Ecological site F116AY009MO
Calcareous Dolomite Upland Woodland

Last updated: 9/24/2020
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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): 116A–Ozark Highland

The Ozark Highland constitutes the Salem Plateau of the Ozark Uplift. Elevation ranges from about 300 feet on the southeast edge of the Ozark escarpment, to about 1,600 feet in the west, adjacent to the Burlington Escarpment of the Springfield Plateau. The underlying bedrock is mainly horizontally bedded Ordovician-aged dolomites and sandstones that dip gently away from the uplift apex in southeast Missouri. Cambrian dolomites are exposed on deeply dissected hillslopes. In some places, Pennsylvanian and Mississipian sediments overlie the plateau. Relief varies, from the gently rolling central plateau areas to deeply dissected hillslopes associated with drainageways such as the Buffalo, Current, Eleven Point and White Rivers.

Classification relationships

Terrestrial Natural Community Type in Missouri (Nelson, 2010):
The reference state for this ecological site is most similar to a Dry Limestone/Dolomite Woodland.

Missouri Department of Conservation Forest and Woodland Communities (MDC, 2006):
The reference state for this ecological site is most similar to a Limestone/Dolomite Woodland.

National Vegetation Classification System Vegetation Association (NatureServe, 2010):

The reference state for this ecological site is most similar to Quercus muehlenbergii - Fraxinus (quadrangulata, americana) / Schizachyrium scoparium Woodland (CEGL002143).

Geographic relationship to the Missouri Ecological Classification System (Nigh & Schroeder, 2002):
This ecological site occurs in scattered locations throughout the Ozark Highlands Section, primarily within the following Subsections:
Current River Hills
Elk River Hills

Ecological site concept

NOTE: This is a “provisional” Ecological Site Description (ESD) that is under development. It contains basic ecological information that can be used for conservation planning, application and land management. After additional information is collected, analyzed and reviewed, this ESD will be refined and published as “Approved”.

Calcareous Dolomite Upland Woodlands are typically associated with glades on dissected hillslopes of major streams, especially the Current, Pomme de Terre, Black, and Elk rivers. Soils are high in bases, and are moderately deep over dolomite bedrock, with gravelly surfaces. The reference plant community is woodland with an overstory dominated by chinkapin oak, with minor elements of white ash, blue ash and Shumard oak and a ground flora of native grasses and forbs with scattered shrubs.

Associated sites

F116AY010MO	**Calcareous Dolomite Protected Backslope Forest** Calcareous Dolomite Protected Backslope Forests are often downslope, on steep lower backslopes with northern to eastern aspects.
F116AY037MO	**Gravelly/Loamy Upland Drainageway Forest** Gravelly/Loamy Upland Drainageway Forests are often downslope.
F116AY044MO	**Chert Dolomite Upland Woodland** Chert Dolomite Upland Woodlands are often adjacent or upslope.
F116AY047MO	**Calcareous Dolomite Exposed Backslope Woodland** Calcareous Dolomite Exposed Backslope Woodlands are often downslope, on steep lower backslopes with southern to western aspects.
R116AY020MO	**Shallow Dolomite Upland Glade/Woodland** Shallow Dolomite Upland Glade/Woodlands are typically directly upslope.

Similar sites

F116AY047MO	**Calcareous Dolomite Exposed Backslope Woodland** Calcareous Dolomite Exposed Backslope Woodlands are often similar in species composition to Calcareous Dolomite Upland Woodlands but sites are generally dyer and more sloping.

Table 1. Dominant plant species

Tree	(1) *Quercus muehlenbergii* (2) *Quercus shumardii*
Shrub	(1) *Rhus aromatica*
Herbaceous	(1) *Schizachyrium scoparium* (2) *Helianthus hirsutus*

Physiographic features

This site is on upland summits, shoulders and backslopes with slopes of 3 to 15 percent. Sites are often downslope from dolomite glades. The site generates runoff to adjacent, downslope ecological sites. This site does not flood.

The adjacent figure (adapted from Dodd and Dettman 1996) shows the typical landscape position of this ecological site, and landscape relationships with other ecological sites. It is within the area labeled “4” on the figure. The dashed lines within the area indicate the various soils included in this ecological site. Shallow Dolomite Upland Glade/Woodland sites are typically associated with Calcareous Dolomite Upland Woodlands.

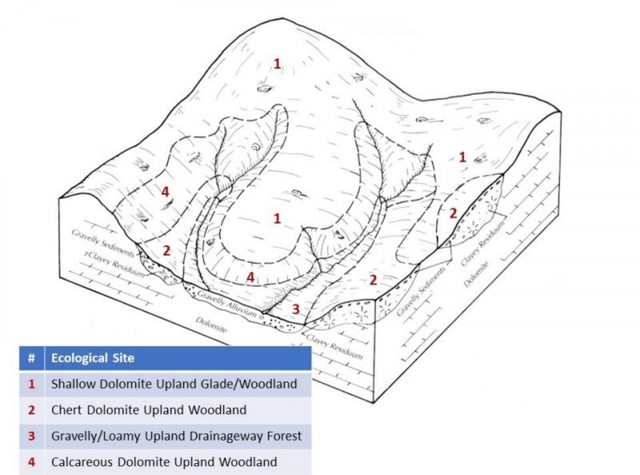


Figure 2. Landscape relationships for this ecological site.

Table 2. Representative physiographic features

Landforms	(1) Ridge (2) Hill (3) Hillslope
Flooding frequency	None
Ponding frequency	None
Slope	3–15%
Water table depth	152 cm
Aspect	Aspect is not a significant factor

Climatic features

The Ozark Highland has a continental type of climate marked by strong seasonality. In winter, dry-cold air masses, unchallenged by any topographic barriers, periodically swing south from the northern plains and Canada. If they invade reasonably humid air, snowfall and rainfall result. In summer, moist, warm air masses, equally unchallenged by topographic barriers, swing north from the Gulf of Mexico and can produce abundant amounts of rain, either by fronts or by convectional processes. In some summers, high pressure stagnates over the region, creating extended droughty periods. Spring and fall are transitional seasons when abrupt changes in temperature and precipitation may occur due to successive, fast-moving fronts separating contrasting air masses.

The Ozark Highland experiences regional differences in climates, but these differences do not have obvious geographic boundaries. Regional climates grade inconspicuously into each other. The basic gradient for most climatic characteristics is along a line crossing the MLRA from northwest to southeast.

The average annual precipitation in almost all of this area is 38 to 45 inches. Snow falls nearly every winter, but the snow cover lasts for only a few days. The average annual temperature is about 53 to 60 degrees F. The lower temperatures occur at the higher elevations in the western part of the MLRA. Mean January minimum temperature follows a stronger north-to-south gradient. However, mean July maximum temperature shows hardly any geographic variation in the MLRA. Mean July maximum temperatures have a range of only two or three degrees across the area.

Mean annual precipitation varies along a northwest to southeast gradient. Seasonal climatic variations are more complex. Seasonality in precipitation is very pronounced due to strong continental influences. June precipitation, for example, averages three to four times greater than January precipitation. Most of the rainfall occurs as high-intensity, convective thunderstorms in summer.

During years when precipitation comes in a fairly normal manner, moisture is stored in the top layers of the soil during the winter and early spring, when evaporation and transpiration are low. During the summer months the loss of water by evaporation and transpiration is high, and if rainfall fails to occur at frequent intervals, drought will result. Drought directly affects plant and animal life by limiting water supplies, especially at times of high temperatures and high evaporation rates.

Superimposed upon the basic MLRA climatic patterns are local topographic influences that create topoclimatic, or microclimatic variations. In regions of appreciable relief, for example, air drainage at nighttime may produce temperatures several degrees lower in valley bottoms than on side slopes. At critical times during the year, this phenomenon may produce later spring or earlier fall freezes in valley bottoms. Deep sinkholes often have a microclimate significantly cooler, moister, and shadier than surrounding surfaces, a phenomenon that may result in a strikingly different ecology. Higher daytime temperatures of bare rock surfaces and higher reflectivity of these unvegetated surfaces may create distinctive environmental niches such as glades and cliffs.

Slope orientation is an important topographic influence on climate. Summits and south-and-west-facing slopes are regularly warmer and drier than adjacent north- and-east-facing slopes. Finally, the climate within a canopied forest is measurably different from the climate of a more open grassland or savanna areas.

Source: University of Missouri Climate Center - http://climate.missouri.edu/climate.php; Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin, United States Department of Agriculture Handbook 296 - http://soils.usda.gov/survey/geography/mlra/

Table 3. Representative climatic features

Frost-free period (characteristic range)	148-173 days
Freeze-free period (characteristic range)	181-199 days
Precipitation total (characteristic range)	1,194-1,245 mm
Frost-free period (actual range)	147-183 days
Freeze-free period (actual range)	180-204 days
Precipitation total (actual range)	1,194-1,270 mm
Frost-free period (average)	162 days
Freeze-free period (average)	191 days
Precipitation total (average)	1,219 mm

Climate stations used

- (1) BOLIVAR 1 NE [USC00230789], Bolivar, MO
- (2) EUREKA SPRINGS 3 WNW [USC00032356], Eureka Springs, AR
- (3) EVENING SHADE 1 NNE [USC00032366], Evening Shade, AR
- (4) CLEARWATER DAM [USC00231674], Ellington, MO

Influencing water features

Water features associated with this upland ecological site are influenced by karst landscapes throughout the area (see diagram). Rainfall enters the groundwater system through the soil or by flowing into sinkholes and streams. Springs form where land drops low enough to meet underground water tables. Dissolution of carbonate rocks along fractures and faults has produced cave systems, sinkholes (closed and open), springs, and natural tunnels in the region. These sinkholes and losing streams can rapidly transfer water from upland recharge areas to spring outlets. The most common mechanism for groundwater recharge occurs by the relatively slow downward movement of water through soil and carbonate bedrock over a large area known as diffuse recharge, which maintains a high storage volume providing a consistent supply of water to springs. In addition to diffuse recharge, aquifers in karst terrain receive the relatively rapid transfer of water through sinkholes or losing streams connected by subsurface conduits. Surface water entering the aquifer in this fashion has very little contact with soil or rock and consequently the chemical nature of the water changes little in route. Discharge variability does not seem to be controlled by drainage area, but rather the conduit capacity of losing stream sections that can transport the entire volume of base-flow during dry periods in the year. High variability in base ?ow shows the impact of karst in the form of losing and gaining stream sections (Owen and Pavlowsky 2010).

The accompanying map depicts the distribution of these karst-related features in the state of Missouri. Relative cave density per USGS 7.5" quadrangle is depicted by shades of red, deeper red signifying a larger number of caves in the quadrangle. Stretches of losing streams are shown in yellow. Known springs are shown as blue dots. Image from Wikimedia Commons developed from the Missouri Department of Natural Resources, Division of Geology and Land Survey.

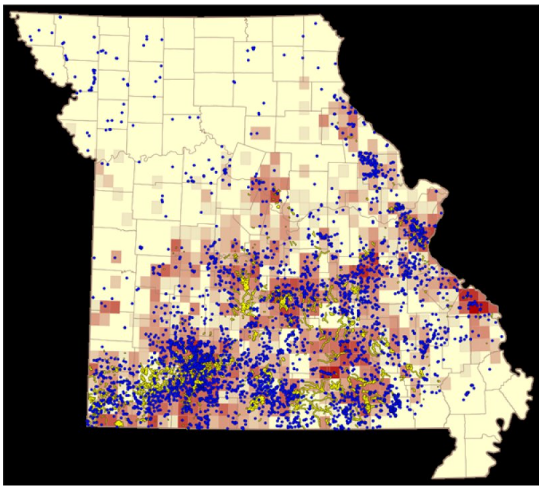


Figure 9. Distribution of karst-related features in Missouri. Image from Wikimedia Commons developed from the Missouri Department of Natural Resources, Division of Geology and Land Survey.

Soil features

These soils are underlain with dolomite bedrock at 20 to 40 inches. The soils were formed under a mixture of prairie and woodland vegetation, and have dark, organic-rich surface horizons that are enriched in places by upslope prairie glades. Parent material is slope alluvium over residuum weathered from dolomite, overlying dolomite bedrock. They have gravelly or cobbly silt loam surface layers, with clayey subsoils that have moderate to high amounts of chert and dolomite gravel and cobbles. These soils are base-rich, but do not contain free carbonates. These soils are not affected by seasonal wetness. Soil series associated with this site include Arkana, Blueye, and Clinkenbeard.

Table 4. Representative soil features

Parent material	(1) Slope alluvium–dolomite (2) Residuum–dolomite
Surface texture	(1) Gravelly silt loam (2) Very gravelly loam
Family particle size	(1) Clayey
Drainage class	Well drained
Soil depth	51–102 cm
Surface fragment cover <=3"	18–48%
Surface fragment cover >3"	0–30%
Available water capacity (0-101.6cm)	5.08–10.16 cm
Calcium carbonate equivalent (0-101.6cm)	0%

Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	4.5–7.8
Subsurface fragment volume <=3" (Depth not specified)	28–48%
Subsurface fragment volume >3" (Depth not specified)	0–25%

Ecological dynamics

Information contained in this section was developed using historical data, professional experience, field reviews, and scientific studies. 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 somewhat shallow soils of Calcareous Dolomite Upland Woodlands limited the growth of trees and supported an abundance of native grasses and forbs in the understory. Rather short (35 to 50 feet) chinquapin oaks dominated an open overstory, with occasional white ash, blue ash and Shumard oak. Shrubs were scattered within a dense matrix of native grasses and forbs.

Fire played an important role in the maintenance of these systems. It is likely that these ecological sites, along with adjacent glades and woodlands burned at least once every 5 years. These periodic fires kept woodlands open, removed the litter, and stimulated the growth and flowering of the grasses and forbs. They would have also further limited the growth and dominance of trees, especially eastern redcedar. During fire free intervals, woody species would have increased and the herbaceous understory diminished.

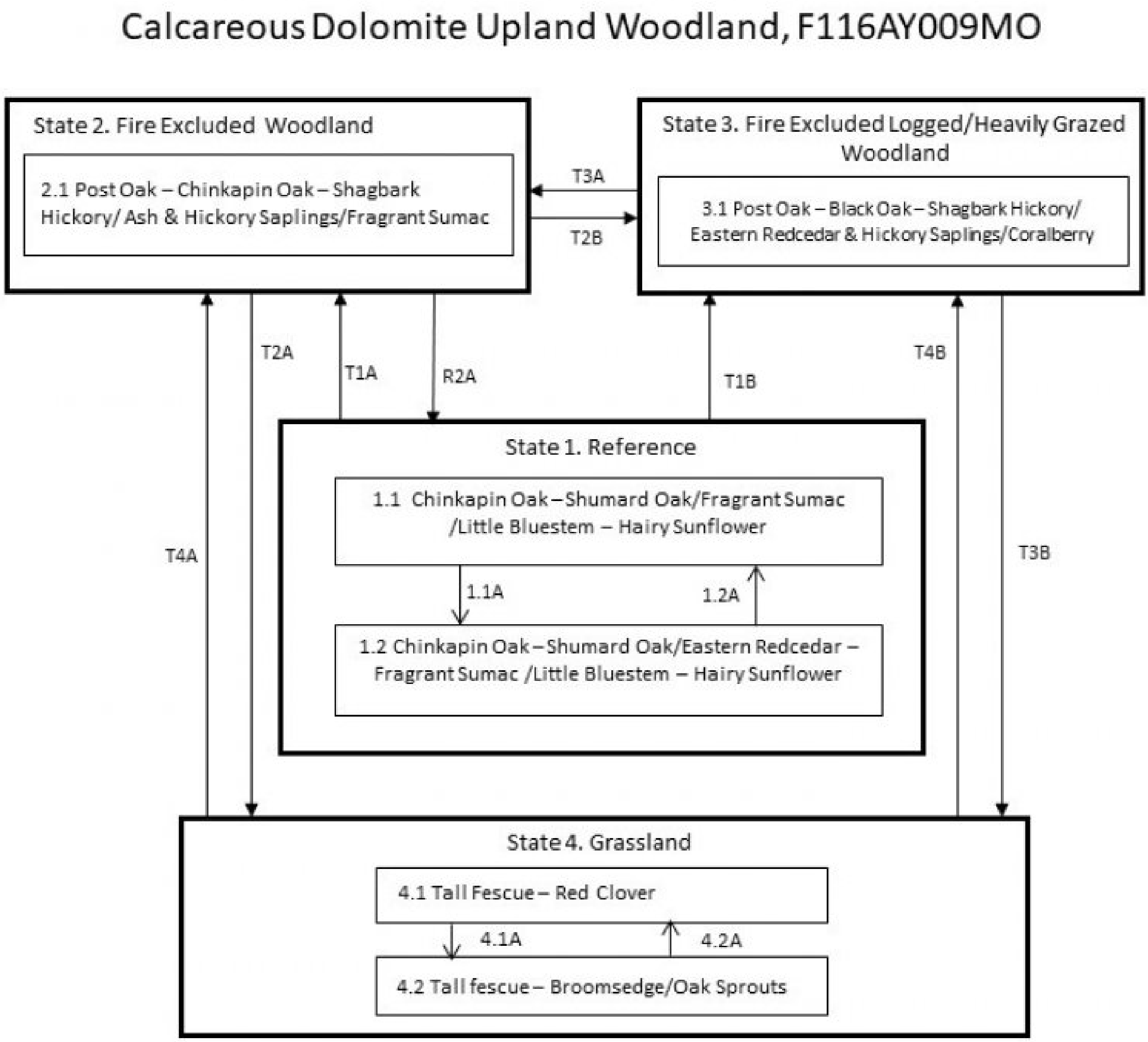
Most of these ecological sites today are denser, and shadier with a greatly diminished ground flora. In the long term absence of fire, woody species, especially eastern redcedar have encroached into these ecological sites. Removal of the younger understory by thinning and the application of prescribed fire have proven to be effective restoration methods. 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, and tree height growth.

Calcareous Dolomite Upland Woodlands were also subjected to occasional disturbances from wind and ice, as well as grazing by native large herbivores, such as bison, elk, and white-tailed 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 sun-loving ground flora species.

Uncontrolled domestic grazing has also impacted these communities, further diminishing the diversity of native plants and introducing species that are tolerant of grazing, such as coralberry, gooseberry, and Virginia creeper. It also promotes the invasion of eastern redcedar. Grazed sites 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 not productive and as a consequence timber harvesting is limiting. Without some thinning of the stands and application of prescribed fire, the ground flora diversity can be shaded out and diversity of the stand may suffer.

A State and Transition Diagram follows. 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



Code	Event/Activity
T1A	Fire-free interval (20+ years)
T1B	Fire suppression; heavy grazing by livestock; logging
T3A	Livestock removal
T2B	Heavy grazing by livestock; logging
T2A, T3B	Clearing; grassland seeding; grassland management
T4A	Tree planting; long term succession (50+ years); no grazing
T4B	Long term succession (50+ years); light periodic 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 10. State and transition diagram for this ecological site

State 1

Reference

Historically, these woodlands occurred occur on upland summits, shoulders and backslopes. The restricted soil depth, droughty conditions, and native grasses made them susceptible to frequent fires, once every 3 to 5 years. Consequently, fire-tolerant Shumard oak and chinkapin oak dominated the open-canopy overstory. The understory consisted of a dense cover of native grasses and forbs. Tree height was 40 to 50 feet, and canopy closure 40 to 80 percent. During fire-free intervals, eastern red cedar, along with hickory and oak sprouts, increased in abundance and competed with the herbaceous ground flora, creating brushy woodland (community phase 1.2). However, the return of fire would re-open the woodland and promote the ground flora.

Community 1.1
Chinkapin Oak – Shumard Oak/Fragrant Sumac /Little Bluestem – Hairy Sunflower

This phase has an overstory that is dominated by old growth chinkapin oak and Shumard oak with hickory and northern red oak and post oak also present. This woodland community has a two-tiered structure with an open understory and a dense, diverse herbaceous ground flora.

Forest overstory. The Overstory Species list is based on field reconnaissance as well as commonly occurring species listed in Nelson 2010; names and symbols are from USDA PLANTS database.

Forest understory. The Understory Species list is based on field reconnaissance as well as commonly occurring species listed in Nelson 2010; names and symbols are from USDA PLANTS database.

Community 1.2
Chinkapin Oak – Shumard Oak/Eastern Redcedar – Fragrant Sumac /Little Bluestem – Hairy Sunflower

This phase is similar to community phase 1.1 but oak, eastern redcedar and hickory understory densities are increasing due to longer periods of fire suppression. Displacement of some grasses and forbs may be occurring due to shading and competition from the increased densities of oak and hickory saplings in the understory.

Pathway P1.1A
Community 1.1 to 1.2

This pathway is the result of fire-free interval 10-20 years.

Pathway P1.2A
Community 1.2 to 1.1

This pathway is the result of a fire 3-10 year cycle being re-established.

State 2
Fire Excluded Woodland

Fire suppression has allowed these previously open woodlands to become dense with less fire-tolerant trees and saplings such as eastern redcedar, black oak, and hickory. The dense, shaded conditions and lack of fire has caused the ground flora to decrease in cover and diversity. Fragrant sumac often forms a dense shrub understory under these conditions. However, many of the original herbaceous species persist as small plants or in the seed bank. Consequently, thinning of the woody species and the re-introduction of fire has shown these communities to be exceptionally resilient, and a return, after a period of many years, to the reference condition is possible.

Community 2.1
Post Oak - Chinkapin Oak – Shagbark Hickory/ Ash & Hickory Saplings/Fragrant Sumac

This is the only phase associated with this state at this time. See the corresponding state narrative for details.

State 3

Fire Excluded/Logged/Heavily Grazed Woodland

In addition to fire exclusion, many of these sites have been subjected to heavy grazing by domestic livestock and periodic logging. Like State 2, these areas are dense and shady with a diminished ground flora. In addition, grazed areas exhibit a lower diversity of native ground flora species and an increased abundance of eastern redcedar and other invasive natives such as coralberry. Like State 2, restoration using thinning and fire is possible, but will take longer and require more effort. Restricting livestock access and eliminating logging will be necessary for successful restoration.

Community 3.1
Post Oak – Black Oak – Shagbark Hickory/ Eastern Redcedar & Hickory Saplings/Coralberry

This is the only phase associated with this state at this time. See the corresponding state narrative for details.

State 4
Grassland

Conversion of other states to non-native cool season species such as tall fescue, orchard grass, and red clover has been common. Occasionally, these pastures will have scattered oaks. Long term uncontrolled grazing can cause significant soil erosion and compaction. A return to the reference state may be impossible, requiring a very long term series of management options. If oak sprouting is left unchecked and grazing is eliminated or reduced then over time this state will transition to a fire excluded woodland or to a high-graded/grazed woodland.

Community 4.1
Tall Fescue - Red Clover

This phase is well managed grassland, composed of non-native cool season grasses and legumes. Grazing and haying is occurring. The effects of long-term liming on soil pH, and calcium and magnesium content, is most evident in this phase. Studies show that these soils have higher pH and higher base status in soil horizons as much as two feet below the surface, relative to poorly managed grassland and to woodland communities (where liming is not practiced).

Dominant resource concerns

- Plant structure and composition
- Terrestrial habitat for wildlife and invertebrates

Community 4.2
Tall fescue - Broomsedge/Oak Sprouts

This phase is the result of poor grassland management. Over grazing and little fertility application has allowed broomsedge and oak sprouts to increase in cover and density reducing overall forage quality and site productivity. Soil pH and bases such as calcium and magnesium are lower, relative to well-managed pastures.

Dominant resource concerns

- Ephemeral gully erosion
- Pathogens and chemicals from manure, biosolids, or compost applications transported to surface water
- Plant productivity and health
- Plant structure and composition
- Plant pest pressure
- Terrestrial habitat for wildlife and invertebrates

Pathway P4.1A
Community 4.1 to 4.2

This pathway is the result of over grazing and lack of proper grassland management.

Pathway P4.2A
Community 4.2 to 4.1

This pathway is the result of brush management, grassland re-seeding and proper grassland management.

Transition T1A
State 1 to 2

This is a gradual transition that results from extended, disturbance-free periods of roughly 50 years or longer. Selective logging is also occurring.

Transition T1B
State 1 to 3

This transition is the result of high-grade logging, uncontrolled domestic livestock grazing and fire suppression.

Restoration pathway R2A
State 2 to 1

This restoration pathway is the result of the systematic application of prescribed fire. Mechanical thinning may also be used along with understory removal.

Transition T2B
State 2 to 3

This transition is the result of high-grade logging and uncontrolled domestic livestock grazing.

Transition T2A
State 2 to 4

This transition is the result of clearing and conversion to non-native cool season grassland.

Transition T3A
State 3 to 2

This transition results from the cessation of cattle grazing.

Transition T3B
State 3 to 4

This transition is the result of clearing and conversion to non-native cool season grassland.

Transition T4A
State 4 to 2

This is a gradual transition that results from extended, disturbance-free periods of roughly 50 years or longer, selective logging, tree planting and no grazing.

Transition T4B
State 4 to 3

This transition is the result of light intermittent grazing, long idle periods and increased woody growth and development.

Additional community tables

Table 5. Community 1.1 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height (M)	Canopy Cover (%)	Diameter (Cm)	Basal Area (Square M/Hectare)
Tree							
chinquapin oak	QUMU	*Quercus muehlenbergii*	Native	–	20–40	–	–
white ash	FRAM2	*Fraxinus americana*	Native	–	10–20	–	–
post oak	QUST	*Quercus stellata*	Native	–	10–20	–	–
blue ash	FRQU	*Fraxinus quadrangulata*	Native	–	10–20	–	–
black oak	QUVE	*Quercus velutina*	Native	–	10–20	–	–
shagbark hickory	CAOV2	*Carya ovata*	Native	–	10–20	–	–
Shumard's oak	QUSH	*Quercus shumardii*	Native	–	10–20	–	–

Table 6. Community 1.1 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (M)	Canopy Cover (%)
Grass/grass-like (Graminoids)					
little bluestem	SCSC	*Schizachyrium scoparium*	Native	–	–
hairy woodland brome	BRPU6	*Bromus pubescens*	Native	–	–
rock muhly	MUSO	*Muhlenbergia sobolifera*	Native	–	–
eastern bottlebrush grass	ELHY	*Elymus hystrix*	Native	–	–
Virginia wildrye	ELVI3	*Elymus virginicus*	Native	–	–
oval-leaf sedge	CACE	*Carex cephalophora*	Native	–	–
bristleleaf sedge	CAEB2	*Carex eburnea*	Native	–	–
Forb/Herb					
yellow pimpernel	TAIN	*Taenidia integerrima*	Native	–	–
slimflower scurfpea	PSTE5	*Psoralidium tenuiflorum*	Native	–	–
tall blazing star	LIAS	*Liatris aspera*	Native	–	–
crowpoison	NOBI2	*Nothoscordum bivalve*	Native	–	–
wild quinine	PAAU7	*Parthenium auriculatum*	Native	–	–
widowsfrill	SIST	*Silene stellata*	Native	–	–
purple meadowparsnip	THTR	*Thaspium trifoliatum*	Native	–	–
golden zizia	ZIAU	*Zizia aurea*	Native	–	–
butterfly milkweed	ASTU	*Asclepias tuberosa*	Native	–	–
downy pagoda-plant	BLCI	*Blephilia ciliata*	Native	–	–
hoary puccoon	LICA12	*Lithospermum canescens*	Native	–	–
groundplum milkvetch	ASCRT	*Astragalus crassicarpus var. trichocalyx*	Native	–	–
Ozark milkvetch	ASDI4	*Astragalus distortus*	Native	–	–
Curtis' star-grass	HYCU5	*Hypoxis curtissii*	Native	–	–
Atlantic camas	CASC5	*Camassia scilloides*	Native	–	–
groovestem Indian plantain	ARPL4	*Arnoglossum plantagineum*	Native	–	–
Shrub/Subshrub					
fragrant sumac	RHAR4	*Rhus aromatica*	Native	–	–
dwarf hackberry	CETE	*Celtis tenuifolia*	Native	–	–
Carolina buckthorn	FRCA13	*Frangula caroliniana*	Native	–	–
eastern redbud	CECA4	*Cercis canadensis*	Native	–	–
American hazelnut	COAM3	*Corylus americana*	Native	–	–

Animal community

Wildlife (MDC 2006):
Oaks provide hard mast for wildlife; scattered shrubs provide soft mast.

Sedges and native grasses provide green browse; native grasses on dry sites provide cover and nesting habitat and a diversity of forbs provides a diversity and abundance of insects.

Post-burn areas can provide temporary bare-ground – herbaceous cover habitat important for turkey poults and quail chicks.

Bird species associated with Calcareous Woodlands include Indigo Bunting, Red-headed Woodpecker, Eastern Bluebird, Northern Bobwhite, Summer Tanager, Eastern Wood-Pewee, Whip-poor-will, Chuck-will’s widow, and Red-eyed Vireo.

Reptiles and amphibians associated with mature Calcareous Woodlands include: ornate box turtle, northern fence lizard, five-lined skink, coal skink, broad-headed skink, six-lined racerunner, western slender glass lizard, prairie ring-necked snake, flat-headed snake, rough earth snake, red milk snake, western pygmy rattlesnake, and timber rattlesnake

Other information

Forestry (NRCS 2002, 2014):
Management: Estimated site index values range from 50 to 55 for oak. Timber management opportunities are fair. Create group openings of at least 2 acres. Large clearcuts should be minimized if possible to reduce impacts on wildlife and aesthetics. Uneven-aged management using single tree selection or small group selection cuttings of ½ to 1 acre are other options that can be used if clear cutting is not desired or warranted. Using prescribed fire is an effective management.

Limitations: Coarse fragments occur throughout profile; bedrock is within 40 inches. Surface stones and rocks are problems for efficient and safe equipment operation and will make equipment use somewhat difficult. Disturbing the surface excessively in harvesting operations and building roads increases soil losses, which leaves a greater amount of coarse fragments on the surface. Hand planting or direct seeding may be necessary. Seedling mortality due to low available water capacity may be high. Mulching or providing shade can improve seedling survival. Mechanical tree planting will be limited. Erosion is a hazard when slopes exceed 15 percent.

Inventory data references

Potential Reference Sites: Calcareous Dolomite Upland Woodland

No high-quality reference sites are known to exist.

Other references

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Approval

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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	05/13/2025
Approved by	Nels Barrett
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:**