Ecological site F116AY019MO
Loamy Dolomite Protected Backslope Forest

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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 Mesic Limestone/Dolomite Forest.

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

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

The reference state for this ecological site is most similar to a Quercus alba - Quercus rubra - Acer saccharum - Carya cordiformis / Lindera benzoin Forest (CEGL002058).

Geographic relationship to the Missouri Ecological Classification System (Nigh & Schroeder, 2002):
This ecological site occurs primarily within the following Subsections:
Inner Ozark Border
Meramec 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”.

The Loamy Dolomite Protected Backslope Forests occupy the northerly and easterly aspects of steep, dissected slopes, and are mapped in complex with the Loamy Dolomite Exposed Backslope Woodland ecological site. These ecological sites occur primarily in the Ozark Border counties of the northeastern Ozark Highland, near the border with MLRA 115B. Soils are typically moderately deep over limestone/dolomite bedrock, with loamy surfaces and clayey subsoils. The reference plant community is forest dominated by northern red oak, white oak, chinkapin oak, white ash, bitternut hickory, sugar maple, and American elm, with a well-developed understory and a rich herbaceous ground flora.

Associated sites

F116AY018MO	**Loamy Dolomite Upland Woodland** Loamy Dolomite Upland Woodlands are upslope, on shoulders and upper backslopes.
F116AY037MO	**Gravelly/Loamy Upland Drainageway Forest** Gravelly/Loamy Upland Drainageway Forests are often downslope.
F116AY044MO	**Chert Dolomite Upland Woodland** Chert Dolomite Upland Woodlands are adjacent or upslope, where loess is thinner.
F116AY051MO	**Loamy Dolomite Exposed Backslope Woodland** Loamy Dolomite Exposed Backslope Woodlands are mapped in complex with this ecological site, on steep lower backslopes with southern to western exposures.

Similar sites

F116AY051MO	**Loamy Dolomite Exposed Backslope Woodland** Loamy Dolomite Exposed Backslope Woodlands are mapped in complex with Loamy Dolomite Protected Backslope Woodlands, on steep lower backslopes but with southern to western exposures.

Table 1. Dominant plant species

Tree	(1) *Quercus alba* (2) *Quercus rubra*
Shrub	(1) *Asimina triloba*
Herbaceous	(1) *Asarum canadense* (2) *Polygonatum biflorum*

Physiographic features

This site is on upland backslopes with slopes of 15 to 40 percent. It is on protected aspects (north, northeast, and east), which receive significantly less solar radiation than the exposed 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 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 “4” on the figure, on lower backslopes with northerly to easterly exposures. Loamy Dolomite Exposed Backslope Woodland sites are on the corresponding southerly to westerly exposures. Loamy Dolomite Upland Woodland sites, labeled “2”, are typically upslope. Loamy Upland Woodland sites are often on local crests, labeled “1”. The dashed lines within the Loamy Upland Woodland area indicate the various soils included in this ecological site. Chert Dolomite Upland Woodland sites, labeled “3”, occur where the loess thins and surface chert fragment content increases.

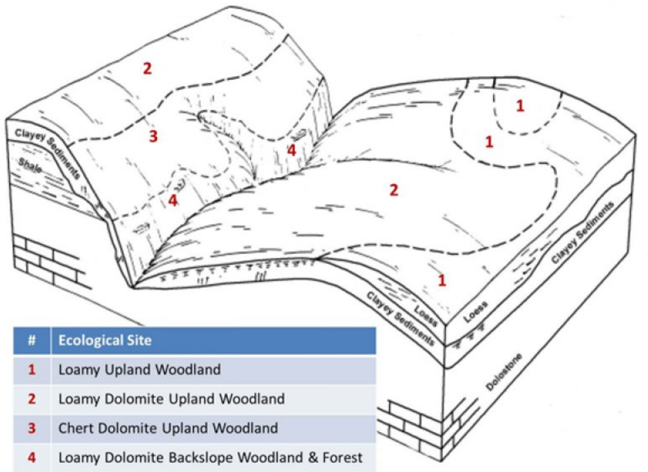


Figure 2. Landscape relationships for this ecological site.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Hillslope
Flooding frequency	None
Ponding frequency	None
Slope	15–40%
Water table depth	152 cm
Aspect	NW, N, NE, E

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)	141-158 days
Freeze-free period (characteristic range)	171-188 days
Precipitation total (characteristic range)	1,143-1,219 mm
Frost-free period (actual range)	136-163 days
Freeze-free period (actual range)	166-191 days
Precipitation total (actual range)	1,092-1,219 mm
Frost-free period (average)	149 days
Freeze-free period (average)	179 days
Precipitation total (average)	1,168 mm

Climate stations used

- (1) GILBERT [USC00032794], Saint Joe, AR
- (2) GREENVILLE 6 N [USC00233451], Silva, MO
- (3) FESTUS [USC00232850], Crystal City, 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.

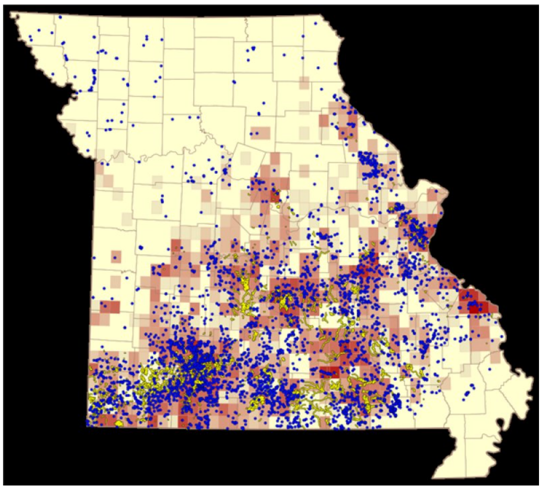


Figure 9. Distribution of karst-related features in Missouri. Image from Wikimedia Commons developed from the Missouri Department of Natural Resources, Division of Geology and Land Survey.

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 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	Moderately well drained to well drained
Permeability class	Very slow to slow
Soil depth	51–102 cm
Surface fragment cover <=3"	0–9%
Surface fragment cover >3"	1–40%
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%
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.

Loamy Dolomite Protected Backslope Forests have a well-developed forest canopy and subcanopy (70 to 80 feet tall and 80 to 90 percent canopy cover) dominated by a mixture of oaks and other hardwoods adapted to the cooler, more mesic conditions. White oak, chinkapin oak and northern red oak are common, along with, sugar maple, bitternut hickory, white ash, elm and an occasional walnut. This ecological site exhibits a structurally diverse understory and an abundant forest ground flora. While similar to deeper Chert Protected Backslope Forests, the shallower carbonate soils limit tree height, but create an environment where a wider variety of species occur in a more complex structural arrangement.

Loamy Dolomite Protected Backslope Forests occur in rather protected landscape positions on steep slopes in the deeper valleys furthest from the prairie uplands. While the upland prairies and savannas had an estimated fire frequency of 1 to 3 years, this ecological site burned less frequently (estimated 10 to 25 years) and with lower intensity. The moderately deep soils and occasional fires make this community transitional between forest and woodland, with more open woodland conditions being created briefly after the periodic fires. Site conditions overall, however, favor shade and moisture loving forest species that quickly redevelop after fire.

Loamy Dolomite Protected Backslope Forests would have also been subjected to occasional disturbances from wind and ice, as well as grazing by native 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. Such canopy disturbances allowed more light to reach the ground and favored reproduction of the dominant oak species. Grazing by native large herbivores would have kept understory conditions more open, also creating conditions more favorable to oak reproduction.

Today, these communities have been cleared and converted to pasture, or have undergone repeated timber harvest and domestic grazing. Most existing occurrences have a younger (50 to 80 years) canopy layer whose composition has been altered by timber harvesting practices. An increase in hickory over historic conditions is common. In addition, in the absence of fire, the canopy, sub-canopy and woody understory layers are better developed. The absence of periodic fire has allowed more shade-tolerant tree species, such as sugar maple, white ash, or hickory to increase in abundance.

Uncontrolled domestic grazing has diminished the diversity and cover of woodland ground flora species, and has introduced weedy species such as gooseberry, coralberry, poison ivy and Virginia creeper created a more open understory and increased soil compaction.
Loamy Dolomite Protected Backslope Forests are moderately productive timber sites. Carefully planned single tree selection or the creation of small group openings can help regenerate more desirable oak species and increase vigor on the residual trees. Clear-cutting does occur and results in dense, even-aged stands of primarily oak. This

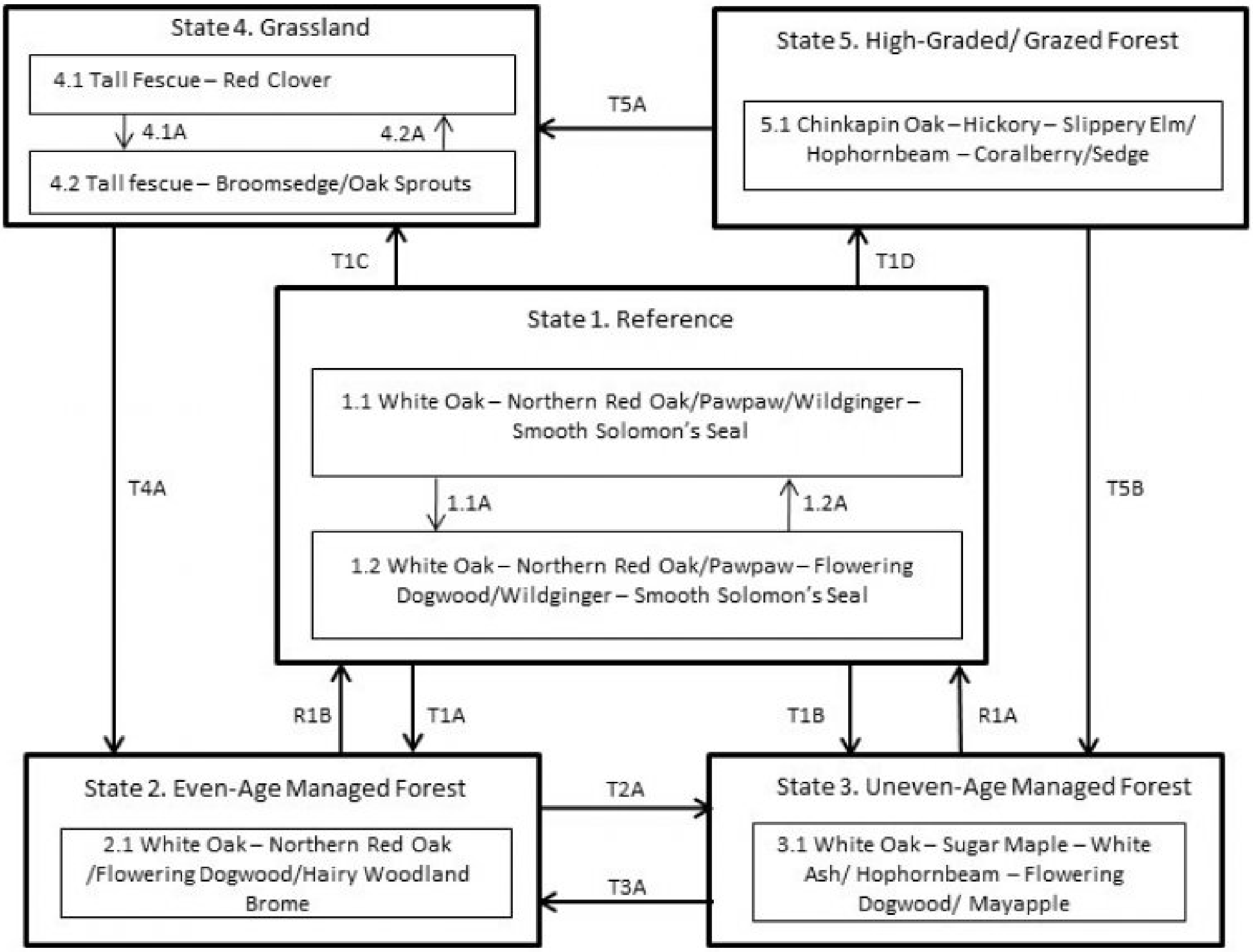
may be most beneficial for existing stands whose composition has been highly altered by past management practices. However, without some thinning of the dense stands, the ground flora diversity can be shaded out and productivity of the stand may suffer.

Oak regeneration is typically problematic. Sugar maple, red elm, hophornbeam, hickory, grapes, pawpaw and northern spicebush are often dominant competitors in the understory. Maintenance of the oak component will require disturbances that will impair the cool, moist, shaded conditions, so trade-offs will have to be made carefully. Prescribed fire can play a beneficial but limited role in the management of this ecological site. The higher productivity of these sites makes it more challenging than on other forest sites in the region. Protected aspect forests did evolve with some fire, but their composition often reflects more closed, forested conditions, with fewer woodland ground flora species that can respond to fire. Consequently, while having protected aspects in a burn unit is acceptable, targeting them solely for woodland restoration is not advisable.

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

Loamy Dolomite Protected Backslope Forest, F116AY019MO



Code	Event/Process
T1A	Harvesting; even-aged management
T1B	Harvesting; uneven-age management
T1C, T5A	Clearing; pasture planting
T1D	High-grade harvesting; uncontrolled grazing
T2A	Uneven-age management
T3A	Even-age management
T4A, T5A	Tree planting; long-term succession; no grazing
T5B	Uneven-age management; tree planting; no grazing

Code	Event/Process
1.1A	No disturbance (10+ yrs)
1.2A	Disturbance (fire, wind, ice) < 10 yrs
4.1A	Over grazing; no fertilization
4.2A	Brush management; grassland seeding; grassland management

Code	Event/Process
R1A	Extended rotations
R1B	Uneven-age mgt, extended rotations

Figure 10. State and transition diagram for this ecological site

State 1

Reference

The reference state was dominated by white oak and northern red oak. Periodic disturbances from wind or ice maintained the dominance of oaks by opening up the canopy and allowing more light for oak reproduction. In the absence of disturbance, more shade tolerant species such as sugar maple and hickory, white ash and others increase in importance and add structural diversity to the system. Two community phases are recognized in this state, with shifts between phases based on disturbance frequency. The reference state is rare 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 5). Lack of disturbances has resulted in increased canopy density, which has affected the abundance and diversity of ground flora. Many reference sites have been managed for timber harvest, resulting in either even-age (State 2) or uneven-age (State 3) forests.

Community 1.1
White Oak – Northern Red Oak/Pawpaw/Wildginger – Smooth Solomon's Seal

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

Forest overstory. Forest 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. Forest 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
White Oak – Northern Red Oak/Pawpaw – Flowering Dogwood/Wildginger – Smooth Solomon's Seal

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 a gradual transition that results from extended, disturbance-free periods of roughly 10 years or longer.

Pathway P1.2A
Community 1.2 to 1.1

This pathway is a transition that results from extended, disturbance periods returning.

State 2
Even-Age Managed Forest

These forests tend to have an under developed understory and ground flora. Thinning can increase overall tree vigor and improve understory diversity. Continual timber management, depending on the practices used, will either maintain this state, or convert the site to uneven-age (State 3) forests.

Community 2.1
White Oak – Northern Red Oak /Flowering Dogwood/Hairy Woodland Brome

State 3
Uneven-Age Managed Forest

Uneven-Age Managed forests can resemble the reference state. The biggest difference is tree age, most being only 50 to 90 years old. Composition is also likely altered from the reference state depending on tree selection during harvest. In addition, without a regular 15 to 20 year harvest re-entry into these stands, they will slowly increase in more shade tolerant species such as sugar maple and white oak will become less dominant.

Community 3.1
White Oak – Sugar Maple – White Ash/ Hophornbeam – Flowering Dogwood/ Mayapple

State 4
Grassland

Conversion of forests to planted, non-native pasture species such as tall fescue has been common in this MLRA. Steep slopes, abundant surface fragments, low organic matter contents and soil acidity make non-native pastures challenging to maintain in a healthy, productive state on this ecological site. If grazing and active pasture management is discontinued, the site will eventually transition, over time, to State 2 (Even-Age).

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.

State 5
High-Graded/Grazed Forest

Forested sites subjected to repeated, high-graded timber harvests and uncontrolled domestic grazing transition to this state. This state exhibits an over-abundance of hickory and other less desirable tree species, and weedy understory species such as coralberry, gooseberry, poison ivy and Virginia creeper. The vegetation offers little nutritional value for cattle, and excessive stocking damages tree boles, degrades understory species composition and results in soil compaction and accelerated erosion and runoff. Exclusion of livestock from sites in this state coupled with uneven-age management techniques will cause a transition to State 3 (Uneven-Age).

Community 5.1
Chinkapin Oak – Hickory – Slippery Elm/ Hophornbeam - Coralberry/Sedge

Transition T1A
State 1 to 2

This transition typically results from even-age forestry management techniques with a 15 year rotation and a minimum timber tree age of 120 years.

Transition T1B
State 1 to 3

This transition typically results from uneven-age timber management practices, such as single tree or group selection harvest.

Transition T1C
State 1 to 4

Transition T1D
State 1 to 5

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

Restoration pathway R1B
State 2 to 1

This restoration pathway generally requires uneven-age timber management practices, such as single tree or group selection harvest, with extended rotations that allow mature trees to exceed ages of about 120 years.

Transition T2A
State 2 to 3

This transition typically results from uneven-age timber management practices, such as single tree or group selection harvest.

Restoration pathway R1A
State 3 to 1

This restoration transition is the result of extended rotations and minimal disturbance.

Transition T3A
State 3 to 2

This transition typically results from even-age timber management practices, such as clear-cut, seed tree or shelterwood harvest.

Transition T5B
State 5 to 3

This transition typically results from uneven-age timber management practices, such as single tree or group selection harvest, tree planting and no grazing.

Transition T5A
State 5 to 4

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

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							
blue ash	FRQU	*Fraxinus quadrangulata*	Native	–	–	–	–
chinquapin oak	QUMU	*Quercus muehlenbergii*	Native	–	–	–	–
post oak	QUST	*Quercus stellata*	Native	–	–	–	–
bitternut hickory	CACO15	*Carya cordiformis*	Native	–	–	–	–
American basswood	TIAM	*Tilia americana*	Native	–	–	–	–
white ash	FRAM2	*Fraxinus americana*	Native	–	–	–	–
shagbark hickory	CAOV2	*Carya ovata*	Native	–	–	–	–
black walnut	JUNI	*Juglans nigra*	Native	–	–	–	–
Kentucky coffeetree	GYDI	*Gymnocladus dioicus*	Native	–	–	–	–
white oak	QUAL	*Quercus alba*	Native	–	–	–	–
northern red oak	QURU	*Quercus rubra*	Native	–	–	–	–
sugar maple	ACSA3	*Acer saccharum*	Native	–	–	–	–

Table 6. Community 1.1 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (M)	Canopy Cover (%)
Grass/grass-like (Graminoids)					
Bosc's panicgrass	DIBO2	*Dichanthelium boscii*	Native	–	–
white bear sedge	CAAL11	*Carex albursina*	Native	–	–
James' sedge	CAJA2	*Carex jamesii*	Native	–	–
eastern woodland sedge	CABL	*Carex blanda*	Native	–	–
Hitchcock's sedge	CAHI8	*Carex hitchcockiana*	Native	–	–
richwoods sedge	CAOL2	*Carex oligocarpa*	Native	–	–
slender woodland sedge	CADI5	*Carex digitalis*	Native	–	–
parasol sedge	CAUM4	*Carex umbellata*	Native	–	–
white bear sedge	CAAL11	*Carex albursina*	Native	–	–
hairy wildrye	ELVI	*Elymus villosus*	Native	–	–
hairy woodland brome	BRPU6	*Bromus pubescens*	Native	–	–
Forb/Herb					
eastern greenviolet	HYCO6	*Hybanthus concolor*	Native	–	–
Canadian woodnettle	LACA3	*Laportea canadensis*	Native	–	–
harbinger of spring	ERBU	*Erigenia bulbosa*	Native	–	–
cutleaf toothwort	CACO26	*Cardamine concatenata*	Native	–	–
whiteflower leafcup	POCA11	*Polymnia canadensis*	Native	–	–
roundleaf ragwort	PAOB6	*Packera obovata*	Native	–	–
toadshade	TRSE2	*Trillium sessile*	Native	–	–
bloodroot	SACA13	*Sanguinaria canadensis*	Native	–	–
white fawnlily	ERAL9	*Erythronium albidum*	Native	–	–
eastern false rue anemone	ENBI	*Enemion biternatum*	Native	–	–
blue cohosh	CATH2	*Caulophyllum thalictroides*	Native	–	–

largeflower bellwort	UVGR	*Uvularia grandiflora*	Native	–	–
green dragon	ARDR3	*Arisaema dracontium*	Native	–	–
American ginseng	PAQU	*Panax quinquefolius*	Native	–	–
bloody butcher	TRRE5	*Trillium recurvatum*	Native	–	–
wood wakerobin	TRVI4	*Trillium viride*	Native	–	–
showy orchid	GASP5	*Galearis spectabilis*	Native	–	–
white baneberry	ACPA	*Actaea pachypoda*	Native	–	–
Canadian wildginger	ASCA	*Asarum canadense*	Native	–	–
Jack in the pulpit	ARTR	*Arisaema triphyllum*	Native	–	–
yellow fumewort	COFL3	*Corydalis flavula*	Native	–	–
glade fern	DIPY	*Diplazium pycnocarpon*	Native	–	–
lowland bladderfern	CYPR4	*Cystopteris protrusa*	Native	–	–
zigzag goldenrod	SOFL2	*Solidago flexicaulis*	Native	–	–
dutchman's breeches	DICU	*Dicentra cucullaria*	Native	–	–
eastern waterleaf	HYVI	*Hydrophyllum virginianum*	Native	–	–
great waterleaf	HYAP	*Hydrophyllum appendiculatum*	Native	–	–
smooth Solomon's seal	POBI2	*Polygonatum biflorum*	Native	–	–
goldenseal	HYCA	*Hydrastis canadensis*	Native	–	–
feathery false lily of the valley	MARA7	*Maianthemum racemosum*	Native	–	–
hepatica	HENO2	*Hepatica nobilis*	Native	–	–
dwarf larkspur	DETR	*Delphinium tricorne*	Native	–	–
early meadow-rue	THDI	*Thalictrum dioicum*	Native	–	–
Wood's bunchflower	VEWO3	*Veratrum woodii*	Native	–	–
rue anemone	THTH2	*Thalictrum thalictroides*	Native	–	–
nakedflower ticktrefoil	DENU4	*Desmodium nudiflorum*	Native	–	–
manyray aster	SYAN2	*Symphyotrichum anomalum*	Native	–	–
American hogpeanut	AMBR2	*Amphicarpaea bracteata*	Native	–	–
Dillenius' ticktrefoil	DEGL4	*Desmodium glabellum*	Native	–	–
pointedleaf ticktrefoil	DEGL5	*Desmodium glutinosum*	Native	–	–
Greek valerian	PORE2	*Polemonium reptans*	Native	–	–
Fern/fern ally					
broad beechfern	PHHE11	*Phegopteris hexagonoptera*	Native	–	–
northern maidenhair	ADPE	*Adiantum pedatum*	Native	–	–
bulblet bladderfern	CYBU3	*Cystopteris bulbifera*	Native	–	–
rattlesnake fern	BOVI	*Botrychium virginianum*	Native	–	–
lowland bladderfern	CYPR4	*Cystopteris protrusa*	Native	–	–
Shrub/Subshrub					
Blue Ridge blueberry	VAPA4	*Vaccinium pallidum*	Native	–	–
northern spicebush	LIBE3	*Lindera benzoin*	Native	–	–
Tree					
American bladdernut	STTR	*Staphylea trifolia*	Native	–	–
common serviceberry	AMAR3	*Amelanchier arborea*	Native	–	–
Ohio buckeye	AEGL	*Aesculus glabra*	Native	–	–

pawpaw	ASTR	*Asimina triloba*	Native	–	–
slippery elm	ULRU	*Ulmus rubra*	Native	–	–
American hornbeam	CACA18	*Carpinus caroliniana*	Native	–	–
flowering dogwood	COFL2	*Cornus florida*	Native	–	–
hophornbeam	OSVI	*Ostrya virginiana*	Native	–	–

Animal community

Wildlife (MDC 2006):

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

Birds associated with this ecological site include Worm-eating warbler, Whip-poor-will, Great Crested Flycatcher, Ovenbird, Pileated Woodpecker, Wood Thrush, Red-eyed Vireo, Northern Parula, Louisiana Waterthrush (near streams), and Broad-winged Hawk.

Reptile and amphibian species associated with mature forests include: ringed salamander, spotted salamander, marbled salamander, central newt, long-tailed salamander, dark-sided salamander, southern red-backed salamander, three-toed box turtle, western worm snake, western earth snake, and American toad.

Other information

Forestry (NRCS 2002, 2014):

Management: Field measured site index values range from 53 to 60 for oak. Timber management opportunities are generally good. 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 site if timber management is the primary objective.

Limitations: Coarse fragments occur throughout the lower 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 Protected Backslope Forest

Plot VAVICA02 - Caneyville soil
Located in Valley View Glade CA, Jefferson County, MO
Latitude: 38.264039
Longitude: -90.624293

Plot YOUNCA04 – Caneyville soil
Located in Young CA, Jefferson County, MO
Latitude: 38.434212
Longitude: -90.657828

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Contributors

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Approval

Nels Barrett, 9/24/2020

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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	02/26/2024
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):**

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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:**
