Ecological site F119XY026AR
Clayey Backslope

Accessed: 05/22/2024

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.

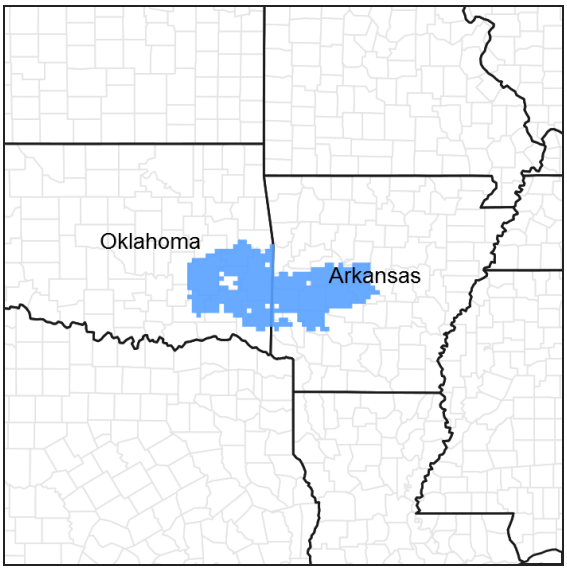

Figure 1. Mapped extent

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): 119X–Ouachita Mountains

This ecological site is found in MLRA 119: Ouachita Mountains.
This area is in the Ouachita Mountains Section of the Ouachita Province of the Interior Highlands. The steep mountains are underlain by folded and faulted sedimentary and metamorphic rocks. Most of the stream valleys are narrow and have steep gradients, but wide terraces and flood plains border the Ouachita River in western Arkansas. Elevation ranges from 330 feet (100 meters) on the lowest valley floors to 2,625 feet (800 meters) on the highest mountain peaks. Local relief is generally 100 to 200 feet (30 to 60 meters), but it can exceed 980 feet (300 meters).

Classification relationships

Ozark-Ouachita Mesic Hardwood Forest
Summary: This system is found on lower slopes, toeslopes and valley bottoms within the Ozark and Ouachita regions, as well as on north slopes. In the Ozarks, Quercus rubra increases in abundance compared to dry-mesic habitats, and Acer saccharum is sometimes a leading dominant. On more alkaline moist soils, Quercus muehlenbergii, Tilia americana, and Cercis canadensis may be common. In the Boston Mountains, mesic forests may also be common on protected slopes and terraces next to streams. Here, Fagus grandifolia may be the leading dominant, with codominants of Acer saccharum, Liquidambar styraciflua, Tilia americana, Magnolia acuminata, Magnolia tripetala, and others. Similar habitats occur in the western Ouachita Mountains.

Ecological site concept

This site is on greater than 15 percent backslopes with udic moisture and thermic temperature regimes. It has clayey soils with high available water.

Table 1. Dominant plant species

Tree	(1) *Quercus alba*
Shrub	Not specified
Herbaceous	(1) *Desmodium*

Physiographic features

This site is on 12 to 60 percent back slopes of hill and mountainsides.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Mountain slope
Flooding frequency	None
Ponding frequency	None
Elevation	91–549 m
Slope	12–60%
Ponding depth	0 cm
Water table depth	61–76 cm
Aspect	SE

Climatic features

Table 3. Representative climatic features

Frost-free period (average)	189 days
Freeze-free period (average)	213 days
Precipitation total (average)	1,397 mm

Climate stations used

- (1) WILBURTON 9 ENE [USC00349634], Red Oak, OK
- (2) ALUM FORK [USC00030130], Paron, AR
- (3) BLAKELY MTN DAM [USC00030764], Mountain Pine, AR
- (4) TUSKAHOMA [USC00349023], Tuskahoma, OK

Influencing water features

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

Soil features

The soil series associated with this site are: Townley, Stapp, Littlefir, Honobia, Endsaw, Carnasaw, Bengal. They are Moderately deep to Deep, Moderately well drained to Well drained, and Slow to Moderate permeable soils, with very acidic to strongly acidic soil reaction, that formed in Colluvium and Residuum from Acid shale, Sandstone and shale, and siltstone.

Table 4. Representative soil features

Parent material	(1) Colluvium–sandstone and shale (2) Residuum–acid shale
Surface texture	(1) Cobbly clay loam (2) Stony silty clay loam (3) Bouldery loam
Family particle size	(1) Clayey
Drainage class	Moderately well drained to well drained
Permeability class	Slow to moderate
Soil depth	61–150 cm
Surface fragment cover <=3"	0–10%
Surface fragment cover >3"	2–10%
Available water capacity (0-101.6cm)	5.08–14.73 cm
Calcium carbonate equivalent (0-101.6cm)	0%
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	5–5.3
Subsurface fragment volume <=3" (Depth not specified)	1–20%
Subsurface fragment volume >3" (Depth not specified)	0–65%

Ecological dynamics

Information contained in this section was adapted from Missouri ESD. 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.

While the upland prairies and savannahs in the area may have had a fire frequency of 1 to 3 years, Clayey Backslope Forests burned less frequently (5 to 20 years) and with lower intensity. Occurrences in landscape positions closer to prairies were more likely to burn, and may have been maintained in a more open, woodland condition.

In addition to periodic fire, these ecological sites were subjected to occasional disturbances from wind and ice, as well as grazing by native large herbivores, such as bison, elk, and deer. Wind and ice would have periodically opened the canopy up by knocking over trees or breaking substantial branches off canopy trees. Grazing by native large herbivores would have effectively kept understory conditions more open, creating conditions more favorable to oak reproduction.

Today, many of these ecological sites have been cleared and converted to pasture or have undergone repeated timber harvest and domestic grazing. Most existing forested ecological sites have a younger (50 to 80 years) canopy layer whose species composition and quality has been altered by timber harvesting practices. An increase in hickories over historic conditions is not uncommon. In addition, in the absence of fire, the canopy, sub-canopy and understory layers are more fully developed. On these protected slopes, the absence of periodic fire has allowed

more shade tolerant tree species, such as sugar maple, white ash, and hickories to increase.
Uncontrolled domestic grazing has also impacted these communities, further diminishing the diversity of native plants and introducing species that are tolerant of grazing. Grazed sites also have a more open understory. In addition, soil compaction and soil erosion related to grazing can be a problem and lower site productivity.
These ecological sites are moderately productive sites. Oak regeneration is typically problematic. Sugar maple, ironwood, hickories are often dominant competitors in the understory. Maintenance of the oak component will require disturbances that will encourage more sun adapted species and reduce shading effects.
Single tree selection timber harvests are common in this region and often results in removal of the most productive trees (high grading) in the stand leading to poorer quality timber and a shift in species composition away from more valuable oak species. Better planned single tree selection or the creation of group openings can help regenerate and maintain more desirable oak species and increase vigor on the residual trees.
Clear cutting also occurs and results in dense, even-aged stands dominated by oak. This may be most beneficial for existing stands whose composition has been highly altered by past management practices. However, without some thinning of the dense stands, the ground flora diversity can be shaded out and diversity of the stand may suffer.
Protected aspect forests did evolve with some fire, but their composition often reflects more closed, forested conditions, with fewer woodland ground flora species that can respond to fire. Consequently, while having protected aspects in a burn unit is acceptable, targeting them solely for woodland restoration is not advisable.

A State and Transition Diagram is depicted in Figure 1. Detailed descriptions of each state, transition, plant community, and pathway follow the model. This model is based on available experimental research, field observations, professional consensus, and interpretations. It is likely to change as knowledge increases.

State and transition model

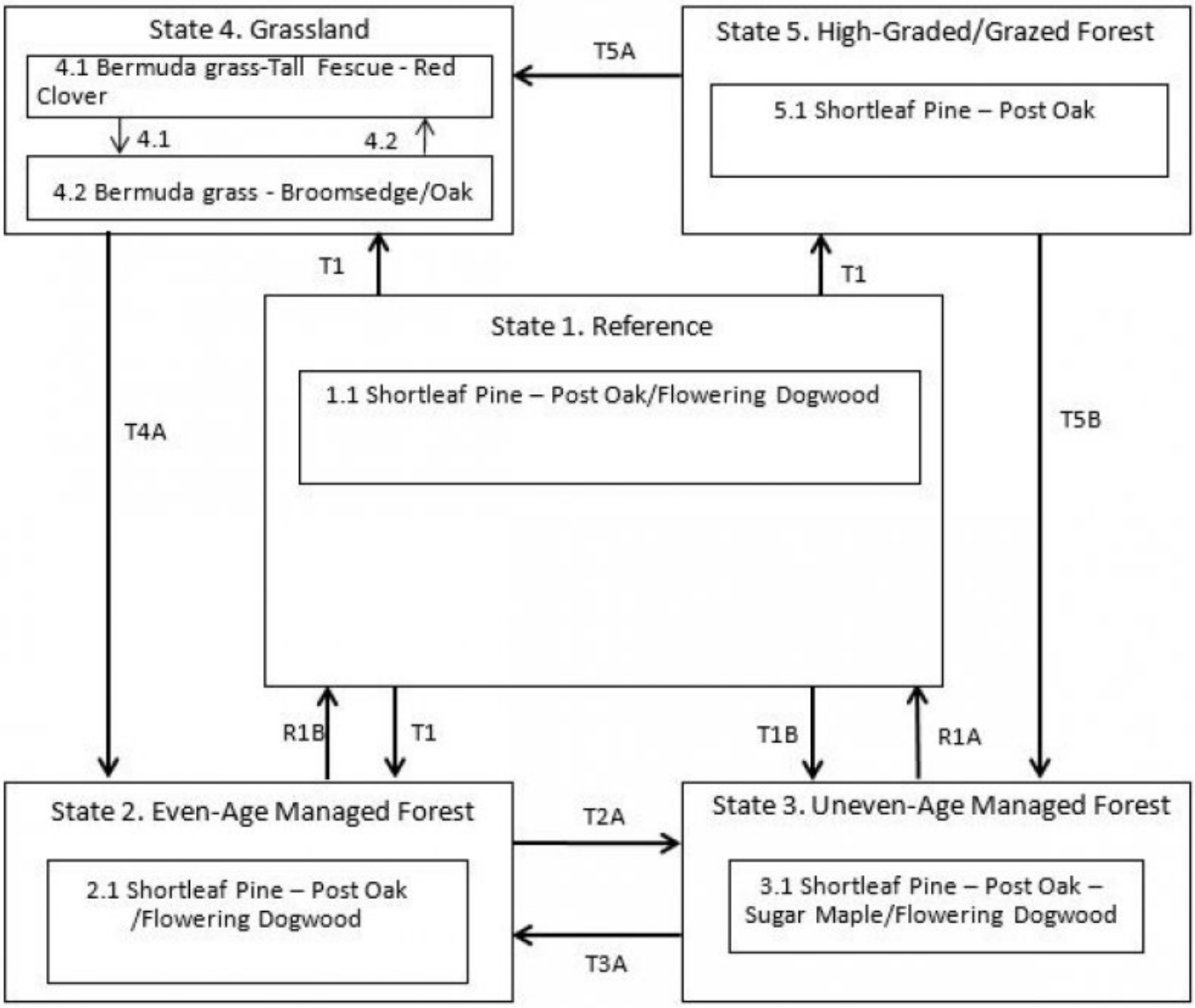

Figure 6. F119XY026AR, Clayey Backslope

Code	Activity/Event/Process
T1A	Harvesting; even-aged management
T1B	Harvesting; uneven-age management
T1C, T5A	Clearing; pasture planting
T1D	High-grade harvesting; uncontrolled grazing
T2A	Uneven-age management
T3A	Even-age management
T4A, T5A	Tree planting; long-term succession; no grazing
T5B	Uneven-age management; tree planting; no grazing
4.1A	Over grazing; no fertilization
4.2A	Brush management; grassland seeding; grassland management
Code	Activity/Event/Process
R1A	Extended rotations; prescribed fire
R1B	Uneven-age mgt, extended rotations; prescribed fire

Figure 7. F119XY026AR, Clayey Backslope

State 1
Reference

The reference state was dominated by Post oak and Shortleaf pine. Periodic disturbances from fire, wind or ice maintained the dominance of oaks by opening up the canopy and allowing more light for oak reproduction. Long disturbance-free periods allowed an increase in more shade tolerant species such as hickory and sugar maple. Two community phases are recognized in this state, with shifts between phases based on disturbance frequency. The reference state is rare today. Some sites have been converted to grassland (State 4). Others have been subject to repeated, high-graded timber harvest coupled with uncontrolled domestic livestock grazing (State 5). Fire suppression has also resulted in increased canopy density, which has affected the abundance and diversity of ground flora. Many reference sites have been managed for timber harvest, resulting in either even-age (State 2) or uneven-age (State 3) forests.

Other references

NatureServe. 2015. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia.
Available http://explorer.natureserve.org. (Accessed: October 27, 2015).

Official Soil Survey, USDA-NRCS: https://soilseries.sc.egov.usda.gov/osdname.asp

Landfire: http://www.landfire.gov 2015 data

United States Department of Agriculture Handbook 296: Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin

NASIS database 2016 NASIS Client Version Number 6.4.1 and database model 7.2.5

Contributors

Kevin Godsey

Acknowledgments

Doug Wallace and Fred Young at Missouri NRCS State office, personal communication and sharing of state and transition models.

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):

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

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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:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

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14. **Average percent litter cover (%) and depth (in):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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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:**
