Ecological site F119XY001AR
Igneous 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.

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

The NatureServe area associated with this site is: OZARK-OUACHITA DRY OAK WOODLAND
This system occurs in the Ozark and Ouachita Highlands and far western portions of the Interior Low Plateau regions along gentle to steep slopes and over bluff escarpments with southerly to westerly aspects. Parent material can range from calcareous to acidic with very shallow, well- to excessively well-drained soils, sometimes with a fragipan that causes "xero-hydric" moisture conditions. Historically, this system primarily exhibited a woodland structure with related composition and processes, but now most stands have a more closed canopy. Oak species such as Quercus stellata, Quercus marilandica, and Quercus coccinea dominate this system with an understory of grassland species such as Schizachyrium scoparium and shrub species such as Vaccinium arboreum.
Drought stress is the major dynamic influencing and maintaining this system. Some examples are flatwoods with fragipans; in these examples Quercus stellata is the major dominant. In addition, Quercus alba, Quercus falcata, and/or Carya texana may be present in some stands.

Ecological site concept

This site is an Oak-Hickory woodland on slopes less than 20 percent in the udic moisture and thermic temperature regimes. Many of the sites have been converted to pastures.

Table 1. Dominant plant species

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

Physiographic features

These sites are found on hillside positions of less than 20 percent slope with parent material from an intruding igneous dike.

Table 2. Representative physiographic features

Landforms	(1) Dike
Flooding frequency	None
Ponding frequency	None
Elevation	600–1,200 ft
Slope	3–20%
Aspect	SE, NW

Climatic features

Table 3. Representative climatic features

Frost-free period (average)	202 days
Freeze-free period (average)	232 days
Precipitation total (average)	58 in

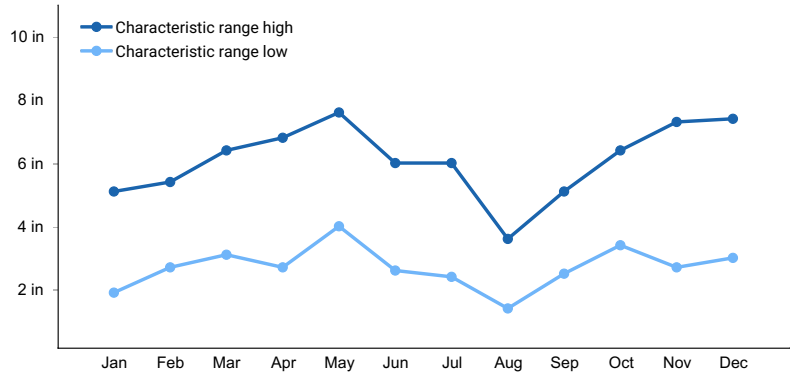

Figure 1. Monthly precipitation range

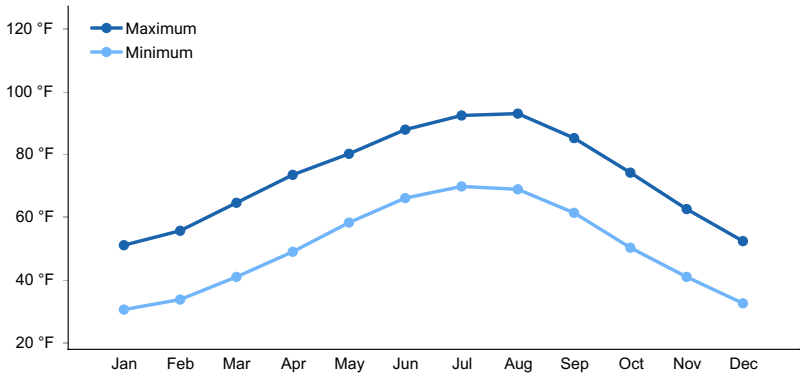

Figure 2. Monthly average minimum and maximum temperature

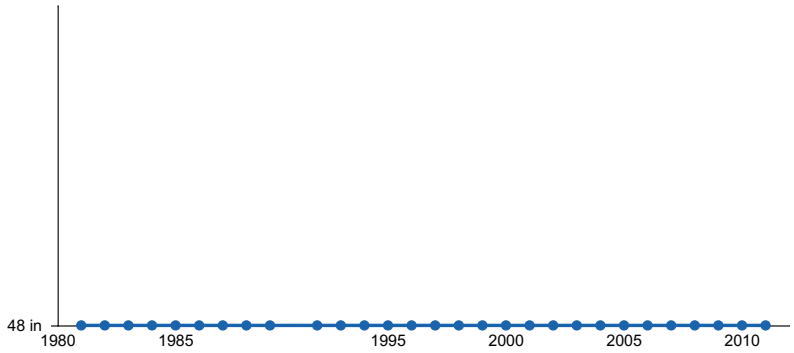

Figure 3. Annual precipitation pattern

Climate stations used

- (1) HOT SPRINGS 1 NNE [USC00033466], Hot Springs National Park, AR
- (2) BLAKELY MTN DAM [USC00030764], Mountain Pine, AR
- (3) HOT SPRINGS ASOS [USW00003962], Donaldson, AR

Influencing water features

This site is not associated with any water features.

Soil features

The soil series associated with this site is Magnet.
These are well drained loamy moderately deep, moderately permeable, acidic soils created from igneous residuum.

Table 4. Representative soil features

Parent material	(1) Residuum–granite
Surface texture	(1) Stony loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately slow to moderately rapid
Soil depth	31 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	4.7–5 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)	5.5–6.1
Subsurface fragment volume <=3" (Depth not specified)	4–10%
Subsurface fragment volume >3" (Depth not specified)	1–15%

Ecological dynamics

State and transition model

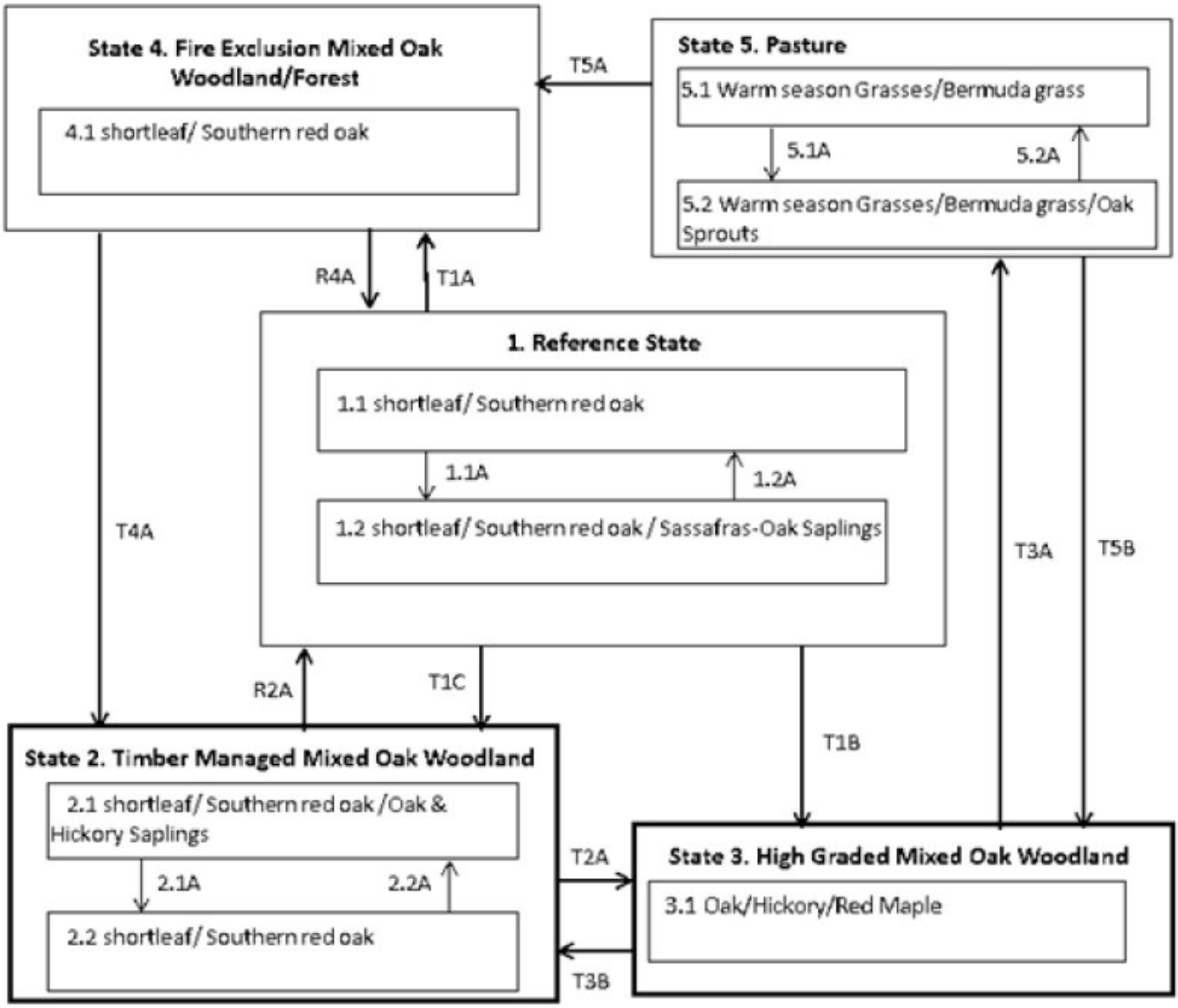

Figure 5. Igneous Upland, F119XY001AR

Code	Event/Process
T1A	Fire suppression > 20 years
T1B, T2A	Logging – high grading
T3A	Clearing; grassland seeding; grassland management
T1C, T4A, 2.2A	Managed forest harvesting
1.1A	Fire-free interval 10-15 years
1.2A	Fire interval 3-5 years
2.1A	20-30 years of limited logging disturbance
5.1A	Over grazing; no fertilization
5.2A	Brush management; grassland seeding; grassland management
R2A, R4A	Selective thinning and prescribed fire interval 3-5 years
R3A	Logging cessation; selective thinning
R5A	Cessation of grazing & haying; native tree, forb and grass planting

Figure 6. Igneous Upland, F119XY001AR

State 1
Reference State

Narrative: The historical reference state for this ecological site was old growth oak woodland with an open understory and a dense ground flora of native grasses and forbs. This state was dominated by white oak, with occasional red oak, post oak, and shortleaf pine. Maximum tree age was likely 150 to 300 years. Periodic disturbances from fire, wind or ice maintained the woodland structure and diverse ground flora species. Long disturbance-free periods allowed an increase in both the density of trees and the abundance of shade tolerant species. Two community phases are recognized in the reference state, with shifts between phases based on disturbance frequency. Reference sites are very rare today. Most of these sites have been subject to repeated, high-graded timber harvest (State 3). Fire suppression has resulted in increased canopy density, which has affected the abundance and diversity of ground flora (State 4). Relatively few Igneous Upland Woodlands have been managed effectively for timber harvest (State 2), resulting in either even-age or uneven-age 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):**

   _____

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:**
