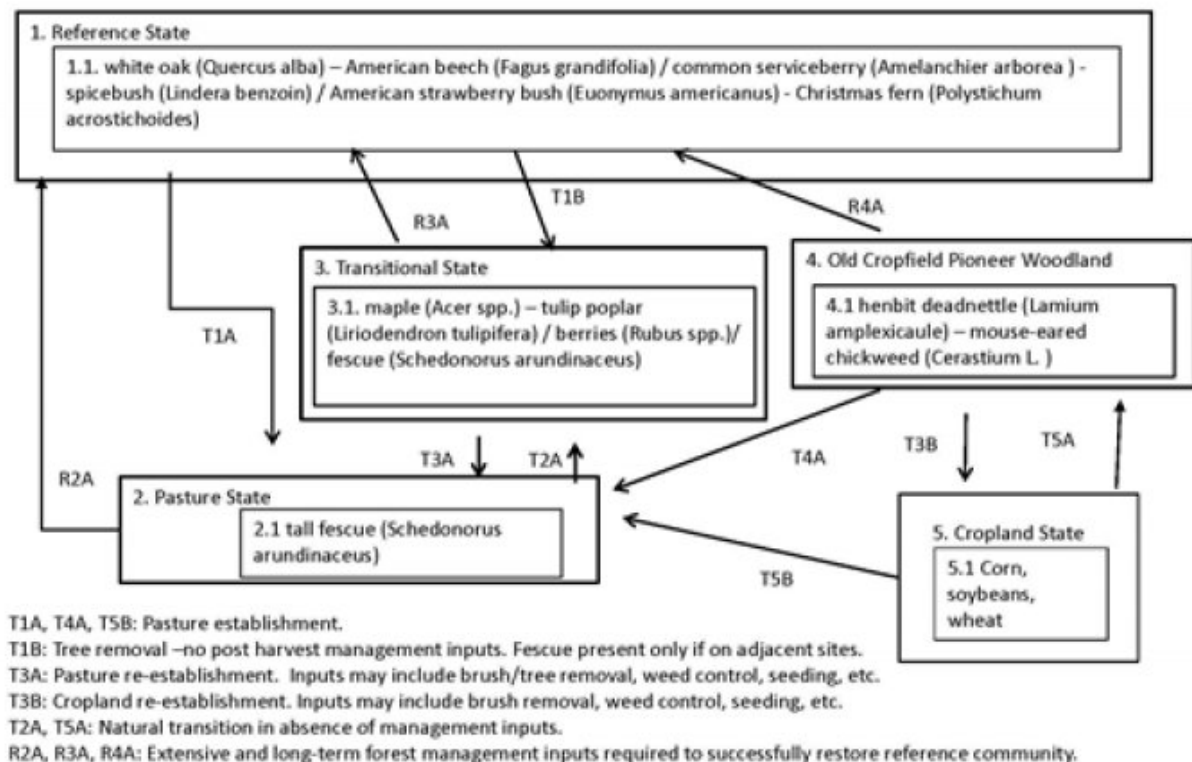


Figure 7. Group14

## Inventory data references

### Site Development and Testing Plan

Future work is needed, as described in a future project plan, to validate the information presented in this provisional ecological site description. Future work includes field sampling, data collection and analysis by qualified vegetation ecologists and soil scientists. As warranted, annual reviews of the project plan can be conducted by the Ecological Site Technical Team. A final field review, peer review, quality control, and quality assurance reviews of the ESD are necessary to approve a final document.

## Other references

- Abrams, M.D. 1992. Fire and the development of oak forests. *BioScience*, 42: 346–353.
- Abrams, M.D. and G.J.Nowacki. 2008. Native Americans as active and passive promoters of mast and fruit trees in the eastern USA. *The Holocene* 18.7. pp. 1123-1137.
- Alexander, H.D. and M.A. Arthur, D.L. Loftis, and S.R. Green. 2008. Survival and growth

of upland oak and co-occurring competitor seedlings following single and repeated prescribed fires. *Forest Ecology and Management* 256: 1021–1030.

Anderson, Michelle D. 2003. *Juniperus virginiana*. In: *Fire Effects Information System*, U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, and Fire Sciences Laboratory.

Anderson, R.C. & Brown, L.E. 1983. Comparative effects of fire on trees in a Midwestern savannah and an adjacent forest. *Bulletin of the Torrey Botanical Club*, 110: 87–90.

Baskin, J.M., C.C. Baskin, and E.W. Chester. 1994. The Big Barrens of Kentucky and Tennessee: Further observations and considerations. *Castanea* 59:226-254.

Black, B.A., Abrams, M.D. 2001. Influence of Native Americans and surveyor biases on metes and bounds witness tree distribution. *Ecology*. 82:2574-2586.

Braun, E.L. 1950. *Deciduous forests of Eastern North America*. Blakinston Co., Pennsylvania. Reprinted in 2001 by Blackburn Press, Caldwell, New Jersey.

Carmean, W.H. 1970. Site quality for eastern hardwoods. The silviculture of oaks and associated species. USDA Forest Service Research paper, Northeast. Forest Exp. Sta., Upper Darby, PA, NE-144: 36-56.

Carmean, W.H. 1971. Soil-site relationships of the upland oaks. Oak Symp. Proc. USDA Forest Service Research Paper. Northeast. Forest Exp. Sta., Upper Darby, PA. p. 23-29.

Carmean, Willard H.; Hahn, Jerold T.; Jacobs, Rodney D. 1989. Site index curves for forest species in the eastern United States. Gen. Tech. Rep. NC-128. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station.

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

Curtis, J. T., 1959. *Ecological Systems of the United States: A Working Classification of U.S. Terrestrial Systems*. NatureServe, Virginia. .

Denevan, W.M. 1992. The pristine myth: the landscape of the Americas in 1492. *Annals of the Association of American Geographers*, 82 (3), 369–385.

DeSelm, H. R. 1994. Tennessee barrens. *Castanea* 59(3):214-225.

Faber-Langendoen, D., editor. 2001. Plant communities of the Midwest: Classification in an ecological context. Association for Biodiversity Information, Arlington, VA. 61 pp. + appendix (705 pp.).

Fenneman, N.M. 1917. Physiographic subdivisions of the United States. Proceedings of the National Academy of Sciences of the United States of America. Vol. 3(1). pp. 17 -22.

Gleason, H.A. and A. Cronquist. Manual of Vascular Plants of Northeastern United States and Adjacent Canada. 2nd edition. The New York Botanical Garden, Bronx.

Griffith, G. E., J. M. Omernik, and S. H. Azevedo. 1998. Ecoregions of Tennessee. (Two-sided color poster with map, descriptive text, summary tables, and photographs). U.S. Geological Survey, Reston, VA. Scale 1:940,000.

Kartesz, J.T., The Biota of North America Program (BONAP). 2011. North American Plant Atlas (<http://www.bonap.org/MapSwitchboard.html>). Chapel Hill, N.C. [maps generated from Kartesz, J.T. 2010. Floristic Synthesis of North America, Version 1.0. Biota of North America Program (BONAP). (in press)].

Keever, C. 1978. A study of the mixed mesophytic, western mesophytic, and oak chestnut regions of the eastern deciduous forest including a review of the vegetation and sites recommended as potential natural landmarks. Millersville State College, Pennsylvania.

Kuchler, A.W. 1964. Potential natural vegetation of the conterminous United States. Spec. Publ. 36 New York, NY: American Geographical society.

Land Resource Regions and Major Land Resource Areas of the United States. United States Department of Agriculture Soil Conservation Service Handbook 296. Dec. 1981. 87-88.

Landfire [Landfire National Vegetation Dynamics Database]. 2007a. Landfire National Vegetation Dynamics Models. Landfire Project, USDA Forest Service, U.S. Department of Interior. (January - last update)

Lawless, P. J., Baskin, J. M. and C. C. Baskin. 2006. Xeric Limestone Prairies of Eastern United States: Review and Synthesis. The Botanical Review 73(4): 303–325. The New York Botanical Garden.

Lunt, I.D. & Spooner, P.G. 2005. Using historical ecology to understand patterns of biodiversity in fragmented agricultural landscapes. Journal of Biogeography, 32:1859–1873.

McNab, W.H. and P.E. Avers. 1994. Ecological subregions of the United States. U.S.

Forest Service. Prepared in cooperation with Regional Compilers and the ECOMAP Team of the Forest Service.

Miller, J.H., Chambliss, E.B. and Loewenstein, N.J. 2010. A field guide for the Identification of Invasive Plants in Southern Forests. US Forest Service Southern Research Station, General Technical Report SRS-119.

Parker, G.R. 1989. Old-growth forests of the Central Hardwood Region. Nat. Areas J. 9(1): 5-11.

Quarterman, E. and R.L. Powell. 1978. Potential ecological/geological natural landmarks on the Interior Low Plateaus. pp. 7-73. U.S. Department of the Interior, Washington, D.C. Quarterman,

Stritch, L.R. 1990. Landscape-scale restoration of barrens-woodland within the oak-hickory forest mosaic. Restoration & Management Notes 8: 73-77.

Somers, P., L. R. Smith, P. B. Hamel, and E. L. Bridges. 1986. Preliminary analyses of plant communities and seasonal changes in cedar glades of middle Tennessee. ASB Bulletin 33:178-192.

U.S. Department of Agriculture (USDA), Natural Resources Conservation Service. Soil surveys of Tennessee counties in MLRA 123.

U.S. Department of Agriculture-Forest Service, Agriculture Handbook 654, Silvics of North America.

Zollner, D., M.H. MacRoberts, B.R. MacRoberts, & D. Ladd. 2005. Endemic vascular plants of the Interior Highlands, U.S.A. Sida 21:1781-1791.

#### Websites:

Cleland, D. T., J. A. Freeouf, J. E. Keys, Jr., G. J. Nowacki, C. A. Carpenter, and W. H. McNab. 2007. Ecological Subregions: Sections and Subsections of the Conterminous United States.

GTR-WO-76C-1. [http://fsgeodata.fs.fed.us/other\\_resources/ecosubregions.html](http://fsgeodata.fs.fed.us/other_resources/ecosubregions.html)

Ecosystem classification of the United States; Ecological Subregions of the United States. 1994. Compiled by W. Henry McNab, Peter E. Avers, et al. Forest Service, U.S. Department of Agriculture [USDA], Washington, DC., USA:  
<http://www.fs.fed.us/land/pubs/ecoregions>

Environmental Mapping and Assessment Program (EMAP). 2004. Washington, DC., USA:

<http://www.epa.gov/docs/emap/>

Geospatial Data Gateways: <https://gdg.sc.egov.usda.gov/>

Landfire: <http://www.landfire.gov>

NatureServe. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. <http://www.natureserve.org/explorer>

Nashville Basin Limestone Glade and Woodland, Ecological System Comprehensive Report

[http://http://explorer.natureserve.org/servlet/NatureServe?searchSystemUid=ELEMENT\\_GLOBAL.2.723170](http://http://explorer.natureserve.org/servlet/NatureServe?searchSystemUid=ELEMENT_GLOBAL.2.723170)

Official Soil Series Descriptions, USDA-NRCS:  
<https://soilseries.sc.egov.usda.gov/osdname.asp>

Silvics of North America, US Forest Service.  
[http://www.na.fs.fed.us/spfo/pubs/silvics\\_manual/table\\_of\\_contents.htm](http://www.na.fs.fed.us/spfo/pubs/silvics_manual/table_of_contents.htm)

USDA Plants: <http://plants.usda.gov/java/>

U.S. Geological Survey (USGS), Center for Biological Informatics (CBI) 2004. U.S. Department of the Interior: <http://biology.usgs.gov/cbi>

Vascular Plant Image Library: <http://botany.csd.tamu.edu/FLORA/imaxxara.htm>

Vegetation Mapping Program, National Vegetation Classification Standard. 2004. Vegetation Classification Standard, Vegetation Subcommittee, U.S. Geological Survey [USGS; U.S. Department of the Interior], Reston, Virginia, USA.  
<http://www.fgdc.gov/standards/projects/FGDC-standards-projects/vegetation>

Vegbank: [www.vegbank.org](http://www.vegbank.org)

Web Soil Survey, USDA-NRCS: <http://websoilsurvey.nrcs.usda.gov/app/>

Woodland Wildflowers of Illinois:  
[http://www.illinoiswildflowers.info/woodland/woodland\\_index.htm](http://www.illinoiswildflowers.info/woodland/woodland_index.htm)

U.S. Department of Agriculture, Forest Service. 1994. Ecosystem classification of the United States; Ecological Subregions of the United States. Compiled by W. Henry McNab, Peter E. Avers, et al., Washington, DC. <http://www.fs.fed.us/land/pubs/ecoregions>

U.S. Department of the Interior. 2004. Vegetation Mapping Program, National Vegetation

Classification Standard. <http://biology.usgs.gov/npsveg>

U.S. Geological Survey (USGS), Center for Biological Informatics (CBI) 2004. U.S. Department of the Interior. <http://biology.usgs.gov/cbi>

## Approval

Matthew Duvall, 5/14/2025

## 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	05/21/2025
Approved by	Matthew Duvall
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:**

---