USDA Natural Resources Conservation Service

Ecological site F116AY018MO
Loamy 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.

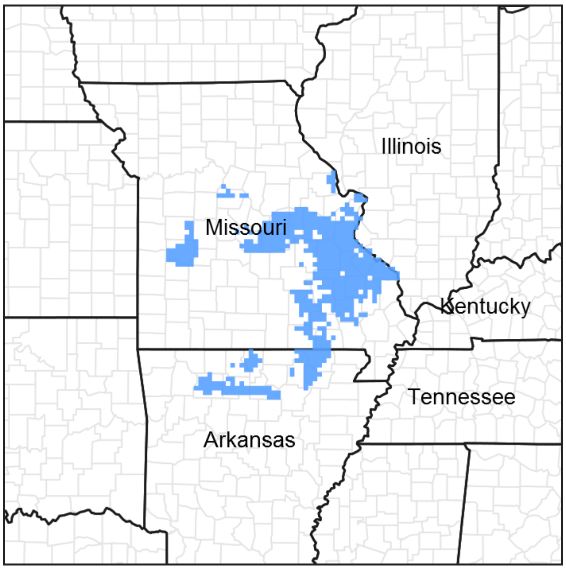


Figure 1. Mapped extent

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-Mesic 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 scattered locations throughout the Ozark Highlands Section, primarily within the following Subsections:
Inner Ozark Border
Meramec River Hills
Osage River Hills
St. Francois Knobs and Basins

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”.

Loamy Dolomite Upland Woodlands occur primarily in the Ozark border counties, in the northeastern part of the Ozark Highland. Soils are typically moderately deep over dolomite bedrock, with loamy surfaces and clayey subsoils. The reference plant community is woodland with an overstory dominated by white oak, with chinkapin oak, black oak, post oak, and northern red oak, and a ground flora of native grasses and forbs with scattered shrubs.

Associated sites

F116AY008MO	**Loamy Upland Woodland** Loamy Upland Woodlands are upslope, on summits and shoulders.
F116AY019MO	**Loamy Dolomite Protected Backslope Forest** Loamy Dolomite Protected Backslope Forests are downslope, on steep lower backslopes with northern to eastern exposures.
F116AY044MO	**Chert Dolomite Upland Woodland** Chert Dolomite Upland Woodlands are adjacent or downslope, where loess is thinner.
F116AY051MO	**Loamy Dolomite Exposed Backslope Woodland** Loamy Dolomite Exposed Backslope Woodlands are downslope, on steep lower backslopes with southern to western exposures.

Similar sites

F116AY008MO	**Loamy Upland Woodland** Loamy Upland Woodlands are on similar landscape positions but are more productive.

Table 1. Dominant plant species

Tree	(1) *Quercus alba* (2) *Quercus muehlenbergii*
Shrub	(1) *Cercis Canadensis* (2) *Rhus aromatica*
Herbaceous	(1) *Elymus virginicus* (2) *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 Skaer and Cook, 2005) 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. Loamy Upland Woodland sites are often upslope, labeled “1”. The dashed lines within the Loamy Upland Woodland area indicate the various soils included in this ecological site. Loamy Dolomite Backslope sites are typically downslope, labeled “4”. Chert Dolomite Upland Woodland sites, labeled “3”, occur where the loess thins and surface chert fragment content increases.

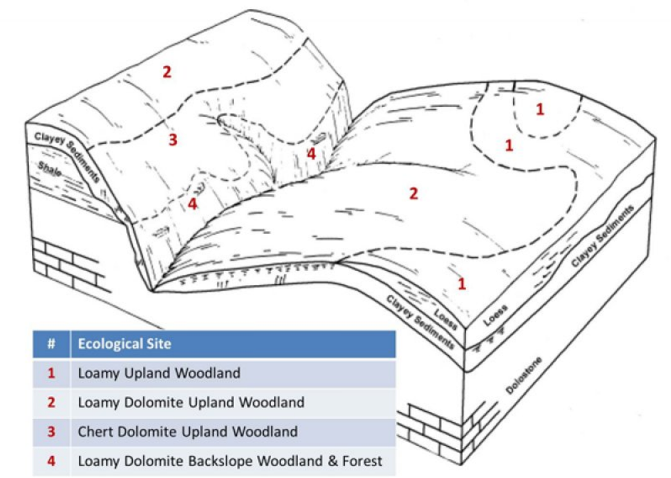


Figure 2. Landscape relationships for this ecological site.

Table 2. Representative physiographic features

Landforms	(1) Ridge (2) Interfluve (3) Hill
Flooding frequency	None
Ponding frequency	None
Slope	1–15%
Water table depth	36–114 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)	158-174 days
Freeze-free period (characteristic range)	192-204 days
Precipitation total (characteristic range)	1,092-1,219 mm
Frost-free period (actual range)	153-185 days
Freeze-free period (actual range)	191-211 days
Precipitation total (actual range)	1,092-1,219 mm
Frost-free period (average)	167 days
Freeze-free period (average)	199 days
Precipitation total (average)	1,143 mm

Climate stations used

- (1) POCAHONTAS 1 [USC00035820], Pocahontas, AR
- (2) WEST PLAINS [USC00238880], West Plains, MO
- (3) FESTUS [USC00232850], Crystal City, MO
- (4) VICHY ROLLA NATIONAL AP [USW00013997], Vichy, 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.

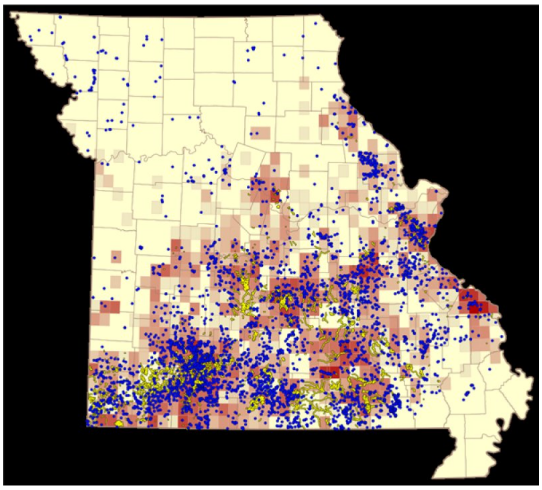


Figure 9. Distribution of karst-related features in Missouri. Image from Wikimedia Commons developed from the Missouri Department of Natural Resources, Division of Geology and Land Survey.

Soil features

These soils are underlain with dolomite bedrock at 20 to 40 inches depth. The soils were formed under woodland vegetation, and have thin, light-colored surface horizons. Parent material is a thin layer of loess, over slope alluvium, over residuum weathered from dolomite, overlying dolomite bedrock. Some areas are underlain with shale. They have silt loam surface layers, with clayey subsoils that have low to moderate amounts of chert gravel and cobbles. Some soils are affected by seasonal wetness in spring months from a water table perched on the clayey subsoil. Soil series associated with this site include Caneyville, Eudy, and Useful.

Table 4. Representative soil features

Parent material	(1) Residuum–dolomite (2) Slope alluvium–dolomite (3) Residuum–shale
Surface texture	(1) Silt loam
Family particle size	(1) Clayey
Drainage class	Somewhat poorly drained to moderately well drained
Permeability class	Very slow
Soil depth	51–102 cm
Surface fragment cover <=3"	0–9%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	10.16–15.24 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)	4.5–7.3
Subsurface fragment volume <=3" (Depth not specified)	0–40%
Subsurface fragment volume >3" (Depth not specified)	0–3%

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 Loamy Dolomite Upland Woodlands limit the growth of trees and support an abundance of native grasses and forbs in the understory. While more productive than adjacent glades and woodlands, moderately tall (50 to 70 feet) white oak dominated a semi-open overstory, with chinkapin oak and northern red 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 red cedar have encroached into these ecological sites. Most of these ecological sites today are dense, and shady 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.

Loamy 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 red cedar. Grazed sites have a more open understory. In addition, soil compaction and soil erosion from grazing can be a problem and lower site productivity.

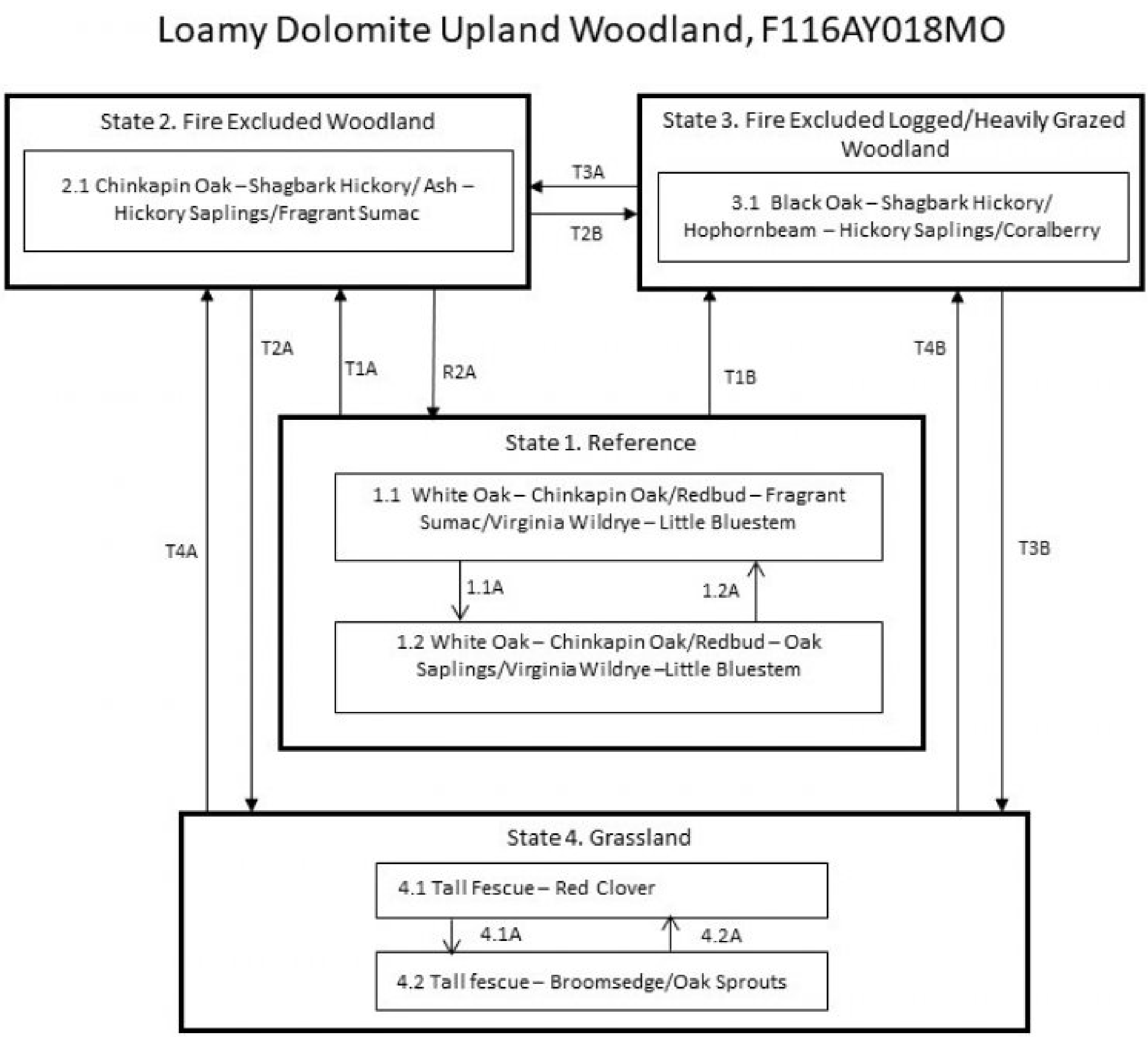
These ecological sites are only marginally productive, especially when compared to adjacent protected slopes and loess covered units. Oak regeneration is typically problematic. Maintenance of the oak component will require disturbances that will encourage more sun adapted species and reduce shading effects.

Single tree selection timber harvests are common for this ecological site and often results in removal of the most productive trees (high grading) in the stand leading to poorer quality timber and a shift in species composition away from more valuable oak species. Better planned single tree selection or the creation of group openings can help regenerate and maintain more desirable oak species and increase vigor on the residual trees.

Clearcutting also occurs and results in dense, even-aged stands dominated by oak. This may be beneficial for existing stands whose composition has been highly altered by past management practices. However, without some thinning of the dense 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); Past logging
T1B	Fire suppression; heavy grazing by livestock; Current 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. The understory consisted of a dense cover of native grasses and forbs. Tree height was 50 to 70 feet, and canopy closure 50 to 80 percent. During fire-free intervals, hickories 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
White Oak – Chinkapin Oak/Eastern Redbud – Fragrant Sumac/Virginia Wildrye – Little Bluestem

Forest overstory. Forest Overstory Composition based on Nelson (2010) and field surveys.

Forest understory. Forest Understory Composition based on Nelson (2010) and field surveys.

Community 1.2
White Oak – Chinkapin Oak/Eastern Redbud – Oak Saplings/Virginia Wildrye –Little Bluestem

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
Fire Excluded Woodland

Fire suppression and cessation of logging has allowed these previously open woodlands to become denser. 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
Chinkapin Oak – Shagbark Hickory/ Ash – Hickory Saplings/Fragrant Sumac

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 unrestricted logging. These grazed and logged areas exhibit a lower diversity of native ground flora species and an increased abundance of eastern redcedar and other invasive natives such as buck brush. 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
Black Oak – Shagbark Hickory/ Hophornbeam – Hickory Saplings/Coralberry

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

Community 4.2
Tall fescue - Broomsedge/Oak Sprouts

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 T2B
State 3 to 2

This transition results from the cessation of cattle 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.

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	–	–	–	–
sugar maple	ACSA3	*Acer saccharum*	Native	–	–	–	–
white oak	QUAL	*Quercus alba*	Native	–	–	–	–
blue ash	FRQU	*Fraxinus quadrangulata*	Native	–	–	–	–
northern red oak	QURU	*Quercus rubra*	Native	–	–	–	–
post oak	QUST	*Quercus stellata*	Native	–	–	–	–
black oak	QUVE	*Quercus velutina*	Native	–	–	–	–
shagbark hickory	CAOV2	*Carya ovata*	Native	–	–	–	–

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	–	–
eastern star sedge	CARA8	*Carex radiata*	Native	–	–
reflexed sedge	CARE9	*Carex retroflexa*	Native	–	–
Indian woodoats	CHLA5	*Chasmanthium latifolium*	Native	–	–
hairy woodland brome	BRPU6	*Bromus pubescens*	Native	–	–
eastern bottlebrush grass	ELHY	*Elymus hystrix*	Native	–	–
rock muhly	MUSO	*Muhlenbergia sobolifera*	Native	–	–
oval-leaf sedge	CACE	*Carex cephalophora*	Native	–	–
Muhlenberg's sedge	CAMU4	*Carex muehlenbergii*	Native	–	–
Bosc's panicgrass	DIBO2	*Dichanthelium boscii*	Native	–	–
poverty oatgrass	DASP2	*Danthonia spicata*	Native	–	–
slender woodland sedge	CADI5	*Carex digitalis*	Native	–	–
Forb/Herb					
widowsfrill	SIST	*Silene stellata*	Native	–	–
eastern greenviolet	HYCO6	*Hybanthus concolor*	Native	–	–
hairy sunflower	HEHI2	*Helianthus hirsutus*	Native	–	–
spotted geranium	GEMA	*Geranium maculatum*	Native	–	–
pointedleaf ticktrefoil	DEGL5	*Desmodium glutinosum*	Native	–	–
largebract ticktrefoil	DECU	*Desmodium cuspidatum*	Native	–	–
elmleaf goldenrod	SOUL2	*Solidago ulmifolia*	Native	–	–
violet lespedeza	LEVI6	*Lespedeza violacea*	Native	–	–
eastern purple coneflower	ECPU	*Echinacea purpurea*	Native	–	–
white arrowleaf aster	SYUR	*Symphyotrichum urophyllum*	Native	–	–
yellowfruit horse-gentian	TRAN3	*Triosteum angustifolium*	Native	–	–
eastern beebalm	MOBR2	*Monarda bradburiana*	Native	–	–
tall blazing star	LIAS	*Liatris aspera*	Native	–	–
licorice bedstraw	GACI2	*Galium circaezans*	Native	–	–
American hogpeanut	AMBR2	*Amphicarpaea bracteata*	Native	–	–
American cancer-root	COAM	*Conopholis americana*	Native	–	–
fourleaf yam	DIQU	*Dioscorea quaternata*	Native	–	–
Shrub/Subshrub					
fragrant sumac	RHAR4	*Rhus aromatica*	Native	–	–
American hazelnut	COAM3	*Corylus americana*	Native	–	–
fragrant sumac	RHAR4	*Rhus aromatica*	Native	–	–
Carolina buckthorn	FRCA13	*Frangula caroliniana*	Native	–	–
Tree					
hophornbeam	OSVI	*Ostrya virginiana*	Native	–	–
eastern redbud	CECA4	*Cercis canadensis*	Native	–	–
Vine/Liana					
Virginia creeper	PAQU2	*Parthenocissus quinquefolia*	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: Field measured site index values average 54 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. Prescribed fire can be a helpful management tool.

Limitations: Coarse fragments occur in the lower soil 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: Loamy Dolomite Upland Woodland

Plot VAVICA01 - Caneyville
Located in Valley View Glades CA, Jefferson County, MO
Latitude: 38.262617
Longitude: -90.623986

Plot VIGLCA02 - Caneyville
Located in Victoria Glades CA, Jefferson County, MO
Latitude: 38.20285
Longitude: -90.54634

Plot WASHSP01 - Caneyville
Located Washington State Park, Washington County, MO

Latitude: 38.086022
Longitude: -90.706009

Other references

Anderson, R.C. 1990. The historic role of fire in North American grasslands. Pp. 8-18 in S.L. Collins and L.L. Wallace (eds.). Fire in North American tallgrass prairies. University of Oklahoma Press, Norman.

Batek, M.J., A.J. Rebertus, W.A. Schroeder, T.L. Haithcoat, E. Compas, and R.P. Guyette. 1999. Reconstruction of early nineteenth-century vegetation and fire regimes in the Missouri Ozarks. Journal of Biogeography 26:397-412.

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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:

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

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12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant:

    Sub-dominant:

    Other:

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

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14. **Average percent litter cover (%) and depth (in):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

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17. **Perennial plant reproductive capability:**
