# Ecological site F116AY047MO
# Calcareous Dolomite Exposed Backslope Woodland

Last updated: 9/24/2020
Accessed: 05/29/2023

## 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 a 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 the Current River Hills Subsection.

## 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”.

The Calcareous Dolomite Exposed Backslope Woodlands occupy the southerly and westerly aspects of steep, dissected slopes, and are mapped in complex with the Calcareous Dolomite Protected Backslope Forest ecological site. These ecological sites are typically associated with glades, and occur primarily on slopes above the Current and Jacks Fork rivers in Shannon county, Missouri. Soils are high in bases, and are moderately deep over dolomite or limestone bedrock, with gravelly surfaces. The reference plant community is woodland with an overstory dominated by chinkapin oak, with white ash, blue ash and Shumard oak and a ground flora of native grasses and forbs with scattered shrubs.

## Associated sites

| | |
|---|---|
| F116AY009MO | **Calcareous Dolomite Upland Woodland**<br>Calcareous Dolomite Upland Woodlands are often upslope, on upper backslopes. |
| F116AY010MO | **Calcareous Dolomite Protected Backslope Forest**<br>Calcareous Dolomite Protected Backslope Forests are mapped in complex with this ecological site, on steep lower backslopes with northern to eastern aspects. |
| F116AY037MO | **Gravelly/Loamy Upland Drainageway Forest**<br>Gravelly/Loamy Upland Drainageway Forests are often downslope. |
| F116AY044MO | **Chert Dolomite Upland Woodland**<br>Chert Dolomite Upland Woodlands are often adjacent or upslope. |
| R116AY020MO | **Shallow Dolomite Upland Glade/Woodland**<br>Shallow Dolomite Upland Glade/Woodlands are typically directly upslope. |

## Similar sites

| | |
|---|---|
| F116AY010MO | **Calcareous Dolomite Protected Backslope Forest**<br>Calcareous Dolomite Protected Backslope Forests are mapped in complex with this ecological site, on steep lower backslopes with northern to eastern aspects. |

**Table 1. Dominant plant species**

| | |
|---|---|
| Tree | (1) *Quercus muehlenbergii*<br>(2) *Quercus shumardii* |
| Shrub | (1) *Rhus aromatica* |
| Herbaceous | (1) *Schizachyrium scoparium*<br>(2) *Helianthus hirsutus* |

## Physiographic features

This site is on backslopes with slopes of 15 to 55 percent. It is on exposed aspects (south, southwest, and west), which receive significantly more solar radiation than the protected aspects. Sites are often downslope from dolomite glades. The site generates runoff to adjacent, downslope ecological sites. This site does not flood.

The accompanying 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 this ecological site.

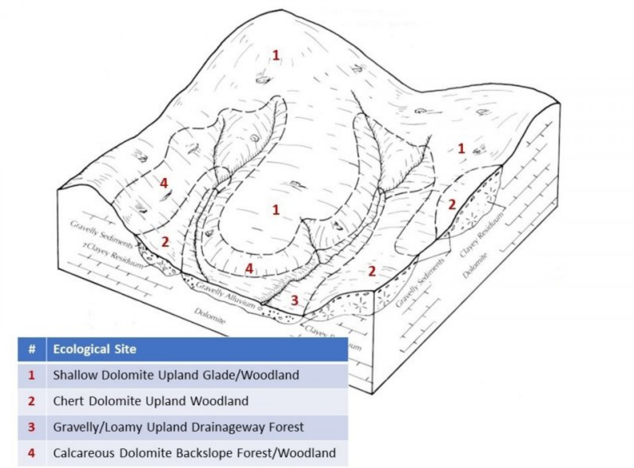



**Figure 2. Landscape relationships for this ecological site.**

**Table 2. Representative physiographic features**

| | |
|---|---|
| Landforms | (1) Hill<br>(2) Hillslope |
| Flooding frequency | None |
| Ponding frequency | None |
| Slope | 15–55% |
| Water table depth | 60 in |
| Aspect | W, SE, S, SW |

## 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) | 161-180 days |
| Freeze-free period (characteristic range) | 194-203 days |
| Precipitation total (characteristic range) | 47 in |
| Frost-free period (actual range) | 156-185 days |
| Freeze-free period (actual range) | 192-205 days |
| Precipitation total (actual range) | 46-48 in |
| Frost-free period (average) | 171 days |
| Freeze-free period (average) | 199 days |
| Precipitation total (average) | 47 in |

## Climate stations used

- (1) CALICO ROCK 2 WSW [USC00031132], Calico Rock, AR
- (2) EUREKA SPRINGS 3 WNW [USC00032356], Eureka Springs, AR
- (3) ROUND SPRING 2SW [USC00237309], Eminence, 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.

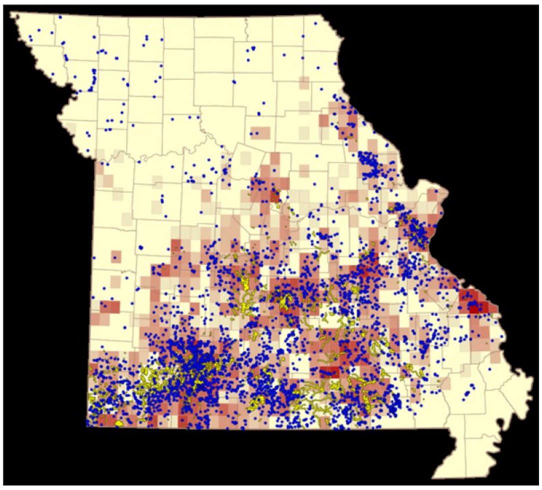


**Figure 9. Distribution of karst-related features in Missouri. Image from Wikimedia Commons developed from the Missouri Department of Natural Resources, Division of Geology and Land Survey.**

## 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.

**Table 4. Representative soil features**

| | |
|---|---|
| Parent material | (1) Slope alluvium–dolomite<br>(2) Residuum–dolomite |
| Surface texture | (1) Very gravelly silt loam |
| Family particle size | (1) Clayey |
| Drainage class | Well drained |
| Soil depth | 20–40 in |
| Surface fragment cover <=3" | 35–50% |
| Surface fragment cover >3" | 5–30% |
| Available water capacity (0-40in) | 2–4 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) | 25–40% |
| Subsurface fragment volume >3" (Depth not specified) | 5–20% |

## 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 and south to west aspects of Calcareous Dolomite Exposed Backslope Woodlands limited the growth of trees and supported an abundance of native grasses and forbs in the understory. Chinkapin oak dominated an open overstory, with 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. But the return of fire would have re-opened the woodlands and stimulated the ground flora.

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

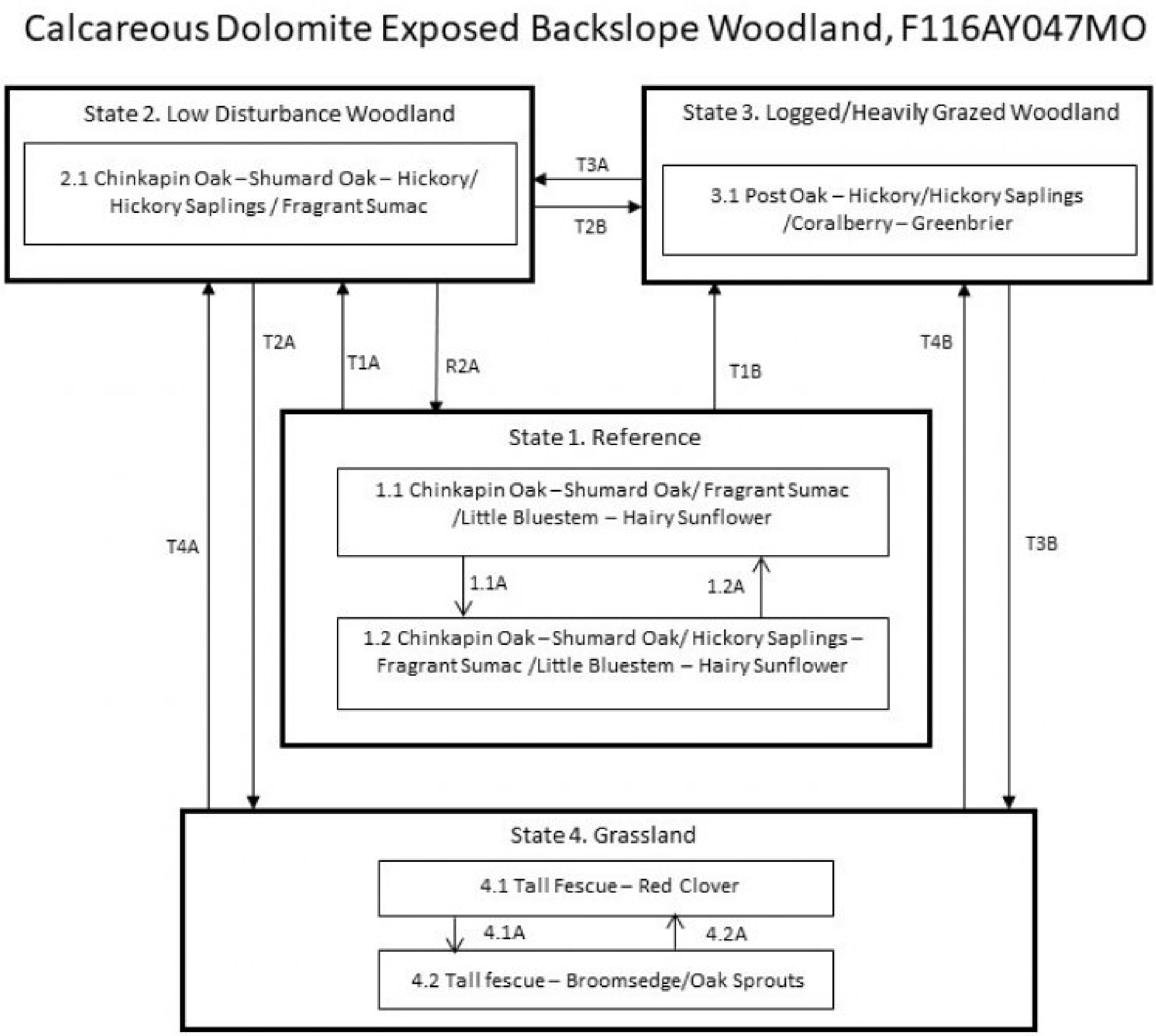
Calcareous Dolomite Exposed Backslope Woodlands were also subjected to occasional disturbances from wind and ice, as well as grazing by native large herbivores, such as bison, elk, and white-tailed deer. Wind and ice would have periodically opened the canopy up by knocking over trees or breaking substantial 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 red cedar. Grazed sites have a more open understory. In addition, soil compaction and soil erosion related to grazing can be a problem along with lower site productivity.

These ecological sites are not productive. Timber harvesting is limited. 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. 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.

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 | Disturbance-free interval >20 years |
| 1.2A | Disturbance 10-20 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

The reference state was dominated by Shumard oak, chinkapin oak and ash. Periodic disturbances from fire, wind or ice maintained the dominance of white and chinkapin oak by opening up the canopy and allowing more light for oak reproduction. Long disturbance-free periods allowed an increase in more shade tolerant species such as northern red oak and sugar maple. Two community phases are recognized in this state, with shifts between phases based on disturbance frequency. This reference state is uncommon today. Some sites have been converted to grassland (State 4). Others have been subject to repeated, high-graded timber harvest coupled with domestic livestock grazing (State 3). Fire suppression has resulted in increased canopy density, which has affected the abundance and diversity of ground flora. Many reference sites have been managed for timber harvests.

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

Periodic disturbances from fire, wind or ice maintained the dominance of white oak and chinkapin oak by opening the canopy and allowing more light for oak reproduction.

**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/ Hickory Saplings – Fragrant Sumac /Little Bluestem – Hairy Sunflower

Two community phases are recognized in this state, with shifts between phases based on disturbance frequency.

### Pathway P1.1A
### Community 1.1 to 1.2

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

### Pathway P1.2A
### Community 1.2 to 1.1

This pathway is the result of a fire 3 to 10 year cycle being reestablished.

### State 2
### Low Disturbance Woodland

Lower disturbance levels has allowed these woodlands to become dense with saplings such as maple, ash and hickory. The dense, shaded conditions and lack of disturbance has caused the ground flora to decrease in cover and diversity. 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 periodic disturbances 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
### Chinkapin Oak – Shumard Oak – Hickory/Hickory Saplings/Fragrant Sumac

### State 3
### Logged/Heavily Grazed Woodland

Many of these sites have been subjected to heavy grazing by domestic livestock and periodic logging. These areas are more open with a diminished ground flora. In addition, grazed areas exhibit a lower diversity of native ground flora species and an increase of invasive natives such as coralberry and greenbrier. Restricting livestock access and eliminating logging will be necessary for successful restoration.

### Community 3.1
### Post Oak – Hickory/Hickory Saplings /Coralberry – Greenbrier

### State 4
### Grassland

Conversion of other states to non-native cool season species such as tall fescue 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

Conversion of other states to non-native cool season species such as tall fescue and red clover has been common.

### Community 4.2
### Tall fescue - Broomsedge/Oak Sprouts

Long term uncontrolled grazing can cause significant soil erosion and compaction.

### 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 reseeding 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 livestock grazing and forest stand improvement.

### 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.

### Restoration pathway 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 (Ft) | Canopy Cover (%) | Diameter (In) | Basal Area (Square Ft/Acre) |
|---|---|---|---|---|---|---|---|
| **Tree** | | | | | | | |
| chinquapin oak | QUMU | *Quercus muehlenbergii* | Native | – | – | – | – |
| eastern redcedar | JUVI | *Juniperus virginiana* | Native | – | – | – | – |
| pignut hickory | CAGL8 | *Carya glabra* | Native | – | – | – | – |
| white ash | FRAM2 | *Fraxinus americana* | Native | – | – | – | – |
| blue ash | FRQU | *Fraxinus quadrangulata* | Native | – | – | – | – |
| post oak | QUST | *Quercus stellata* | Native | – | – | – | – |
| white oak | QUAL | *Quercus alba* | Native | – | – | – | – |
| Shumard oak | QUSHS2 | *Quercus shumardii var. shumardii* | Native | – | – | – | – |
| shagbark hickory | CAOV2 | *Carya ovata* | Native | – | – | – | – |
| northern red oak | QURU | *Quercus rubra* | 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 | – | – |
| rock muhly | MUSO | *Muhlenbergia sobolifera* | Native | – | – |
| little bluestem | SCSC | *Schizachyrium scoparium* | Native | – | – |
| eastern bottlebrush grass | ELHY | *Elymus hystrix* | Native | – | – |
| slender woodland sedge | CADI5 | *Carex digitalis* | Native | – | – |
| Bosc's panicgrass | DIBO2 | *Dichanthelium boscii* | Native | – | – |
| Virginia wildrye | ELVI3 | *Elymus virginicus* | Native | – | – |
| bristleleaf sedge | CAEB2 | *Carex eburnea* | Native | – | – |
| **Forb/Herb** | | | | | |
| Ozark milkvetch | ASDI4 | *Astragalus distortus* | Native | – | – |
| Curtis' star-grass | HYCU5 | *Hypoxis curtissii* | Native | – | – |
| wild quinine | PAAU7 | *Parthenium auriculatum* | Native | – | – |
| widowsfrill | SIST | *Silene stellata* | Native | – | – |
| purple meadowparsnip | THTR | *Thaspium trifoliatum* | Native | – | – |
| golden zizia | ZIAU | *Zizia aurea* | Native | – | – |
| flowering spurge | EUCO10 | *Euphorbia corollata* | Native | – | – |
| butterfly milkweed | ASTU | *Asclepias tuberosa* | Native | – | – |
| slimflower scurfpea | PSTE5 | *Psoralidium tenuiflorum* | Native | – | – |
| tall blazing star | LIAS | *Liatris aspera* | Native | – | – |
| yellow pimpernel | TAIN | *Taenidia integerrima* | Native | – | – |
| hairy sunflower | HEHI2 | *Helianthus hirsutus* | Native | – | – |
| bearded shorthusk | BRER2 | *Brachyelytrum erectum* | Native | – | – |
| Dillenius' ticktrefoil | DEGL4 | *Desmodium glabellum* | Native | – | – |
| pointedleaf ticktrefoil | DEGL5 | *Desmodium glutinosum* | Native | – | – |
| yellow passionflower | PALU2 | *Passiflora lutea* | Native | – | – |
| elmleaf goldenrod | SOUL2 | *Solidago ulmifolia* | Native | – | – |
| manyray aster | SYAN2 | *Symphyotrichum anomalum* | Native | – | – |
| hoary puccoon | LICA12 | *Lithospermum canescens* | Native | – | – |
| groundplum milkvetch | ASCRT | *Astragalus crassicarpus var. trichocalyx* | Native | – | – |
| three-lobe violet | VITR2 | *Viola triloba* | Native | – | – |
| shrubby lespedeza | LEFR5 | *Lespedeza frutescens* | Native | – | – |
| smooth oxeye | HEHE5 | *Heliopsis helianthoides* | Native | – | – |
| **Fern/fern ally** | | | | | |
| ebony spleenwort | ASPL | *Asplenium platyneuron* | Native | – | – |
| **Shrub/Subshrub** | | | | | |
| American hazelnut | COAM3 | *Corylus americana* | Native | – | – |
| rusty blackhaw | VIRU | *Viburnum rufidulum* | Native | – | – |
| fragrant sumac | RHAR4 | *Rhus aromatica* | Native | – | – |
| New Jersey tea | CEAM | *Ceanothus americanus* | Native | – | – |
| Carolina buckthorn | FRCA13 | *Frangula caroliniana* | Native | – | – |
| dwarf hackberry | CETE | *Celtis tenuifolia* | Native | – | – |
| **Tree** | | | | | |
| eastern redbud | CECA4 | *Cercis canadensis* | Native | – | – |

## Animal community

Wildlife (MDC 2006):

Oaks provide hard mast for wildlife; scattered shrubs provide soft mast; frequent bedrock outcrops provide reptile habitat and a patchier ground flora.

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 Dolomite 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 Dolomite 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 as a management tool is a management objective.

Limitations: Large 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: Calcareous Dolomite Exposed Backslope Woodland

Plot CURINP01 - Arkana soil
Located in Current River, Ozark National Scenic Riverway, National Park Service, Shannon County, MO
Latitude: 37.163628
Longitude: -91.164948

Plot CURINP05 - Arkana soil
Located in Current River, Ozark National Scenic Riverway, National Park Service, Shannon County, MO
Latitude: 37.089143
Longitude: -91.059965

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### Contributors

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Doug Wallace

### Approval

Nels Barrett, 9/24/2020

### Acknowledgments

Missouri Department of Conservation and Missouri Department of Natural Resources personnel provided significant and helpful field and technical support in the development of this ecological site.

### 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 | 05/29/2023 |
| 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:**