Ecological site F119XY005AR
Clayey Moderately Drained Upland

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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.

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 Shortleaf Pine-Oak Forest and Woodland

Summary: This system represents forests and woodlands of the Ouachita and Ozark mountains region of Arkansas, adjacent Oklahoma, and southern Missouri in which Pinus echinata is an important or dominant component. Although examples of this system occur throughout this region, there is local variation in the extent to which they were present. For example, in the Ozark Highlands, this system was historically prominent only in the southeastern part where sandstone-derived soils were common, and in the southern part on soils derived from chert, being excluded from or diminished in other areas by non-conducive soils. In contrast, pine was virtually ubiquitous in the historical forests of the Ouachitas. In nearly all cases (at least in the Ouachitas), Pinus echinata occurs with a

variable mixture of hardwood species. The exact composition of the hardwoods is much more closely related to aspect and topographic factors than is the pine component. In some examples of this system, the aggregate importance of hardwoods may be greater than pine, especially on subxeric and mesic sites.

Ecological site concept

This site is a woodland on less than 15 percent slopes in the uplands with udic moisture and thermic temperature regimes. It has moderately drained clayey soils with greater than 3 inches of Available water.

Table 1. Dominant plant species

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

Physiographic features

These sites are on slopes 1 to 15 percent on back slopes of hill slopes.

Table 2. Representative physiographic features

Landforms	(1) Hill
Flooding frequency	None
Ponding frequency	None
Elevation	298–1,994 ft
Slope	1–15%
Water table depth	24–30 in
Aspect	SE

Climatic features

Table 3. Representative climatic features

Frost-free period (average)	195 days
Freeze-free period (average)	216 days
Precipitation total (average)	56 in

Climate stations used

- (1) MT IDA 3 SE [USC00034988], Mount Ida, AR
- (2) TUSKAHOMA [USC00349023], Tuskahoma, OK
- (3) BROKEN BOW DAM [USC00341168], Broken Bow, OK
- (4) BLAKELY MTN DAM [USC00030764], Mountain Pine, AR
- (5) BATTIEST [USC00340567], Bethel, OK
- (6) MCGEE CREEK DAM [USC00345713], Atoka, 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: Stapp, Littlefir. 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 Residuum from Acid shale,and siltstone.

Table 4. Representative soil features

Parent material	(1) Residuum–shale and siltstone
Surface texture	(1) Stony fine sandy loam (2) Very gravelly loam (3) Silt loam
Family particle size	(1) Clayey
Drainage class	Moderately well drained to well drained
Permeability class	Slow to moderate
Soil depth	30–45 in
Surface fragment cover <=3"	2–8%
Surface fragment cover >3"	1–8%
Available water capacity (0-40in)	4.2–6 in
Calcium carbonate equivalent (0-40in)	0%
Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	5–5.3
Subsurface fragment volume <=3" (Depth not specified)	2–35%
Subsurface fragment volume >3" (Depth not specified)	0–65%

Ecological dynamics

The information presented is representative of very complex vegetation communities. 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.
The reference plant community is woodland dominated by an overstory of oak and short leaf pine. Woodlands are distinguished from forest, by their relatively open understory, and the presence of sun-loving ground flora species including the dominant prairie grasses. Characteristic plants in the ground flora can be used to gauge the restoration potential along with remnant open-grown old-age trees, and tree height growth.

Fire played an important role in the maintenance of these systems. Because Shale Uplands normally occur next to the prairie edge, it is likely that these ecological sites burned at least once every 3 to 5 years. These periodic fires kept woodlands open, removed the litter, and stimulated the growth and flowering of the grasses and forbs. During fire free intervals, woody understory species increased and the herbaceous understory diminished. The return of fire would open the woodlands up again and stimulate the abundant ground flora.

Today, this community has either been cleared and converted to pasture or cropland, or has grown dense in the absence of fire. In the long term absence of fire, woody species, especially hickory encroach into these woodlands. Once established, these woody plants can quickly fill the existing understory increasing shade levels greatly diminishing the ground flora. Removal of the younger understory and the application of prescribed fire have proven to be effective management tools.

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.

Shale Uplands, if managed properly, can be a source for timber products especially pine. Most areas on this ecological site have been repeatedly logged and high graded. Even-age management, using clearcut, or shelterwood and seed-tree harvest systems without fire will perpetuate the overly dense, shaded conditions. Thinning and/or occasional partial cuts, using an uneven-age management system can provide sunlight to the woodland floor, stimulating native woodland ground flora. However, in the absence of fire and continual cultural treatments, oak sprouting creates a dense stand, again shading out the sun-loving ground flora. Partial cutting and prescribed fire can restore the more open structure and diversity of ground flora species. This type of site with proper management can provide timber products, wildlife habitat, and potential native forage.

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

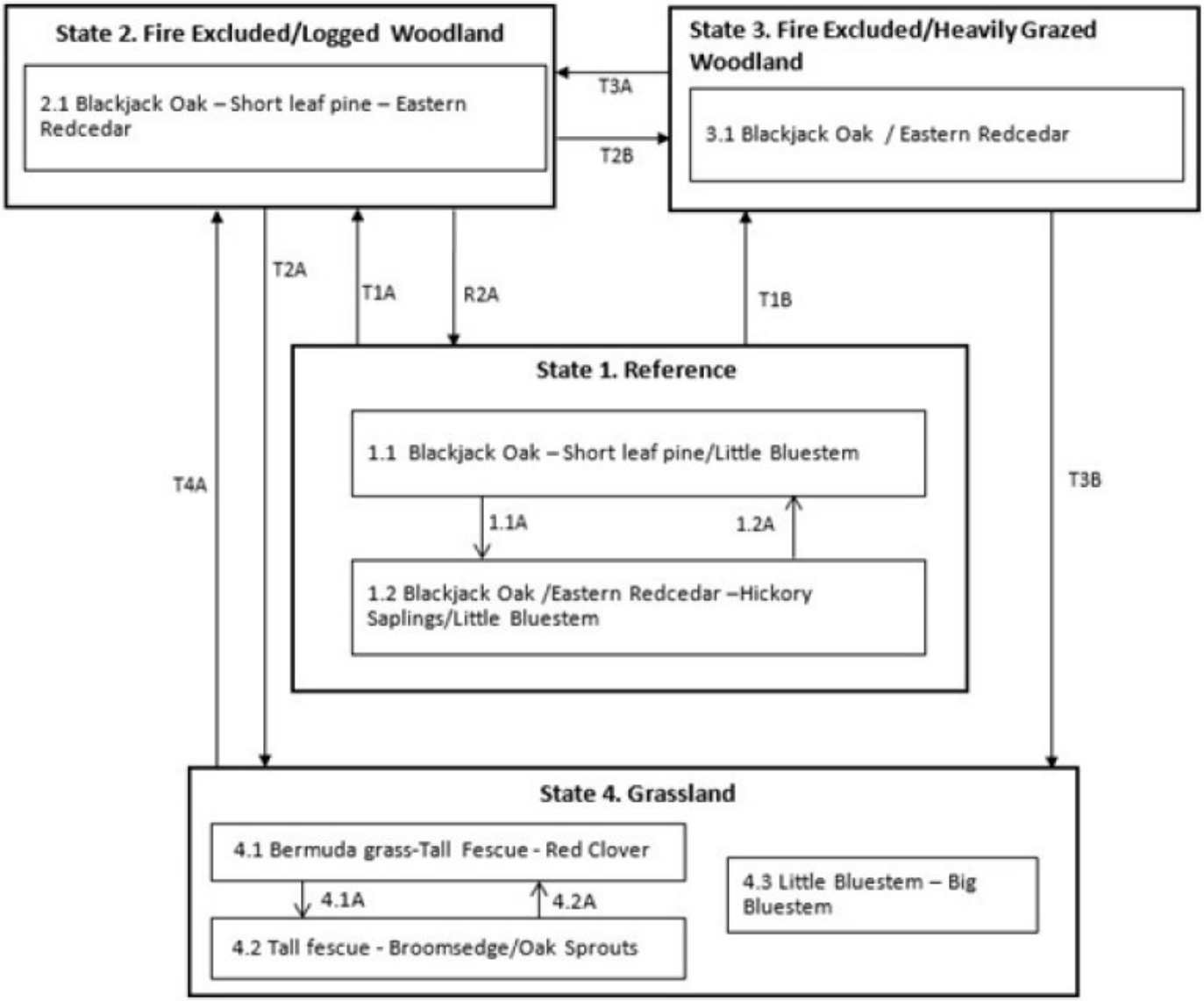

Figure 6. F119XY005AR, Clayey Moderately Drained Upland

Code	Event/Activity
T1A	Fire suppression; fire-free interval (20+ years); logging
T1B	Fire suppression; heavy grazing by livestock; logging
T2B	Uncontrolled domestic grazing
T3A	Livestock removal
T2A, T3B	Clearing; pasture seeding; grassland management
T4A	Tree planting; long term succession (50+ years); no grazing
R2A	Understory removal; prescribed fire
1.1A	Fire-free interval 10-20 years
1.2A	Fire 3-10 year cycle
4.1A	Over grazing; no fertilization
4.2A	Brush management; grassland seeding; grassland management

Figure 7. F119XY005AR, Clayey Moderately Drained Upland

State 1
Reference

The restricted soil depth, droughty conditions, and native grasses made them susceptible to frequent fires, once every 3 to 5 years. Consequently, fire-tolerant oak dominated the open-canopy overstory, and the understory consisted of a dense cover of native grasses and forbs (Community 1.1). During fire-free intervals, eastern redcedar, along with hickories and oak sprouts, increased in abundance and competed with the herbaceous ground flora, creating more brushy woodland (Community 1.2). However, the return of fire would re-open the woodland and promote the ground flora.

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

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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:**
