

Ecological site F119XY028AR

Rubbly Shallow Backslope

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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): 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-Bluestem Woodland. Summary: This system represents woodlands of the Ouachita and Ozark mountains region of Arkansas, adjacent Oklahoma, and southern Missouri in which *Pinus echinata* is the canopy dominant, and the understory is characterized by *Andropogon gerardii*, *Schizachyrium scoparium*, and other prairie plants. Although examples of this system occur throughout this region, there is local variation in the extent to which they were present. The center of distribution is the northern and western Ouachita Mountains, and it is best developed in large, dry, and flat to gently undulating portions of the landscape which carry fire well, creating extensive natural fire compartments. In the Ouachitas, the system occurs on the northern Hogback Ridges excluding the Novaculite areas to the south. These are large, gently sloping, east/west-trending ridges of sandstone and shale, the south-facing slopes of which constitute large fire compartments. In nearly all examples, *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 the Ozark Highlands this system is less extensive but was historically prominent where sandstone-derived soils are common. In Missouri and Oklahoma, this system occurs on gently dissected upland cherty plains (in addition to sandstone ridges).

Table 1. Dominant plant species

Tree	(1) <i>Pinus echinata</i>
Shrub	Not specified
Herbaceous	(1) <i>Andropogon</i>

Physiographic features

This site is on rubbly 3 to 70 percent back slopes of hill and mountainsides.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Mountain slope
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Flooding frequency	None
Ponding frequency	None
Elevation	30 – 550 m
Slope	0 – 70 %
Ponding depth	0 cm
Aspect	SE

Climatic features

Table 3 Representative climatic features

Frost-free period (average)	190 days
Freeze-free period (average)	210 days
Precipitation total (average)	1,370 mm

- (1) WILBURTON 9 ENE [USC00349634], Red Oak, OK
- (2) MT IDA 3 SE [USC00034988], Mount Ida, AR
- (3) WALDRON [USC00037488], Waldron, 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: Clebit, Bismarck. They are shallow, Well drained to Somewhat excessively drained, and Moderate to Moderately rapid permeable soils, with very acidic to strongly acidic soil reaction, that formed in Residuum from Acid shale, Sandstone.

Table 4. Representative soil features

Parent material	(1) Residuum – sandstone and shale
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Surface texture	(1) Very gravelly fine sandy loam (2) Very cobbly loam (3) Very stony silt loam
Family particle size	(1) Loamy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderate to moderately rapid
Soil depth	30 – 50 cm
Surface fragment cover <=3"	0 – 70 %
Surface fragment cover >3"	20 – 70 %
Available water capacity (0-101.6cm)	2.29 – 4.57 cm
Calcium carbonate equivalent (0-101.6cm)	Not specified
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	Not specified
Soil reaction (1:1 water) (0-101.6cm)	10 – 5.5
Subsurface fragment volume <=3" (Depth not specified)	0 – 50 %

Subsurface fragment volume >3" (Depth not specified)	0 – 70 %
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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.

The reference community Rubbly Shallow Backslope is closed woodland with a moderately developed canopy (65 to 90 feet tall and 60 to 80 percent canopy closure) dominated by white oak and shortleaf pine. Compared to the uplands above or adjacent exposed slopes, these are often one of the more productive sites in their vicinity. The moderately deep soils and occasional fires make this community transitional between woodland and forest, with more open woodland conditions being created briefly after the periodic fires and denser forest conditions during fire free intervals. These sites likely had an abundance of several huckleberry species, along with a diverse array of native legumes, asters, sunflowers and other forbs. Woodlands are distinguished from forests by their relatively open understory and the presence of sun-loving ground flora species.

Historically, Rubbly Shallow Backslope Woodlands were also 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 herbivores would have effectively kept understory conditions more open, creating conditions more favorable to oak reproduction and ground flora species.

Species composition and structure of the reference plant community varied for this ecological site based on its relative location to the Ouachita Mountains historic native shortleaf pine range. Fragmentary evidence from old records indicate that the original timber stands in the Ouachita Mountains contained a large volume of shortleaf pine on relatively few, concentrated areas, (green area on preceding map) but a relatively small volume of shortleaf pine on extensive areas (cross-hatched area on preceding map) (Fletcher and McDermott, 1957). Because of this situation, this ecological site is classified into two community phases. When the ecological site occurs outside of the historic native pine range, the community phase expressed is a well-developed Oak Woodland dominated by an overstory of white oak, black oak and scarlet oak. Within the historic native pine range, the community phase is characterized as Oak-Pine Woodland, with shortleaf pine as a common overstory species. Soil gravels, droughtiness, low soil bases and complicated landscape complexes are unifying soil features of these rather divergent community phases.

The Oak Woodland phase of Rubbly Shallow Backslope Woodland is a woodland with a moderately developed canopy (60 to 80 feet tall and 65 to 85 percent canopy closure) dominated by white oak and shortleaf pine. Increased light from the more open canopy causes a diversity of ground flora species to flourish. Within the historical native pine range this ecological site contained drought and fire-tolerant shortleaf pine, with occasional to frequent black oak and white oak. Canopy closure likely varied from 60 to 80 percent and tree height from 70 to 90 feet. Native prairie grasses dominated the open understory, along with a diverse mix of native legumes, asters, sunflowers and other forbs. Most of this oak-pine community was cleared by extensive logging around 1890 to 1920. Consequently, persistent sprouting of oak species, especially black and scarlet oak, replaced the pine.

Today, dense, even age stands of oak have replaced much of this community. Most occurrences today exhibit canopy closure of 80 to 100 percent with a greatly diminished ground flora. In the long term absence of fire, woody species, especially scarlet oak, hickory, and black oak have increased in these woodlands. Once established, these woodies can quickly fill the woodland system.

Uncontrolled domestic grazing is also impacting these communities, further diminishing the diversity of native plants and introducing invasive species that are tolerant of grazing, such as buckbrush, gooseberry, Virginia creeper. Grazed sites also have a more open understory. In addition, soil compaction and soil loss from grazing can lower site productivity.

These ecological sites are moderately productive. Some areas have been cleared for non-native pasture, but many areas have been repeatedly logged and high graded. Maintenance of the oak component will require disturbances that encourage more sun adapted species and reduce shading effects. Characteristic plants in the ground flora can be used to gauge the restoration potential of a stand along with remnant open-grown old-age trees. Removal of the younger understory and the application of prescribed fire have proven to be effective management applications. Despite the widespread removal of pine from this ecological type, there are many areas with some pine present on this ecological site. Where present, selective cutting and prescribed fire can help recruit pine, restore the more open structure, and increase the diversity of ground flora species.

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 5. F119XY028AR, Rubbly Shallow Backslope

Figure 6. F119XY028AR, Rubbly Shallow Backslope

Additional community tables

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):

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:
