USDA Natural Resources Conservation Service

Ecological site F116BY019MO
Low-Base Interbedded Sedimentary Upland Woodland

Last updated: 10/07/2020
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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): 116B–Springfield Plain

The Springfield Plain is in the western part of the Ozark Uplift. It is primarily a smooth plateau with some dissection along streams. Elevation is about 1,000 feet in the north to over 1,700 feet in the east along the Burlington Escarpment adjacent to the Ozark Highlands. The underlying bedrock is mainly Mississippian-aged limestone, with areas of shale on lower slopes and structural benches, and intermittent Pennsylvanian-aged sandstone deposits on the plateau surface.

Classification relationships

Terrestrial Natural Community Type in Missouri (Nelson, 2010):
The reference state for this ecological site is most similar to a Dry Chert Woodland.

Missouri Department of Conservation Forest and Woodland Communities (Missouri Department of Conservation, 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 velutina / Schizachyrium

scoparium Woodland (CEGL005281).

Geographic relationship to the Missouri Ecological Classification System (Nigh & Schroeder, 2002):
This ecological site occurs primarily within the following Land Type Associations:
Clear Creek Prairie/Savanna Dissected Plain
Lower Sac River Oak Woodland Hills
Stockton Prairie/Savanna Dissected Plain
Upper Sac River Oak Savanna/Woodland Low Hills

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”.

Low-base Interbedded Sedimentary Upland Woodlands occur typically on lower hillslopes where interbedded shale, mudstone and limestone is near the surface, in the northern part of the Springfield Plain along the Sac River and its tributaries. Soils are typically moderately deep to deep over sedimentary bedrock, acidic, and low in bases such as calcium. The reference plant community is woodland with an overstory dominated by post oak and black oak, and a ground flora of native grasses and forbs.

Associated sites

F116BY017MO	**Gravelly/Loamy Upland Drainageway Woodland** Gravelly/Loamy Upland Drainageway Woodlands are downslope.
F116BY007MO	**Dry Sandstone Upland Woodland** Dry Sandstone Upland Woodlands are commonly upslope.

Similar sites

F116BY005MO	**Low-Base Loamy Upland Woodland** Low-Base Loamy Upland Woodlands occupy similar landscape positions and have similar canopy species composition but are slightly less productive.

Table 1. Dominant plant species

Tree	(1) *Quercus stellata* (2) *Quercus velutina*
Shrub	(1) *Rhus aromatica*
Herbaceous	(1) *Schizachyrium scoparium* (2) *Helianthus hirsutus*

Physiographic features

This site is on upland summit crests, shoulders and backslopes with slopes of 3 to 20 percent. The site generates runoff to adjacent, downslope ecological sites. This site does not flood.

The following figure (adapted from Henderson, 2004) shows the typical landscape position of this ecological site, and landscape relationships with other ecological sites. It is within the area labeled as “2”, and is generally downslope from Dry Sandstone Upland Woodland sites, labeled “1”.

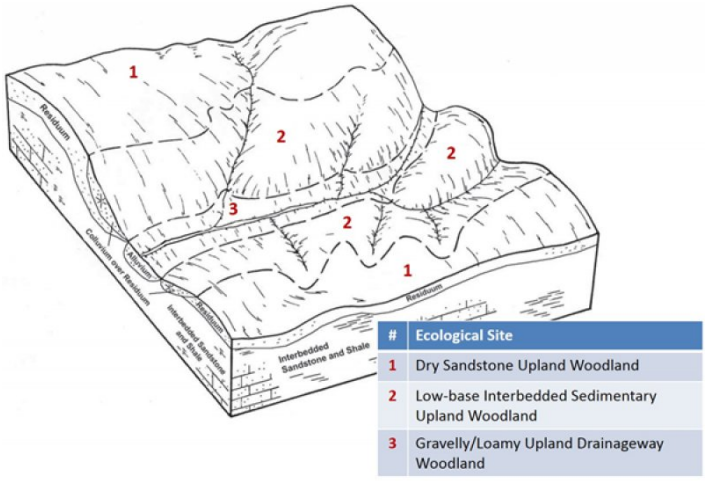


Figure 2. Landscape relationships for this ecological site

Table 2. Representative physiographic features

Landforms	(1) Interfluve (2) Ridge (3) Hill
Flooding frequency	None
Ponding frequency	None
Slope	3–20%
Water table depth	39–48 in
Aspect	Aspect is not a significant factor

Climatic features

The Springfield Plain 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 Springfield Plain experiences few regional differences in climates. The average annual precipitation in this area is 41 to 45 inches. Snow falls nearly every winter, but the snow cover lasts for only a few days. The average annual temperature is about 55 to 58 degrees F. The lower temperatures occur at the higher elevations. Mean July maximum temperatures have a range of only one or two degrees across the area.
Mean annual precipitation varies along a west to east 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)	164-168 days
Freeze-free period (characteristic range)	192-194 days
Precipitation total (characteristic range)	44-47 in
Frost-free period (actual range)	162-170 days
Freeze-free period (actual range)	192-194 days
Precipitation total (actual range)	44-48 in
Frost-free period (average)	166 days
Freeze-free period (average)	193 days
Precipitation total (average)	46 in

Climate stations used

- (1) LOCKWOOD [USC00235027], Lockwood, MO
- (2) STOCKTON DAM [USC00238082], Stockton, MO
- (3) ASH GROVE 4S [USC00230304], Ash Grove, MO

Influencing water features

This ecological site is not influenced by wetland or riparian water features. This site generates runoff to adjacent, downslope ecological sites. This site does not flood.
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.

Soil features

These soils are underlain by interbedded sedimentary bedrock between 40 and 60 inches. These soils have acidic subsoils that are low in bases. The soils were formed under woodland vegetation, and have thin, light-colored surface horizons. Parent material is slope alluvium over residuum derived from sandstone, mudstone, limestone and shale. They have gravelly loam surface horizons, and clayey subsoils with varying amounts of shale and sandstone fragments. These soils are not affected by seasonal wetness. Soil series associated with this site include Cliquot.

The accompanying picture of the Cliquot series shows a thin gravelly loam surface horizon over a yellowish brown, clayey subsoil. Shale and sandstone fragments are abundant in the upper part of the profile. Soft shale is below one

meter. Scale is in centimeters. Picture from Henderson (2004).

Figure 9. Cliquot series

Table 4. Representative soil features

Parent material	(1) Residuum–limestone, sandstone, and shale (2) Slope alluvium
Surface texture	(1) Gravelly loam (2) Fine sandy loam
Family particle size	(1) Clayey
Drainage class	Moderately well drained
Soil depth	40–60 in
Surface fragment cover <=3"	5–25%
Surface fragment cover >3"	0–9%
Available water capacity (0-40in)	3–5 in
Calcium carbonate equivalent (0-40in)	0%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	4.5–6
Subsurface fragment volume <=3" (Depth not specified)	10–40%
Subsurface fragment volume >3" (Depth not specified)	10–45%

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 reference plant community is woodland dominated by an overstory of post oak and black oak. The somewhat shallow soils of Low-base Interbedded Sedimentary Upland Woodlands limit the growth of trees, but support an abundance of native grasses and forbs in the understory. Historically, fire tolerant post oak along with black oak and occasional hickories dominated an open canopy.

Woodlands are distinguished from forest, by their relatively open understory, and the presence of sun-loving ground flora species. 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.

Fire played an important role in the maintenance of these sites. It is likely that these ecological sites 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. During fire free intervals, woody understory species increased and the herbaceous understory diminished. The return of fire would open the woodlands up again and stimulate the abundant ground flora.

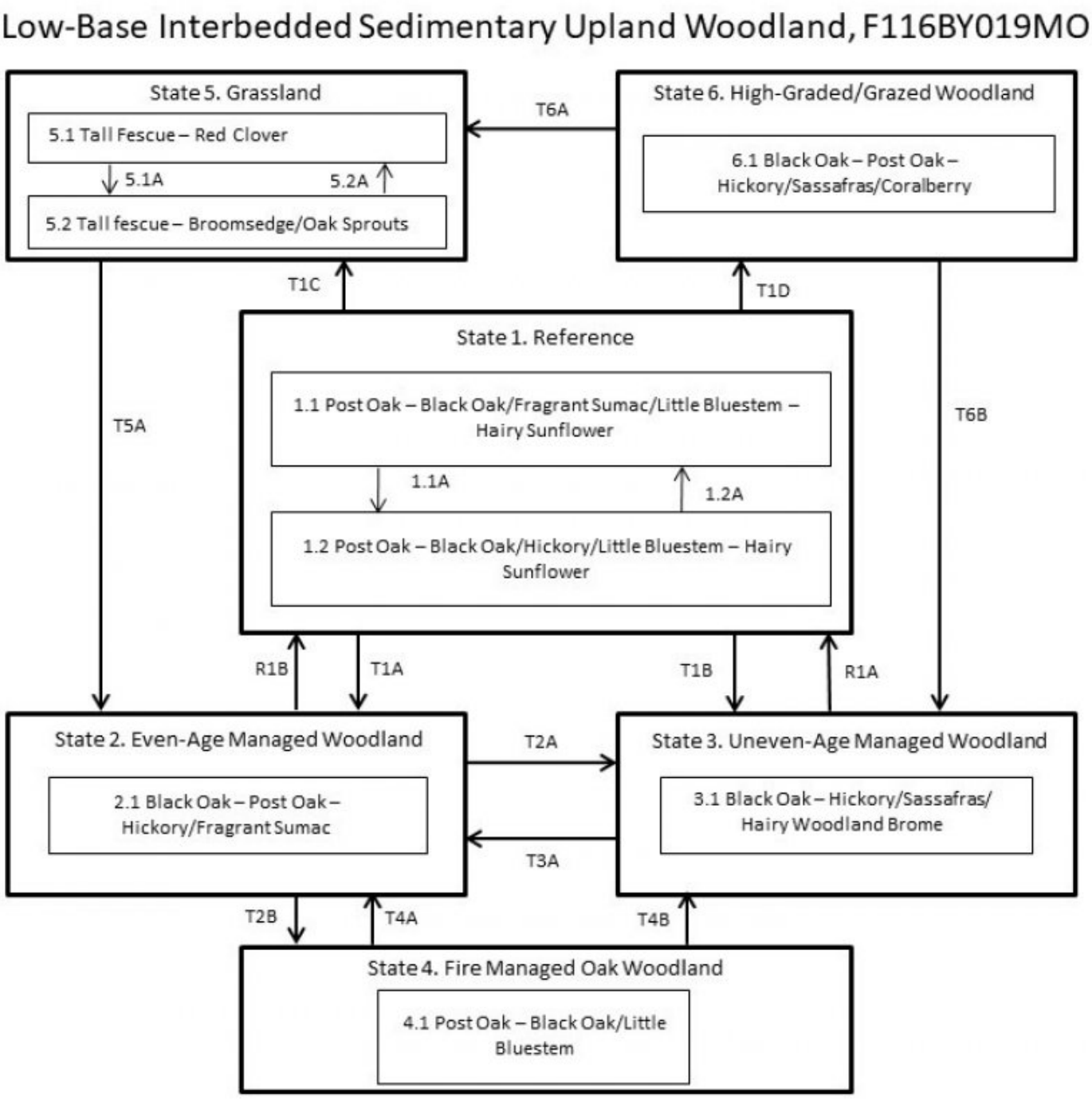
In the long term absence of fire, woody species, such as eastern redcedar, hickory, black oak, and within its range, pine, encroach into these woodlands. Once established, these woody plants can quickly fill the existing understory increasing shade levels, greatly diminishing ground flora. Opening the canopy, removing the younger understory and applying prescribed fire have proven to be effective restoration means.

Uncontrolled domestic grazing has also impacted Low-base Shale Upland Woodland communities, further diminishing the diversity of native plants and introducing species that are tolerant of grazing, such as coralberry, gooseberry, and Virginia creeper. Grazed sites also have a more open understory. In addition, soil compaction and soil erosion from grazing can be a problem and lower site productivity.

Managed areas show an exceptional resiliency with the removal of the younger understory by thinning and the application of prescribed fire. Characteristic (see list below) 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. This type of management can provide limited timber products, wildlife habitat, and potential native forage.

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/Process
T1A	Even-aged management; fire suppression
T1B	Fire suppression; uneven-age management
T2B	Prescribed fire; thinning
T1C, T6A	Clearing; grassland planting; grassland management
T1D	Poorly planned harvest; uncontrolled grazing
T2A, T4B	Uneven-age management; fire suppression
T3A, T4A	Even-age management; fire suppression
T5A	Tree planting; long-term succession; no grazing
T6B	Uneven-age management; no grazing

Code	Event/Process
1.1A	No disturbances (10+ years)
1.2A	Disturbances (fire, wind, ice) < 10 years
5.1A	Over grazing; no fertilization
5.2A	Brush management; grassland seeding; grassland management

Code	Event/Process
R1A, R1B	Prescribed fire; extended rotations; forest stand improvement

Figure 10. State and transition diagram for this ecological site

State 1

Reference

The historical reference state for this ecological site was old growth woodland. This stage was dominated by post oak and black oak. Maximum tree age was likely 150 to 300 years. Periodic disturbances from fire, wind or ice maintained the woodland structure and diverse ground flora species. Long disturbance-free periods allowed an increase in both the density of trees and the abundance of shade tolerant species. Two community phases are recognized in the reference state, with shifts between phases based on disturbance frequency. Reference states are very rare today. Many sites have been converted to non-native pasture (State 5). Others have been subject to repeated, high-graded timber harvest coupled with domestic livestock grazing (State 6). Fire suppression has resulted in increased canopy density, which has affected the abundance and diversity of ground flora. Many reference states have been managed for timber harvest, resulting in either even-age (State 2) or uneven-age (State 3) woodlands.

Community 1.1
Post Oak – Black Oak/Fragrant Sumac/Little Bluestem – Sunflower

Forest overstory. The Overstory Species list is based on field reconnaissance as well as commonly occurring species listed in Nelson 2010; names and symbols are from USDA PLANTS database.

Forest understory. The Understory Species list is based on field reconnaissance as well as commonly occurring species listed in Nelson 2010; names and symbols are from USDA PLANTS database.

Community 1.2
Post Oak – Black Oak/Hickory/Little Bluestem – Sunflower

Pathway 1.1A
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 1.2A
Community 1.2 to 1.1

This pathway results from ecological disturbances such as fire, ice storms, or violent wind storms occurring on a regular basis.

State 2
Even-Age Managed Woodland

This state starts with a sequence of early seral mixed oak woodlands, which mature over time. These woodlands tend to be rather dense, with an underdeveloped understory and ground flora. Thinning can increase overall tree vigor and improve understory diversity. However, in the absence of fire, the diversity and cover of the ground flora is still diminished. Continual timber management, depending on the practices used, will either maintain this state, or convert the site to uneven-age (State 3) woodlands. Prescribed fire without extensive timber harvest will, over time, cause a transition to Managed Oak Woodlands (State 4).

Community 2.1
Black Oak – Post Oak – Hickory/Fragrant Sumac

This woodland community has a simple, dense, single-tiered structure, with canopy height that varies with age, and 100 percent canopy closure. The understory and ground flora is diminished. Thinning can increase overall tree vigor and improve understory diversity. However, in the absence of fire, the diversity and cover of the ground flora is still diminished.

State 3
Uneven-Age Managed Woodland

Composition of this state is likely altered from the reference state depending on tree selection during harvest. Scarlet oak is often more abundant than historically. In addition, without a regular 15 to 20 year harvest re-entry into these stands, they will slowly increase in more shade tolerant species and post oak will become less dominant. Without periodic disturbance, stem density and fire intolerant species, like hickory, increase in abundance.

Dominant resource concerns

- Plant productivity and health
- Plant structure and composition
- Wildfire hazard from biomass accumulation
- Terrestrial habitat for wildlife and invertebrates

Community 3.1
Black Oak – Hickory/Sassafras/ Hairy Woodland Brome

This woodland community has a multi-tiered structure, and 60 to 90 percent canopy closure.

State 4
Fire Managed Oak Woodland

The Fire Managed Oak Woodland state results from managing woodland communities in states 2 or 3 with prescribed fire. This state resembles the reference state, with younger maximum tree ages and lower ground flora diversity.

Dominant resource concerns

- Plant structure and composition
- Terrestrial habitat for wildlife and invertebrates

Community 4.1
Post Oak – Black Oak/Little Bluestem

This woodland community has a single to two-tiered structure, and 70-90% canopy closure.

State 5
Grassland

Conversion of woodlands to planted, non-native pasture species such as tall fescue has been common in the Springfield plateau. Abundant surface fragments, low organic matter contents and soil acidity make non-native pastures difficult to maintain in a healthy, productive state on this ecological site. If grazing and active pasture management is discontinued, the site will eventually transition to state 2 (Even-Age Managed Woodland). Timber Stand Improvement practices can hasten this process.

Community 5.1
Tall Fescue - Red Clover

This is an herbaceous community that is typically dominated by tall fescue. Various other grass and forb species are typically present, in various amounts.

Dominant resource concerns

- Plant structure and composition
- Terrestrial habitat for wildlife and invertebrates

Community 5.2
Tall Fescue - Broomsedge/Oak Sprouts

Shrub and pioneer tree species such as eastern redcedar and oak and hickory sprouts typically invade sites that are not regularly managed.

Dominant resource concerns

- Sheet and rill erosion
- Ephemeral gully erosion
- Nutrients transported to surface water
- Plant productivity and health
- Plant structure and composition
- Plant pest pressure
- Terrestrial habitat for wildlife and invertebrates
- Feed and forage imbalance

Pathway P5.1A
Community 5.1 to 5.2

Over grazing; no fertilization

Pathway P5.2A
Community 5.2 to 5.1

Brush management; grassland seeding; grassland management

State 6
High-Graded / Grazed Woodland

Wooded sites subjected to repeated, high-graded timber harvests and 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 cattle from sites in this state coupled with uneven-age management techniques will cause a transition to State 3 (Uneven-Age Managed).

Community 6.1
Black Oak – Post Oak – Hickory/Sassafras/Coralberry

This woodland community has a multi-tiered structure, with irregular, variable canopy closure. 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. Grazing is common.

Transition T1A
State 1 to 2

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

Transition T1B
State 1 to 3

This transition pathway generally requires uneven-age forest management practices, such as single tree or group selection harvest along fire suppression.

Transition T1C
State 1 to 5

This transition is the result of clearing the woodland community and planting pasture species. Soil erosion can be extensive in this process, along with loss of organic matter. Liming and fertilizing associated with pasture management typically raises the soil pH and increases the cation concentration (such as calcium and magnesium) of the upper soil horizons.

Transition T1D
State 1 to 6

This transition is the result of poorly planned timber harvest techniques such as high-grading, accompanied by unmanaged cattle grazing. Soil erosion and compaction often result from livestock grazing after the understory has been damaged.

Restoration pathway R1B
State 2 to 1

Prescribed fire; extended rotations; forest stand improvement

Transition T2A
State 2 to 3

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

Transition T2B
State 2 to 4

This transition is the result of the systematic application of prescribed fire. Mechanical thinning may also be used.

Restoration pathway R1A
State 3 to 1

This restoration pathway generally requires forest management practices with extended rotations that allow mature trees to exceed ages of about 150 years. Prescribed fire is part of the restoration process. Mechanical thinning may be necessary in dense woodlands.

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 T3B
State 3 to 4

This transition is the result of the systematic application of prescribed fire. Mechanical thinning may also be used.

Transition T4A
State 4 to 2

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

Transition T4B
State 4 to 3

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

Transition T5A
State 5 to 2

This transition results from the cessation of livestock grazing and associated grassland management. Herbicide application, tree planting and forest stand improvement techniques can speed up this otherwise very lengthy transition.

Transition T6B
State 6 to 3

This transition typically results from uneven-age management and no grazing. Tree planting, mechanical thinning and other forest stand improvement techniques may be helpful to decrease the transition time.

Transition T6A
State 6 to 5

This transition is the result of clearing the woodland communities and planting grassland species. Soil erosion can be extensive in this process, along with loss of organic matter. Liming and fertilizing associated with pasture management typically raises the soil pH and increases the cation concentration (such as calcium and magnesium) of the upper soil horizons.

Additional community tables

Table 5. Community 1.1 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)	Diameter (In)	Basal Area (Square Ft/Acre)
Tree							
post oak	QUST	*Quercus stellata*	Native	–	20–40	–	–
black oak	QUVE	*Quercus velutina*	Native	–	20–40	–	–
shortleaf pine	PIEC2	*Pinus echinata*	Native	–	5–10	–	–
white oak	QUAL	*Quercus alba*	Native	–	5–10	–	–
shagbark hickory	CAOV2	*Carya ovata*	Native	–	5–10	–	–
blackjack oak	QUMA3	*Quercus marilandica*	Native	–	5–10	–	–

Table 6. Community 1.1 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)
Grass/grass-like (Graminoids)					
little bluestem	SCSC	*Schizachyrium scoparium*	Native	–	1–10
hairy woodland brome	BRPU6	*Bromus pubescens*	Native	–	1–10
big bluestem	ANGE	*Andropogon gerardii*	Native	–	1–10
Pennsylvania sedge	CAPE6	*Carex pensylvanica*	Native	–	1–10
sideoats grama	BOCU	*Bouteloua curtipendula*	Native	–	1–10
rock muhly	MUSO	*Muhlenbergia sobolifera*	Native	–	1–10
Muhlenberg's sedge	CAMU4	*Carex muehlenbergii*	Native	–	1–10
oval-leaf sedge	CACE	*Carex cephalophora*	Native	–	1–10
black edge sedge	CANI3	*Carex nigromarginata*	Native	–	1–10
parasol sedge	CAUM4	*Carex umbellata*	Native	–	1–10
tapered rosette grass	DIAC2	*Dichanthelium acuminatum*	Native	–	1–10
poverty oatgrass	DASP2	*Danthonia spicata*	Native	–	1–10
slimleaf panicgrass	DILI2	*Dichanthelium linearifolium*	Native	–	1–10
Forb/Herb					
Parlin's pussytoes	ANPA9	*Antennaria parlinii*	Native	–	1–10
flowering spurge	EUCO10	*Euphorbia corollata*	Native	–	1–10
elmleaf goldenrod	SOUL2	*Solidago ulmifolia*	Native	–	1–10
manyray aster	SYAN2	*Symphyotrichum anomalum*	Native	–	1–10
smooth small-leaf ticktrefoil	DEMA2	*Desmodium marilandicum*	Native	–	1–10
nakedflower ticktrefoil	DENU4	*Desmodium nudiflorum*	Native	–	1–10
hairy sunflower	HEHI2	*Helianthus hirsutus*	Native	–	1–10
eastern beebalm	MOBR2	*Monarda bradburiana*	Native	–	1–10
wrinkleleaf goldenrod	SORU2	*Solidago rugosa*	Native	–	1–10
slimflower scurfpea	PSTE5	*Psoralidium tenuiflorum*	Native	–	1–10
smooth blue aster	SYLAL3	*Symphyotrichum laeve var. laeve*	Native	–	1–10
eastern purple coneflower	ECPU	*Echinacea purpurea*	Native	–	1–10
yellow pimpernel	TAIN	*Taenidia integerrima*	Native	–	1–10
slender lespedeza	LEVI7	*Lespedeza virginica*	Native	–	1–10
wild quinine	PAIN3	*Parthenium integrifolium*	Native	–	1–10
butterfly milkweed	ASTU	*Asclepias tuberosa*	Native	–	1–10
Shrub/Subshrub					
American hazelnut	COAM3	*Corylus americana*	Native	–	1–10
New Jersey tea	CEAM	*Ceanothus americanus*	Native	–	1–10
fragrant sumac	RHAR4	*Rhus aromatica*	Native	–	1–10
St. Andrew's cross	HYHY	*Hypericum hypericoides*	Native	–	1–10
leadplant	AMCA6	*Amorpha canescens*	Native	–	1–10

Animal community

Wildlife (MDC 2006):
Wild turkey, white-tailed deer, and eastern gray squirrel depend on hard and soft mast food sources and are typical upland game species of this type.

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

Sedges and native cool-season grasses provide green browse; patchy native warm-season grasses 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 mature communities include Indigo Bunting, Red-headed Woodpecker, Eastern Bluebird, Northern Bobwhite, Eastern Wood-Pewee, Broad-winged Hawk, Great-Crested Flycatcher, Summer Tanager, and Red-eyed Vireo.

Reptiles and amphibians associated with Post Oak 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 for oak range from 51 for post oak, 62 for northern red oak and 54 for white 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. These sites respond well to prescribed fire as a management tool.

Limitations: Coarse fragments in upper portion of soil profile; Clay subsoil; Restrict activities to dry periods or surfaced areas. Seedling mortality may be high during the summer because of lack of adequate soil moisture, especially on south facing slopes. 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: Low-Base Interbedded Sedimentary Upland Woodland

Plot BLSPCA02 – Cliquot soil
Located in Bluff Spring CA, Cedar County, MO
Latitude: 37.789331
Longitude: -93.759643

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.

Harlan, J.D., T.A. Nigh and W.A. Schroeder. 2001. The Missouri original General Land Office survey notes project. University of Missouri, Columbia.

Henderson, Richard L. 2004. Soil Survey of Cedar County, Missouri. U.S. Dept. of Agric. Natural Resources Conservation Service.

Ladd, D. 1991. Reexamination of the role of fire in Missouri oak woodlands. Pp. 67-80 in G.V. Brown, James K.; Smith, Jane Kapler, eds. 2000. Wildland fire in ecosystems: effects of fire on flora. Gen. Tech. Rep. RMRS-GTR-42-vol. 2. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 257 p.

Missouri Department of Conservation. 2006. Missouri Forest and Woodland Community Profiles. Missouri

Department of Conservation, Jefferson City, Missouri.

Natural Resources Conservation Service. 2002. Woodland Suitability Groups. Missouri FOTG, Section II, Soil Interpretations and Reports. 30 pgs.

Natural Resources Conservation Service. Site Index Reports. Accessed May 2014. https://esi.sc.egov.usda.gov/ESI_Forestland/pgFSWelcome.aspx

NatureServe. 2010. Vegetation Associations of Missouri (revised). NatureServe, St. Paul, Minnesota.

Nelson, Paul W. 2010. The Terrestrial Natural Communities of Missouri. Missouri Department of Conservation, Jefferson City, Missouri.

Nigh, Timothy A., and Walter A. Schroeder. 2002. Atlas of Missouri Ecoregions. Missouri Department of Conservation, Jefferson City, Missouri.

Schoolcraft, H.R. 1821. Journal of a tour into the interior of Missouri and Arkansas from Potosi, or Mine a Burton, in Missouri territory, in a southwest direction, toward the Rocky Mountains: performed in the years 1818 and 1819. Richard Phillips and Company, London.

United States Department of Agriculture – Natural Resource Conservation Service (USDA-NRCS). 2006. Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. 682 pgs.

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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	09/28/2020
Approved by	Nels Barrett
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

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2. **Presence of water flow patterns:**

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3. **Number and height of erosional pedestals or terracettes:**

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

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5. **Number of gullies and erosion associated with gullies:**

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6. **Extent of wind scoured, blowouts and/or depositional areas:**

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7. **Amount of litter movement (describe size and distance expected to travel):**

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

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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):**

---

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:**
