Ecological site F115XB046MO
Chert Limestone/Dolomite Exposed Backslope Woodland

Last updated: 12/30/2024
Accessed: 05/12/2025

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): 115X–Central Mississippi Valley Wooded Slopes

This MLRA is characterized by deeply dissected, loess-covered hills bordering well defined valleys of the Illinois, Mississippi, Missouri, Ohio, and Wabash Rivers and their tributaries. It is used to produce cash crops and livestock. About one-third of the area is forested, mostly on the steeper slopes. This area is in Illinois (50 percent), Missouri (36 percent), Indiana (13 percent), and Iowa (1 percent) in two separate areas. It makes up about 25,084 square miles (64,967 square kilometers).

Most of this area is in the Till Plains section and the Dissected Till Plains section of the Central Lowland province of the Interior Plains. The Springfield-Salem plateaus section of the Ozarks Plateaus province of the Interior Highlands occurs along the Missouri River and the Mississippi River south of the confluence with the Missouri River. The nearly level to very steep uplands are dissected by both large and small tributaries of the Illinois, Mississippi, Missouri, Ohio, and Wabash Rivers. The Ohio River flows along the southernmost boundary of this area in Indiana. Well defined valleys with broad flood plains and numerous stream terraces are along the major streams and rivers. The flood plains along the smaller streams are narrow. Broad summits are nearly level to undulating. Karst topography is common in some parts along the Missouri and Mississippi Rivers and their tributaries. Well-developed karst areas have hundreds of sinkholes, caves, springs, and losing streams. In the St. Louis area, many of the karst features have been obliterated by urban development.

Elevation ranges from 90 feet (20 meters) on the southernmost flood plains to 1,030 feet (320 meters) on the highest ridges. Local relief is mainly 10 to 50 feet (3 to 15 meters) but can be 50 to 150 feet (15 to 45 meters) in the steep, deeply dissected hills bordering rivers and streams. The bluffs along the major rivers are generally 200 to 350 feet (60 to 105 meters) above the valley floor.

The uplands in this MLRA are covered almost entirely with Peoria Loess. The loess can be more than 7 feet (2 meters) thick on stable summits. On the steeper slopes, it is thin or does not occur. In Illinois, the loess is underlain mostly by Illinoian-age till that commonly contains a paleosol. Pre-Illinoian-age till is in parts of this MLRA in Iowa and Missouri and to a minor extent in the western part of Illinois. Wisconsin-age outwash, alluvial deposits, and sandy eolian material are on some of the stream terraces and on dunes along the major tributaries. The loess and glacial deposits are underlain by several bedrock systems. Pennsylvanian and Mississippian bedrock are the most extensive. To a lesser extent are Silurian, Devonian, Cretaceous, and Ordovician bedrock. Karst areas have formed where limestone is near the surface, mostly in the southern part of the MLRA along the Mississippi River and some of its major tributaries. Bedrock outcrops are common on the bluffs along the Mississippi, Ohio, and Wabash Rivers and their major tributaries and at the base of some steep slopes along minor streams and drainageways.

The annual precipitation ranges from 35 to 49 inches (880 to 1,250 millimeters) with a mean of 41 inches (1,050 millimeters). The annual temperature ranges from 48 to 58 degrees F (8.6 to 14.3 degrees C) with a mean of 54 degrees F (12.3 degrees C). The freeze-free period ranges from 150 to 220 days with a mean of 195 days.

Soils The dominant soil orders are Alfisols and, to a lesser extent, Entisols and Mollisols. The soils in the area have a mesic soil temperature regime, an aquic or udic soil moisture regime, and mixed or smectitic mineralogy. They are shallow to very deep, excessively drained to poorly drained, and loamy, silty, or clayey.

The soils on uplands in this area support natural hardwoods. Oak, hickory, and sugar maple are the dominant species. Big bluestem, little bluestem, and scattered oak and eastern redcedar grow on some sites. The soils on flood plains support mixed forest vegetation, mainly American elm, eastern cottonwood, river birch, green ash, silver maple, sweetgum, American sycamore, pin oak, pecan, and willow. Sedge and grass meadows and scattered trees are on some low-lying sites. (United States Department of Agriculture, Natural Resources Conservation Service, 2022)

LRU notes

The Central Mississippi Valley Wooded Slopes, Western Part consists of deeply dissected, loess-covered hills bordering the Missouri and Mississippi Rivers as well as floodplains and terraces of these rivers. The Northern boundary runs along the South Fabius River valley separating it from the broad rounded interfluves of the northern till plain. A major physiographic feature within the LRU (Land Resource Unit) includes the Lincoln Hills region. The Lincoln Hills extend along the Mississippi River in Missouri, starting about 40 miles (64 kilometers) northwest of St. Louis and extending north to Hannibal. The Lincoln Hills partially escaped the most recent glaciation in the region during the Pleistocene. In geology and biology, they resemble the rugged and forested hills of the Ozark Highlands (MLRA 116A) more than the rolling plains of northern Missouri. The underlying limestone bedrock has formed bluffs, glades, caves, springs, and sinkholes. Elevation ranges from about 420 feet (128 meters) along the Mississippi River near Cape Girardeau, Missouri to about 830 feet (253 meters) near Clarksville along the Mississippi River upstream from St. Louis. High ridges near Hillsboro, Missouri can reach over 1,000 feet (305 meters). Underlying bedrock is mainly Ordovician-aged dolomite and sandstone, with Mississippian-aged limestone north of the Missouri River. Loess caps both stream and glacial outwash terraces along the major rivers along with Pre-Illinoisan till near the edges of the area.

Classification relationships

Major Land Resource Area (MLRA) (USDA-NRCS, 2022):
115X–Central Mississippi Valley Wooded Slopes

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 a Post Oak Woodland.

National Vegetation Classification System Vegetation Association (NatureServe, 2010):
The reference state for this ecological site is most similar to a 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 occurs primarily in Land Type Associations of the following Subsections:
Inner Ozark Border
Outer Ozark Border

Ecological site concept

Chert Limestone/Dolomite Exposed Backslope Woodlands occupy the southerly and westerly aspects of steep, dissected slopes, and are mapped in complex with the Chert Limestone/Dolomite Protected Backslope Forest ecological site. These sites are in scattered upland locations in the Missouri River watershed. Soils are typically moderately deep over limestone/dolomite bedrock, with gravelly surfaces. The reference plant community is

woodland with an overstory dominated by post oak, with lesser amounts of blackjack oak and black oak, and a ground flora of native grasses and forbs with scattered shrubs.

Associated sites

F115XB005MO	**Loamy Upland Woodland** Loamy Upland Woodlands are typically upslope on hillslope summits, crests and shoulders.
F115XB014MO	**Chert Limestone/Dolomite Protected Backslope Forest** Chert Limestone/Dolomite Protected Backslope Woodlands are mapped in complex with this ecological site on north and east aspects.
R115XB009MO	**Shallow Limestone/Dolomite Upland Glade/Woodland** Shallow Limestone/Dolomite Upland Glade sites are commonly associated with this site.

Similar sites

F115XB014MO	**Chert Limestone/Dolomite Protected Backslope Forest** Chert Limestone/Dolomite Protected Backslope Woodlands are mapped in complex with this ecological site on north and east aspects.

Table 1. Dominant plant species

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

Physiographic features

This site is on backslopes with slopes of 15 to 50 percent. It is on exposed aspects (south, southwest, and west), which receive significantly more solar radiation than the protected aspects. The site receives runoff from upslope summit and shoulder sites, and generates runoff to adjacent, downslope ecological sites. This site does not flood.

The following figure (adapted from Davis, 2002) shows the typical landscape position of this ecological site, and landscape relationships among the major ecological sites in the uplands. The site is within the area labeled “2”, on steep backslopes with northerly and easterly aspects. Loamy Upland Woodlands (labeled “1”) are typically upslope on hillslope summits, crests and shoulders. Shallow Limestone/Dolomite glade sites are commonly associated with this site, but are not shown on the figure.

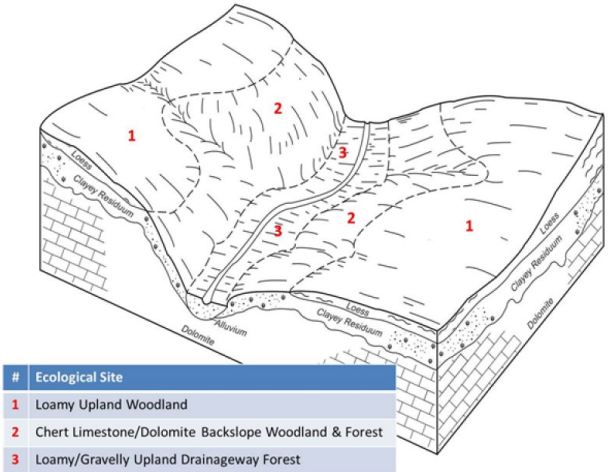

Figure 2. Landscape relationships for this ecological site.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Hillslope
Runoff class	Very high
Flooding frequency	None
Ponding frequency	None
Elevation	152–366 m
Slope	15–50%
Water table depth	61–152 cm
Aspect	W, SE, S, SW

Climatic features

The Central Mississippi Valley Wooded Slopes, Western Part 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 Central Mississippi Valley Wooded Slopes, Western Part 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 diagonally crossing the MLRA from northwest to southeast. Both mean annual temperature and precipitation exhibit gradients along this line.

The average annual precipitation in most of this area is 38 to 48 inches. The average annual temperature is 53 to 57 degrees F. Mean January minimum temperature follows the northwest-to-southeast 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 the same gradient as temperature. 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. Snowfall is common in winter.

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. 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; accessed June 2012

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Table 3. Representative climatic features

Frost-free period (characteristic range)	149-171 days
Freeze-free period (characteristic range)	181-207 days
Precipitation total (characteristic range)	1,118-1,168 mm
Frost-free period (actual range)	141-176 days
Freeze-free period (actual range)	174-213 days
Precipitation total (actual range)	1,067-1,168 mm
Frost-free period (average)	160 days
Freeze-free period (average)	194 days
Precipitation total (average)	1,143 mm

Climate stations used

- (1) COLUMBIA U OF M [USC00231801], Columbia, MO
- (2) ROSEBUD [USC00237300], Gerald, MO
- (3) ST LOUIS SPRT OF S L AP [USW00003966], Chesterfield, MO

Influencing water features

The water features of this upland ecological site include evapotranspiration, surface runoff, and drainage. Each water balance component fluctuates to varying extents from year-to-year. Evapotranspiration remains the most constant. Precipitation and drainage are highly variable between years. Seasonal variability differs for each water component. Precipitation generally occurs as single day events. Evapotranspiration is lowest in the winter and peaks in the summer. Water stored as ice and snow decreases drainage and surface runoff rates throughout the winter and increases these fluxes in the spring. The surface runoff pulse is greatly influenced by extreme events. Conversion to cropland or other high intensities land uses tends to increase runoff, but also decreases evapotranspiration. Depending on the situation, this might increase groundwater discharge, and decrease baseflow in receiving streams (Vano 2005).

Soil features

These soils are underlain with limestone and/or 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 limestone and dolomite, overlying limestone bedrock. They have gravelly to very gravelly 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 and Gatewood.

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

Figure 9. Gatewood series

Table 4. Representative soil features

Parent material	(1) Slope alluvium–limestone and dolomite (2) Residuum–limestone and dolomite
Surface texture	(1) Very gravelly silt loam (2) Gravelly silt loam (3) Very gravelly loam
Family particle size	(1) Clayey
Drainage class	Moderately well drained to well drained
Permeability class	Very slow
Soil depth	51–102 cm
Surface fragment cover <=3"	20–60%
Surface fragment cover >3"	0–15%
Available water capacity (0-101.6cm)	2.54–7.62 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)	35–60%
Subsurface fragment volume >3" (Depth not specified)	0–50%

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, droughty soils of Cherty Limestone/Dolomite Exposed Backslope Woodlands limit the growth of trees and support an abundance of native grasses and forbs in the understory. Wild fires played an important role in the maintenance of these ecological sites with 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. Rather short (40 to 50 feet) post oak dominated an open overstory, with chinkapin oak, blackjack oak and black oak. Shrubs were scattered within a dense matrix of native grasses and forbs.

During longer fire free intervals, woody species, such as especially eastern redcedar and black hickory, would have increased and the herbaceous understory diminished. But the return of wild fires would have opened the woodlands up again and stimulated the abundant ground flora. 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.

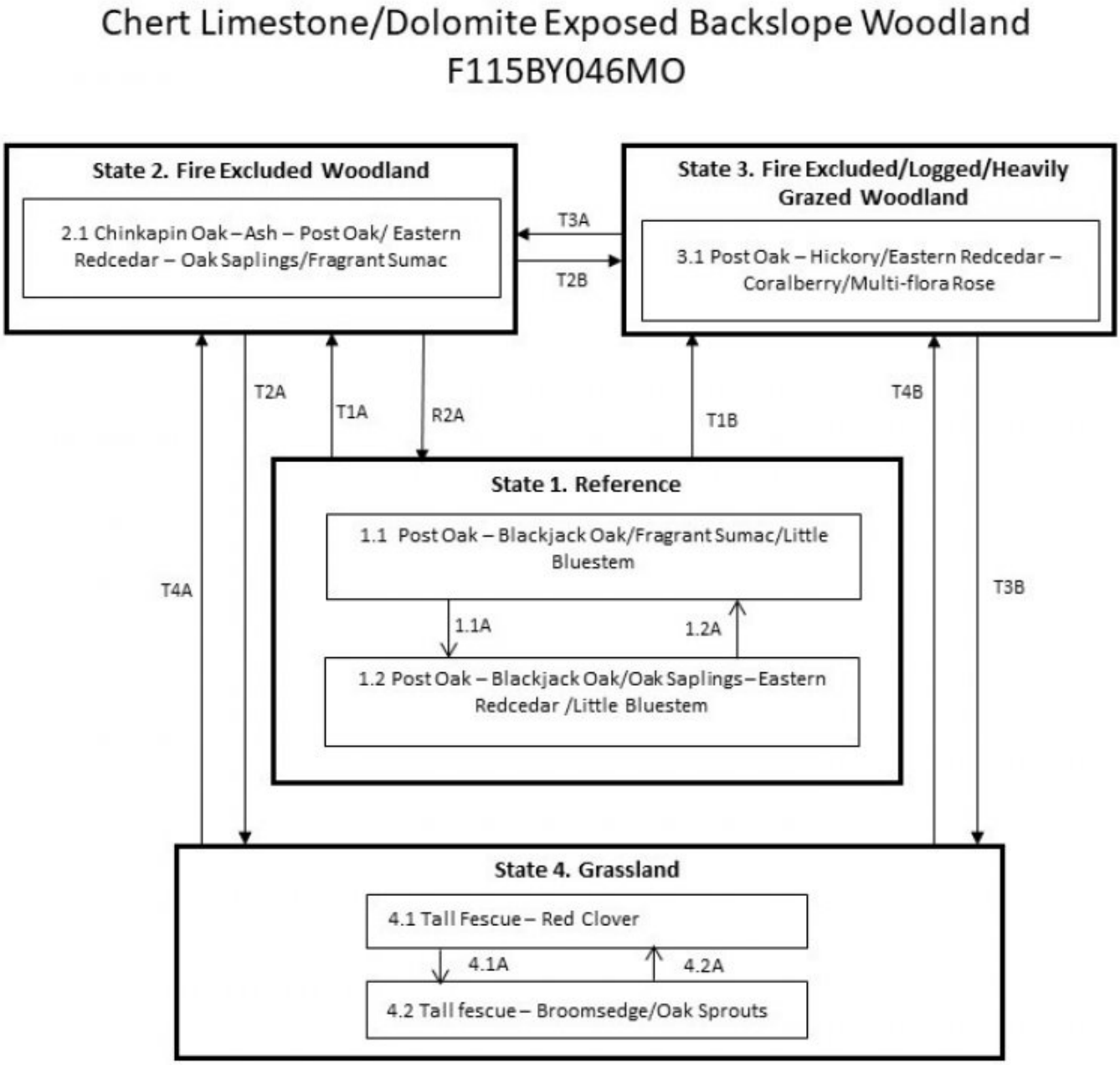
Cherty Limestone/Dolomite Exposed Backslope Woodlands were also subjected to occasional disturbances from wind and ice, as well as grazing by native large herbivores, such as bison, elk, and white-tailed deer. Wind and ice would have periodically opened the canopy up by knocking over trees or breaking 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 eastern redcedar, coralberry, gooseberry, and Virginia creeper. Grazed sites also have a more open understory. In addition, soil compaction and soil erosion due related to grazing can be a problem and lower site productivity.

Timber harvest is limited on these sites because of rather poor to fair quality trees. Removal of the younger understory and the application of prescribed fire have proven to be effective restoration management practices.

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); fire suppression
T1B	Fire suppression; uncontrolled grazing by livestock; logging
T3A	Livestock removal; forest stand improvement
T2B	Uncontrolled grazing by livestock; logging
T2A, T3B	Clearing; grassland seeding; grassland management
T4A	Tree planting; long term succession (50+ years); no grazing
T4B	Woody regrowth; long term succession (50+ years); light periodic grazing
R2A	Understory removal; prescribed fire; long term growth
1.1A	Fire-free interval 10-15 years
1.2A	Fire with 3-5 year intervals
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 steep backslopes with southern and western aspects. The restricted soil depth, droughty conditions, and native grasses made them susceptible to frequent fires, once every 3 to 5 years. Consequently, fire-tolerant post oak, black oak, and chinkapin oak, along with hickory dominated the open-canopy overstory. The understory consisted of a dense cover of native grasses and forbs (community phase 1.1).

Dominant plant species

- post oak (*Quercus stellata*), tree
- blackjack oak (*Quercus marilandica*), tree
- eastern redbud (*Cercis canadensis*), tree
- fragrant sumac (*Rhus aromatica*), shrub
- little bluestem (*Schizachyrium scoparium*), grass

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

This phase has an old growth overstory that is dominated by post oak and blackjack oak with hickory and post oak also present. This woodland community has a two-tiered structure with an open understory and a dense, diverse herbaceous ground flora. Periodic disturbances including fire, ice and wind create canopy gaps, allowing white oak and black oak to successfully reproduce and remain in the canopy. It is likely that this phase burned at least once every 5 years.

Forest overstory. The Overstory Species list is based on field surveys and commonly occurring species listed in Nelson (2010).

Forest understory. The Understory Species list is based on field surveys and commonly occurring species listed in Nelson (2010).

Community 1.2
Post Oak – Blackjack Oak/Oak Saplings - Fragrant Sumac/Little Bluestem

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

Pathway P1.1A
Community 1.1 to 1.2

This pathway is the result of fire-free interval 10 to 15 years.

Pathway P1.2A
Community 1.2 to 1.1

This pathway is the result of a fire 3 to 5 year cycle being reestablished.

State 2
Fire Excluded Woodland

Fire suppression has allowed these previously open woodlands to become dense with less fire-tolerant trees and saplings such as eastern redcedar. 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 plantlets or in the seed bank.

Dominant plant species

- chinquapin oak (*Quercus muehlenbergii*), tree

- blue ash (*Fraxinus quadrangulata*), tree
- eastern redbud (*Cercis canadensis*), tree
- fragrant sumac (*Rhus aromatica*), shrub

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

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

State 3
Fire Excluded/ Logged/Heavily Grazed Woodland

In addition to fire exclusion, many of these sites have been subjected to heavy grazing by domestic livestock and periodic logging. 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 and multi-flora rose.

Dominant plant species

- post oak (*Quercus stellata*), tree
- black hickory (*Carya texana*), tree
- eastern redbud (*Cercis canadensis*), tree
- coralberry (*Symphoricarpos orbiculatus*), shrub
- multiflora rose (*Rosa multiflora*), shrub

Community 3.1
Post Oak – Hickory/Eastern Redcedar – Coralberry/Multi-flora Rose

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

State 4
Grassland

Conversion of other states to non-native cool season species such as tall fescue and red clover has been common. Occasionally, these pastures will have scattered oaks. Long term uncontrolled grazing can cause significant soil erosion and compaction.

Dominant plant species

- tall fescue (*Schedonorus arundinaceus*), grass
- red clover (*Trifolium pratense*), other herbaceous

Community 4.1
Tall Fescue - Red Clover

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

Community 4.2
Tall fescue - Broomsedge/Oak Sprouts

This phase is the result of over use, poor grassland and grazing management and lack of adequate nutrient application. Oak sprouts, oak saplings, and invasive species are increasing as a result of poor management.

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 light intermittent grazing, long idle periods and increased woody growth and development.

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

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

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							
post oak	QUST	*Quercus stellata*	Native	–	–	–	–
blackjack oak	QUMA3	*Quercus marilandica*	Native	–	–	–	–
black oak	QUVE	*Quercus velutina*	Native	–	–	–	–
black hickory	CATE9	*Carya texana*	Native	–	–	–	–
eastern redcedar	JUVI	*Juniperus virginiana*	Native	–	–	–	–
common serviceberry	AMAR3	*Amelanchier arborea*	Native	–	–	–	–
blue ash	FRQU	*Fraxinus quadrangulata*	Native	–	–	–	–
chinquapin oak	QUMU	*Quercus muehlenbergii*	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	–	–
big bluestem	ANGE	*Andropogon gerardii*	Native	–	–
whitetinge sedge	CAALA	*Carex albicans var. albicans*	Native	–	–
fuzzy wuzzy sedge	CAHI6	*Carex hirsutella*	Native	–	–
reflexed sedge	CARE9	*Carex retroflexa*	Native	–	–
poverty oatgrass	DASP2	*Danthonia spicata*	Native	–	–
sideoats grama	BOCU	*Bouteloua curtipendula*	Native	–	–
rock muhly	MUSO	*Muhlenbergia sobolifera*	Native	–	–
Forb/Herb					
hoary puccoon	LICA12	*Lithospermum canescens*	Native	–	–
Ozark milkvetch	ASDI4	*Astragalus distortus*	Native	–	–
manyray aster	SYAN2	*Symphyotrichum anomalum*	Native	–	–
late purple aster	SYPAP2	*Symphyotrichum patens var. patens*	Native	–	–
widowsfrill	SIST	*Silene stellata*	Native	–	–
golden zizia	ZIAU	*Zizia aurea*	Native	–	–
prairie rosinweed	SITE	*Silphium terebinthinaceum*	Native	–	–
smooth violet prairie aster	SYTU2	*Symphyotrichum turbinellum*	Native	–	–
common goldstar	HYHI2	*Hypoxis hirsuta*	Native	–	–
stiff tickseed	COPA10	*Coreopsis palmata*	Native	–	–
Virginia tephrosia	TEVI	*Tephrosia virginiana*	Native	–	–
tall blazing star	LIAS	*Liatris aspera*	Native	–	–
scaly blazing star	LISQ	*Liatris squarrosa*	Native	–	–
wild quinine	PAIN3	*Parthenium integrifolium*	Native	–	–
gray goldenrod	SONE	*Solidago nemoralis*	Native	–	–
downy ragged goldenrod	SOPE	*Solidago petiolaris*	Native	–	–
elmleaf goldenrod	SOUL2	*Solidago ulmifolia*	Native	–	–
longbract wild indigo	BABR2	*Baptisia bracteata*	Native	–	–
white prairie clover	DACA7	*Dalea candida*	Native	–	–
purple prairie clover	DAPU5	*Dalea purpurea*	Native	–	–
smooth small-leaf ticktrefoil	DEMA2	*Desmodium marilandicum*	Native	–	–
hairy sunflower	HEHI2	*Helianthus hirsutus*	Native	–	–
violet lespedeza	LEVI6	*Lespedeza violacea*	Native	–	–
Shrub/Subshrub					
Carolina buckthorn	FRCA13	*Frangula caroliniana*	Native	–	–
dwarf hackberry	CEPU10	*Celtis pumila*	Native	–	–
fragrant sumac	RHAR4	*Rhus aromatica*	Native	–	–
Tree					
rusty blackhaw	VIRU	*Viburnum rufidulum*	Native	–	–

Animal community

Wildlife (MDC 2006):

Oaks provide hard mast; scattered shrubs provide soft mast.

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

Birds associated with Chert Limestone Exposed Backslope Woodlands are 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 this ecological type 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 41 for white oak and 45 for black 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 could have a negative impact on timber quality and should be used with caution on a particular site if timber management is the primary objective. These sites respond well to prescribed fire for restoration purposes.

Limitations: Large amounts of coarse fragments throughout profile; bedrock 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 Limestone/Dolomite Exposed Backslope Woodland

Plot WESPCA01 - Gatewood soil
Located in Weldon Spring CA, St. Charles County, Missouri
Latitude: 38.673956
Longitude: -90.772018

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Approval

Suzanne Mayne-Kinney, 12/30/2024

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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	05/12/2025
Approved by	Suzanne Mayne-Kinney
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:**