USDA Natural Resources Conservation Service

Ecological site F116AY044MO
Chert Dolomite Upland Woodland

Last updated: 9/24/2020
Accessed: 05/11/2025

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 Chert Woodland.

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

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

The reference state for this ecological site is most similar to Quercus stellata - Quercus marilandica - Quercus velutina - Carya texana / Schizachyrium scoparium Woodland (CEGL002149).

Geographic relationship to the Missouri Ecological Classification System (Nigh & Schroeder, 2002):
This ecological site is widespread across the Ozark Highlands Section.

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".

Chert Dolomite Upland Woodlands are extensive in the dissected hills of the western Ozark Highland, primarily over the Ordovician-aged Jefferson City formation. Soils are typically moderately deep over dolomite bedrock, with gravelly surfaces. The reference plant community is a woodland with an overstory dominated by post oak and chinkapin oak and a ground flora of native grasses and forbs.

Associated sites

F116AY011MO	**Chert Upland Woodland** Chert Upland Woodlands are upslope, on convex summit crests and shoulders.
F116AY016MO	**Chert Dolomite Protected Backslope Forest** Chert Dolomite Protected Backslope Forests are downslope, on steep lower backslopes with northern to eastern exposures.
F116AY037MO	**Gravelly/Loamy Upland Drainageway Forest** Gravelly/Loamy Upland Drainageway Forests are often downslope.
F116AY048MO	**Chert Dolomite Exposed Backslope Woodland** Chert Dolomite Exposed Backslope Woodlands are downslope, on steep lower backslopes with southern to western exposures.
R116AY020MO	**Shallow Dolomite Upland Glade/Woodland** Shallow Dolomite Glade/Woodlands are adjacent or downslope.

Similar sites

F116AY011MO	**Chert Upland Woodland** Chert Upland Woodlands are upslope, on convex summit crests and shoulders and have similar species but are more productive.

Table 1. Dominant plant species

Tree	(1) *Quercus stellata* (2) *Quercus muehlenbergii*
Shrub	(1) *Rhus aromatica*
Herbaceous	(1) *Schizachyrium scoparium*

Physiographic features

This site is on upland summits, shoulders and backslopes with slopes of 1 to 15 percent. The site generates runoff to adjacent, downslope ecological sites. This site does not flood.

The following figure (adapted from Sturdevant et al, 2001) shows the typical landscape position of this ecological site, and landscape relationships with other ecological sites. It is within the area labeled "2" on the figure. Chert Upland Woodland sites, labeled "1", are typically upslope on crests and shoulders. Small dolomite outcroppings are common in this ecological site. Shallow Dolomite Upland Glade/Woodland sites, labeled "3", are commonly associated with this site.

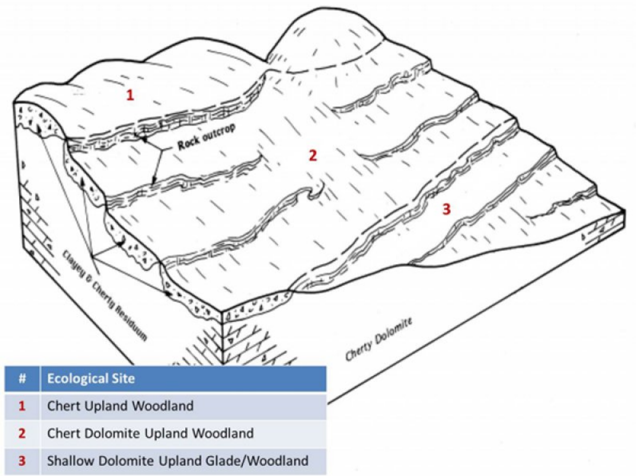


Figure 2. Landscape relationships for this ecological site.

Table 2. Representative physiographic features

Landforms	(1) Ridge (2) Interfluve (3) Hill (4) Hillslope
Flooding frequency	None
Ponding frequency	None
Slope	1–15%
Water table depth	14–60 in
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)	146-163 days
Freeze-free period (characteristic range)	185-192 days
Precipitation total (characteristic range)	44-45 in
Frost-free period (actual range)	144-171 days
Freeze-free period (actual range)	183-193 days
Precipitation total (actual range)	43-49 in
Frost-free period (average)	156 days
Freeze-free period (average)	189 days
Precipitation total (average)	45 in

Climate stations used

- (1) EVENING SHADE 1 NNE [USC00032366], Evening Shade, AR
- (2) POTOSI 4 SW [USC00236826], Potosi, MO
- (3) ELDON [USC00232503], Eldon, MO
- (4) OZARK BEACH [USC00236460], Forsyth, MO
- (5) GROVESPRING 1NE [USC00233483], Grovespring, 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.

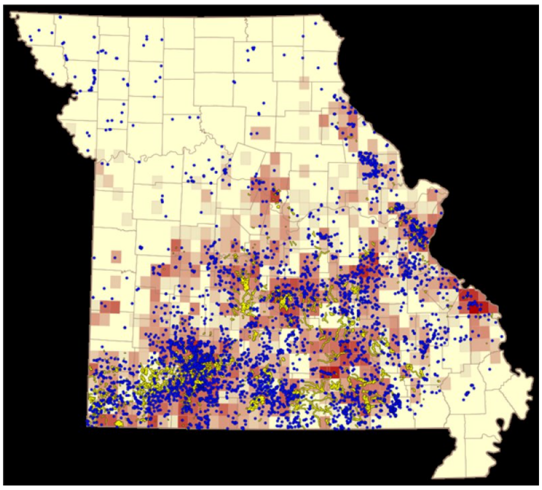


Figure 9. Distribution of karst-related features in Missouri. Image from Wikimedia Commons developed from the Missouri Department of Natural Resources, Division of Geology and Land Survey.

Soil features

These soils are underlain with dolomite bedrock at 20 to 40 inches deep. The soils were formed under woodland vegetation, and have thin, light-colored surface horizons. Parent material is slope alluvium over residuum weathered from dolomite, overlying dolomite bedrock. They have gravelly to very gravelly and cobbly silt loam surface layers, with clayey subsoils that have moderate to high amounts of chert gravel and cobbles. These soils are not affected by seasonal wetness. Soil series associated with this site include Bardley, Gatewood, and Sonsac.

The accompanying picture of the Gatewood series shows abundant chert fragments in the upper part of the soil, over a reddish clay subsoil. Cherty dolomite bedrock limits rooting depth. Picture courtesy of John Preston, NRCS.

Figure 10. Gatewood series

Table 4. Representative soil features

Parent material	(1) Slope alluvium–dolomite (2) Residuum–dolomite

Surface texture	(1) Gravelly silt loam (2) Very gravelly
Family particle size	(1) Clayey
Drainage class	Somewhat poorly drained to well drained
Permeability class	Very slow
Soil depth	20–40 in
Surface fragment cover <=3"	5–53%
Surface fragment cover >3"	0–7%
Available water capacity (0-40in)	3–5 in
Calcium carbonate equivalent (0-40in)	0%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	4.5–7.3
Subsurface fragment volume <=3" (Depth not specified)	25–60%
Subsurface fragment volume >3" (Depth not specified)	0–28%

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.

Chert Dolomite Upland Woodlands are found on ridges, gentle backslope or benches with dolomite glades and woodlands below them. In addition, chinquapin oak dominated Calcareous Limestone/Dolomite Woodlands often occur below the glades. The somewhat shallow, cherty soils of Chert Dolomite Upland Woodlands limit the growth of trees and support an abundance of native grasses and forbs in the understory. Fire also played an important role in the maintenance of these systems. It is likely that these 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 also further limited the growth and dominance of trees, especially eastern red cedar. Fire tolerant post oak and chinkapin oak, dominated an open overstory. During fire free intervals, woody species, such as especially eastern redcedar and black hickory, would have increased and the herbaceous understory diminished. The return of fire would have opened the woodlands up again and stimulated the abundant ground flora.

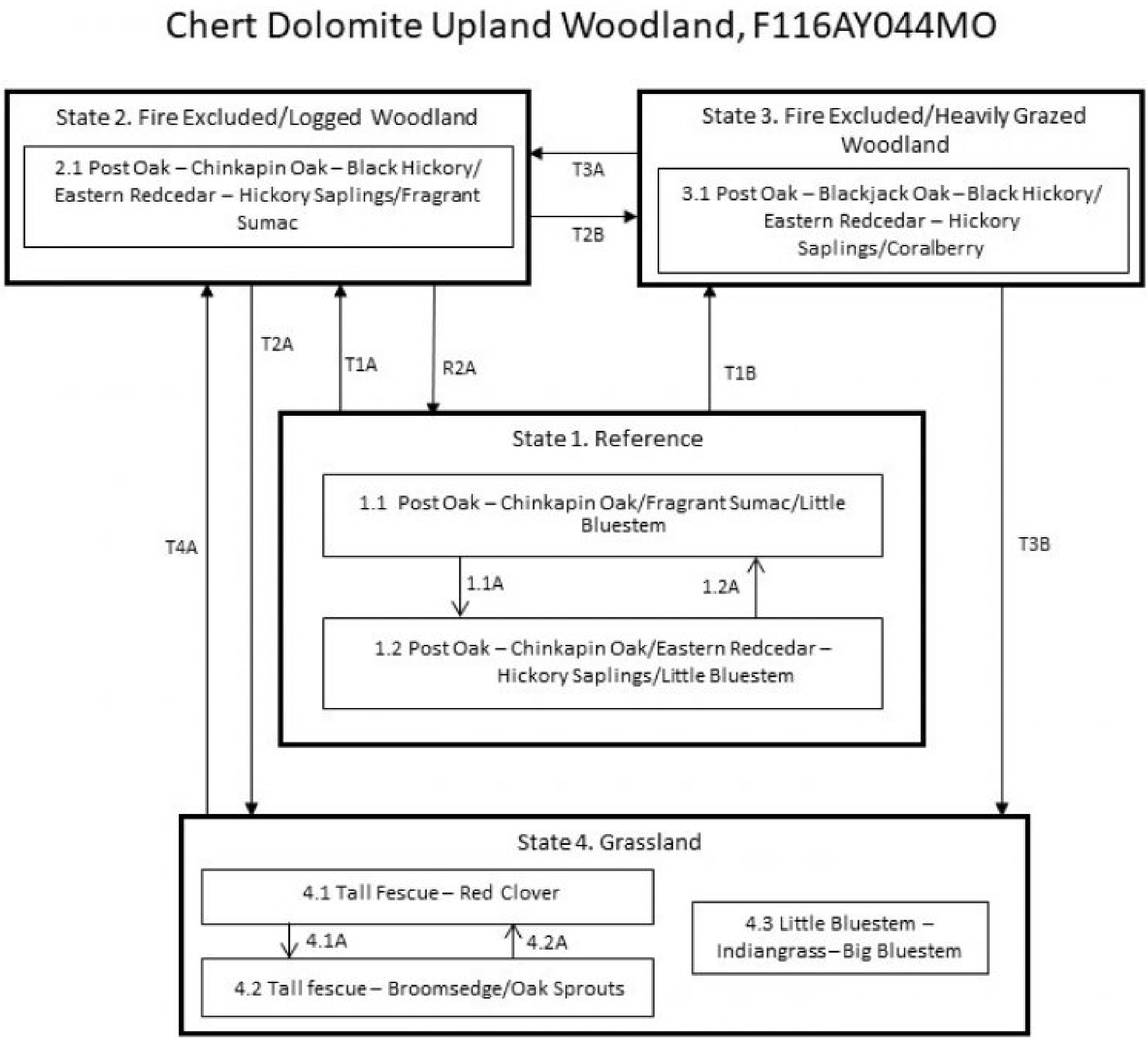
Chert Dolomite Upland Woodlands were also subjected to occasional disturbances from wind and ice, as well as grazing by native large herbivores, such as bison, elk, and white-tailed deer. Wind and ice would have periodically opened the canopy up by knocking over trees or breaking substantial branches 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.

In the long term absence of fire, woody species, especially eastern redcedar, hickory, black oak, and within its range shortleaf pine have encroached into these woodlands. This is especially true after grazing has reduced grass cover and exposed more surface to the dispersal of seeds by birds. Once established, woody plants can quickly fill the woodland system.

Most occurrences today are dense, and shady with a greatly diminished ground flora. Removal of the younger understory and the application of prescribed fire have proven to be effective management tools. 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. Timber harvest is very limited on these sites because of short tree stature and lower tree quality.

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 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; forest stand improvement
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 11. State and Transition Model for this ecological site.

State 1

Reference

Historically, these woodlands occurred on the uplands of most major rivers of the region. The restricted soil depth, droughty conditions, and native grasses made them susceptible to frequent fires, likely once every 3 to 5 years. Consequently, fire-tolerant post oak and chinkapin oak dominated the open-canopy overstory, and the understory consisted of a dense cover of native grasses and forbs (Community 1.1). Tree height was 40 to 60 feet, and canopy closure 20 to 80 percent. During fire-free intervals, eastern redcedar, along with hickory and oak sprouts, increased in abundance and competed with the herbaceous ground flora, creating a brushy woodland (Community 1.2). However, the return of fire would re-open the woodland and promote the ground flora.

Community 1.1
Post Oak – Chinkapin Oak/Fragrant Sumac/Little Bluestem

Fire-tolerant post oak and chinkapin oak dominate the open-canopy overstory, with an understory consisting of a dense cover of native grasses and forbs.

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
Post Oak – Chinkapin Oak/Eastern Redcedar – Hickory Saplings/Little Bluestem

During fire-free intervals, eastern redcedar, along with hickory and oak sprouts, increased in abundance and competed with the herbaceous ground flora, creating a brushy woodland. However, the return of fire would re-open the woodland and promote the ground flora.

Pathway P1.1A
Community 1.1 to 1.2

Fire-free interval 10-20 years

Pathway P1.2A
Community 1.2 to 1.1

Fire, 3-10 year cycle

State 2
Fire Excluded/Logged Woodland

Fire suppression has allowed these open woodlands to become denser 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. Aromatic 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 to the reference condition is possible.

Community 2.1
Post Oak – Chinkapin Oak – Black Hickory/ Eastern Redcedar – Hickory Saplings/Fragrant Sumac

State 3
Fire Excluded/Heavily Grazed Woodland

In addition to fire exclusion, many of these sites have been subjected to heavy grazing by domestic livestock. 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 will be necessary for successful restoration.

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

State 4
Grassland

Conversion of woodlands to planted, non-native cool season grassland species such as tall fescue is common for this region. Surface fragments, low organic matter content and soil acidity make grasslands harder to maintain in a healthy, productive state on this ecological site. Two major community phases are recognized in the Grassland State, with shifts between phases based on types of management. Poor management will result in a shift to Community 4.2 that shows an increase in oak sprouting and increases in broomsedge densities. If grazing and active pasture management is discontinued, the site will eventually transition to State 2 from this phase. Conversion to native warm season grasses and forbs has increased in recent years due federal and state cost-share programs and has created a less common third community phase. On many sites the simple activity of removing most if not all of the canopy will allow existing native grasses and forbs to increase in abundance and create a natural native ground cover.

Community 4.1
Tall Fescue - Red Clover

Two major community phases are recognized in the Grassland State, with shifts between phases based on types of management. Poor management will result in a shift to Community 4.2 that shows an increase in oak sprouting and increases in broomsedge densities.

Community 4.2
Tall Fescue - Broomsedge/Oak Sprouts

Two major community phases are recognized in the Grassland State, with shifts between phases based on types of management. Poor management will result in a shift to Community 4.2 that shows an increase in oak sprouting and increases in broomsedge densities.

Community 4.3
Little Bluestem – Indiangrass – Big Bluestem

Conversion to native warm season grasses and forbs has increased in recent years due federal and state cost-share programs and has created a third less common community phase.

Pathway P4.1A
Community 4.1 to 4.2

Over grazing; no fertilization

Pathway P4.2A
Community 4.2 to 4.1

Brush management; grassland seeding; grassland management

Transition T1A
State 1 to 2

Fire suppression; fire-free interval (20+ years); logging

Transition T1B
State 1 to 3

Fire suppression; heavy grazing by livestock; logging

Restoration pathway R2A
State 2 to 1

Understory removal; prescribed fire; forest stand improvement

Transition T2B
State 2 to 3

Uncontrolled domestic grazing

Transition T2A
State 2 to 4

Clearing; pasture seeding; grassland management

Transition T3A
State 3 to 2

Livestock removal; access control

Transition T4A
State 4 to 2

Tree planting; long term succession (50+ years); no grazing

Additional community tables

Table 5. Community 1.1 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)	Diameter (In)	Basal Area (Square Ft/Acre)
Tree							
blue ash	FRQU	*Fraxinus quadrangulata*	Native	–	–	–	–
common serviceberry	AMAR3	*Amelanchier arborea*	Native	–	–	–	–
eastern redcedar	JUVI	*Juniperus virginiana*	Native	–	–	–	–
post oak	QUST	*Quercus stellata*	Native	–	–	–	–
blackjack oak	QUMA3	*Quercus marilandica*	Native	–	–	–	–
black oak	QUVE	*Quercus velutina*	Native	–	–	–	–
black hickory	CATE9	*Carya texana*	Native	–	–	–	–
chinquapin oak	QUMU	*Quercus muehlenbergii*	Native	–	–	–	–
white ash	FRAM2	*Fraxinus americana*	Native	–	–	–	–

Table 6. Community 1.1 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)
Grass/grass-like (Graminoids)					
hairy woodland brome	BRPU6	*Bromus pubescens*	Native	–	–

rock muhly	MUSO	*Muhlenbergia sobolifera*	Native	–	–
sideoats grama	BOCU	*Bouteloua curtipendula*	Native	–	–
poverty oatgrass	DASP2	*Danthonia spicata*	Native	–	–
whitetinge sedge	CAAL25	*Carex albicans*	Native	–	–
bristleleaf sedge	CAEB2	*Carex eburnea*	Native	–	–
little bluestem	SCSC	*Schizachyrium scoparium*	Native	–	–
fall panicgrass	PADI	*Panicum dichotomiflorum*	Native	–	–
big bluestem	ANGE	*Andropogon gerardii*	Native	–	–
Forb/Herb					
eastern beebalm	MOBR2	*Monarda bradburiana*	Native	–	–
manyray aster	SYAN2	*Symphyotrichum anomalum*	Native	–	–
woman's tobacco	ANPL	*Antennaria plantaginifolia*	Native	–	–
rose mock vervain	GLCA2	*Glandularia canadensis*	Native	–	–
eastern purple coneflower	ECPU	*Echinacea purpurea*	Native	–	–
violet lespedeza	LEVI6	*Lespedeza violacea*	Native	–	–
wild quinine	PAIN3	*Parthenium integrifolium*	Native	–	–
Ontario blazing star	LICY	*Liatris cylindracea*	Native	–	–
narrowleaf mountainmint	PYTE	*Pycnanthemum tenuifolium*	Native	–	–
Virginia tephrosia	TEVI	*Tephrosia virginiana*	Native	–	–
yellow pimpernel	TAIN	*Taenidia integerrima*	Native	–	–
groovestem Indian plantain	ARPL4	*Arnoglossum plantagineum*	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	–	–
crowpoison	NOBI2	*Nothoscordum bivalve*	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	–	–
downy pagoda-plant	BLCI	*Blephilia ciliata*	Native	–	–
slimflower scurfpea	PSTE5	*Psoralidium tenuiflorum*	Native	–	–
tall blazing star	LIAS	*Liatris aspera*	Native	–	–
Shrub/Subshrub					
leadplant	AMCA6	*Amorpha canescens*	Native	–	–
dwarf hackberry	CETE	*Celtis tenuifolia*	Native	–	–
Carolina buckthorn	FRCA13	*Frangula caroliniana*	Native	–	–
fragrant sumac	RHAR4	*Rhus aromatica*	Native	–	–
winged sumac	RHCO	*Rhus copallinum*	Native	–	–

Animal community

Wildlife (MDC 2006):

Wild turkey, white-tailed deer, and eastern gray squirrel depend on hard and soft mast food sources and are typical upland game species of this type.

Oaks provide abundant hard mast; scattered shrubs provide soft mast; native legumes provide high-quality wildlife food;

Sedges and native cool-season grasses provide green browse;

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

Bird species associated with early-successional woodlands are Northern Bobwhite, Prairie Warbler, Field Sparrow, Blue-winged Warbler, Yellow-breasted Chat, and Brown Thrasher.

Bird species associated with mid- to late successional woodlands are Indigo Bunting, Red-headed Woodpecker, Eastern Bluebird, Northern Bobwhite, Summer Tanager, Eastern Wood-Pewee, Whip-poor-will, Chuck-will's widow, Red-eyed Vireo, Rose-breasted Grosbeak, Yellow-billed Cuckoo, and Broad-winged Hawk.

Reptile and amphibian species associated with woodlands include ornate box turtle, northern fence lizard, five-lined skink, broad-headed skink, six-lined racerunner, flat-headed snake, rough earth snake, and timber rattlesnake.

Other information

Forestry (NRCS 2002, 2014):

Management: Field measured site index values average 51 for oak and range from 43 to 71. 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 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 tool.

Limitations: Significant amounts of coarse fragments 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. On steep slopes greater than 35 percent, traction problems increase and equipment use is not recommended.

Inventory data references

Potential Reference Sites: Chert Dolomite Upland Woodland

Plot CAMOCA06 - Gatewood soil
Located in Caney Mountain CA, Ozark County, MO
Latitude: 36.680714
Longitude: -92.411373

Plot GIRACA_KS01- Gatewood soil
Located in Gist Ranch CA, Texas County, MO
Latitude: 37.208384
Longitude: -91.792825

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	05/11/2025
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:**