USDA Natural Resources Conservation Service

Ecological site F116BY008MO
Interbedded Sedimentary Upland Woodland

Last updated: 10/06/2020
Accessed: 05/11/2025

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): 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:
Stockton Prairie/Savanna Dissected Plain
Upper Sac River Oak Savanna/Woodland Low Hills
Little Sac River Oak Savanna/Woodland Low Hills
Upper Pomme de Terre Oak Savanna/Woodland Dissected Plain
James 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”.

Interbedded Sedimentary Upland Woodlands occur primarily along the northeast edge of the Springfield Plain, typically on lower hillslopes where interbedded shale, mudstone and limestone is near the surface. A few isolated areas to the southwest are in the Elk River watershed in McDonald County, Missouri. Soils are moderately deep to deep over sedimentary bedrock, and typically have shale and mustone fragments in clayey subsoils. The reference plant community is woodland with an overstory dominated by white oak and black oak, and a ground flora of native grasses and forbs.

Associated sites

F116BY004MO	**Low-Base Chert Upland Woodland** Low-base Chert Upland Woodlands are upslope.
F116BY012MO	**Interbedded Sedimentary Protected Backslope Forest** Interbedded Sedimentary Protected Backslope Forests are often downslope on steep northern and eastern aspects.
F116BY036MO	**Interbedded Sedimentary Exposed Backslope Woodland** Interbedded Sedimentary Exposed Backslope Woodlands are often downslope on steep southern and western aspects.

Similar sites

F116BY003MO	**Chert Upland Woodland** Chert Upland Woodlands have similar overstory species composition and landscape positions but are generally more productive.

Table 1. Dominant plant species

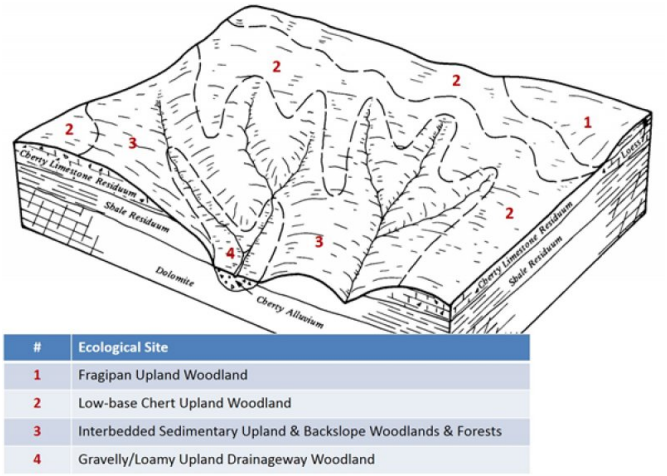
Tree	(1) *Quercus alba* (2) *Quercus velutina*
Shrub	(1) *Rhus aromatica*
Herbaceous	(1) *Schizachyrium scoparium* (2) *Carex pensylvanica*

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 Dodd, 1990) shows the typical landscape position of this ecological site, and landscape relationships with other ecological sites. Interbedded Sedimentary Upland Woodland sites are within the area labeled as “3”, and are typically on lower slopes and structural benches where the shale and mudstone crops out downslope from the overlying limestone. Steeper, lower backslopes within this area are in the Interbedded

Sedimentary Backslope ecological sites. Low-base Chert Upland Woodland sites are typically upslope, and areas of Low-base Chert Upland sites are shown on upper slopes within the area labeled as “3”. Several soils are included within the Low-base Chert Upland Woodland area labeled as “2”, as indicated by the dashed line within the delineation.



#	Ecological Site
1	Fragipan Upland Woodland
2	Low-base Chert Upland Woodland
3	Interbedded Sedimentary Upland & Backslope Woodlands & Forests
4	Gravelly/Loamy Upland Drainageway Woodland

Figure 2. Landscape relationships for this ecological site

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Ridge (3) Interfluve
Flooding frequency	None
Ponding frequency	None
Slope	3–20%
Water table depth	16–39 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 (average)	191 days
Freeze-free period (average)	206 days
Precipitation total (average)	47 in

Climate stations used

- (1) SPRINGFIELD [USW00013995], Springfield, MO
- (2) MARSHFIELD [USC00235307], Marshfield, MO
- (3) STOCKTON DAM [USC00238082], Stockton, 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 shale, siltstone and limestone bedrock between 40 and 70 inches, although the site definition allows for soils as shallow as 20 inches. The subsoils are not 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 siltstone and shale. They have silt loam surface horizons that are often gravelly, and clayey subsoils with varying amounts of shale fragments. These soils are not affected by seasonal wetness. Soil series associated with this site include Alsup and Boskydell.

The accompanying picture of the Alsup series shows a thin gravelly silt loam surface horizon over a yellowish brown, clayey subsoil. The olive yellow colors below about 80 cm in this picture are inherited from the shale parent material. Soft shale is below one meter, at the bottom of this picture. Scale is in centimeters. Picture from Henderson (2004).

Figure 7. Alsup series

Table 4. Representative soil features

Parent material	(1) Residuum–shale and siltstone (2) Slope alluvium
Surface texture	(1) Silt loam (2) Gravelly silt loam (3) Very gravelly silty clay loam
Family particle size	(1) Clayey
Drainage class	Moderately well drained
Permeability class	Very slow
Soil depth	40–70 in
Surface fragment cover <=3"	5–50%
Surface fragment cover >3"	0–17%
Available water capacity (0-40in)	3–6 in
Calcium carbonate equivalent (0-40in)	0%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	4.5–7.8
Subsurface fragment volume <=3" (Depth not specified)	20–50%
Subsurface fragment volume >3" (Depth not specified)	0–15%

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 white oak and black oak. This woodland type is moderate in canopy closure (50 to 80 percent), with an open understory and a dense, diverse herbaceous ground flora. Historically, white oak dominated the canopy, along with black oak and occasional hickory, bur oak and post oak. Woodlands are distinguished from forest, by their relatively open understory, and the presence of sun-loving ground flora species including the dominant prairie grasses. Characteristic plants in the ground flora can be used to gauge the restoration potential along with remnant open-grown old-age trees, and tree height growth.

Fire played an important role in the maintenance of these systems. Because Interbedded Sedimentary Upland Woodlands normally occur next to the prairie edge, it is likely that these ecological sites burned at least once every 3 to 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.

Today, this community has either been cleared and converted to pasture or cropland, or has grown dense in the absence of fire. Most occurrences today exhibit canopy closure of 80 to 100 percent. In addition, the sub-canopy and understory layers are better developed. Black oak and hickory now share dominance with white oak and there are considerable more saplings in the understory. Under these denser, more shaded conditions, the original sun-loving ground flora has diminished in diversity and cover. While some woodland species persist in the ground flora, many have been replaced by more shade-tolerant species.

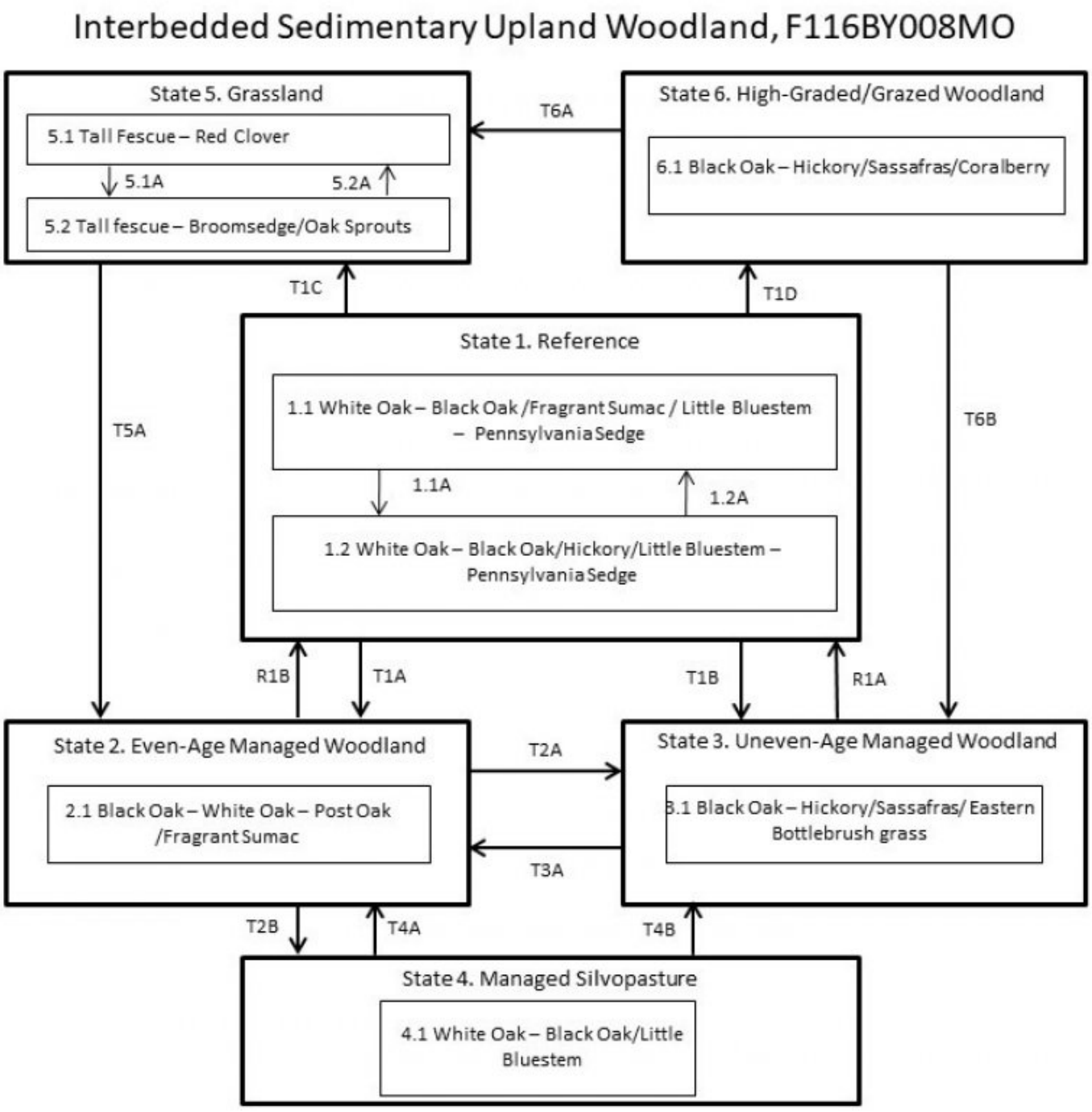
In the long term absence of fire, woody species, especially hickory, hophornbeam and gooseberry encroach into these woodlands. Once established, these woody plants can quickly fill the existing understory increasing shade levels greatly diminishing the ground flora. Removal of the younger understory and the application of prescribed fire have proven to be effective management tools.

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

Interbedded Sedimentary Upland Woodlands, if managed properly, can be a source for timber products especially white oak. Most areas on this ecological site have been repeatedly logged and high graded. Even-age management, using clearcut, or shelterwood and seed-tree harvest systems without fire will perpetuate the overly dense, shaded conditions. Thinning and/or occasional partial cuts, using an uneven-age management system can provide sunlight to the woodland floor, stimulating native woodland ground flora. However, in the absence of fire and continual cultural treatments, oak sprouting creates a dense stand, again shading out the sun-loving ground flora. Partial cutting and prescribed fire can restore the more open structure and diversity of ground flora species. This type of site with proper management can provide 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
T1B	Fire suppression; uneven-age management
T2B	Prescribed fire; thinning; grazing management
T1C, T6A	Clearing & pasture planting
T1D	Poorly planned harvest & uncontrolled grazing
T2A	Uneven-age management
T3A	Even-age management
T5A	Tree planting; long-term succession; no grazing
T6B	Uneven-age management; tree planting
T4A	Uneven-age management; no grazing
T4B	Even-age management; no grazing

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

Code	Event/Process
R1A	Prescribed fire & extended rotations
R1B	Uneven-age mgt, extended rotations

Figure 8. State and transition diagram for this ecological site

State 1

Reference

The historical reference state for this ecological site was old growth oak woodland. The woodland was dominated by white oak and black oak. 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 grassland (State 5). Others have been subject to repeated, high-graded timber harvest coupled with uncontrolled domestic livestock grazing (State 6). Fire suppression has resulted in increased canopy density, which has affected the abundance and diversity of ground flora. Most reference states are currently altered because of timber harvesting, resulting in either even-age (State 2) or uneven-age woodlands (State 3).

Community 1.1
White Oak – Black Oak /Fragrant Sumac / Little Bluestem – Pennsylvania Sedge

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
White Oak – Black Oak/Hickory/Little Bluestem – Pennsylvania Sedge

Pathway P1.1A
Community 1.1 to 1.2

No disturbance (10+ years)

Pathway P1.2A
Community 1.2 to 1.1

Disturbances (fire, wind, ice) every 5 to 10 yrs

State 2
Even-Age Managed Woodland

These woodlands tend to be rather dense, with a sparse 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 diminished. Continual timber management, depending on the practices used, will either maintain this state, or convert the site to uneven-age woodlands.

Dominant resource concerns

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

Community 2.1
Black Oak-White Oak-Post Oak/Aromatic Sumac

This woodland community has a simple, dense, single-tiered structure, with canopy height that varies with age, and 100% canopy closure. The understory and ground flora is depauperate. 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

Uneven-Age Managed Woodlands resemble their reference state. The biggest difference is tree age, most being only 60 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 and white oak will become less dominant. Uneven Age Managed Woodland is also dense because of fire suppression. Without periodic canopy disturbance, stem density and fire intolerant species, like hickory, will increase in abundance.

Dominant resource concerns

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

Community 3.1
Black Oak-Hickory/Sassafras/Bottlebrush grass

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

State 4
Managed Silvopasture

The Managed Silvopasture state results from managing woodland communities (States 2 or 3) with prescribed fire, canopy thinning, and controlled grazing. This state can resemble the reference state, but with younger maximum tree ages, more open canopies and lower ground flora diversity. Sensation of grazing and controlled harvesting will allow transition to various managed woodland states.

Dominant resource concerns

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

Community 4.1
White Oak-Black Oak/Little Bluestem

State 5
Grassland

Conversion of woodlands to planted, non-native grassland species such as tall fescue has been common for this region. Steep slopes, surface fragments, low organic matter contents and soil acidity make grasslands harder to maintain in a healthy, productive state on this ecological site. Two community phases are recognized in the Grassland state, with shifts between phases based on types of management. Poor management will result in a shift to community 5.2 that shows an increase in oak sprouting and increases in broomsedge densities. If grazing and active pasture management is discontinued, the site will eventually transition to State 2 from this phase.

Community 5.1
Tall Fescue - Red Clover

Two community phases are recognized in the Grassland state, with shifts between phases based on types of management. Poor management will result in a shift to community 5.2 that shows an increase in oak sprouting and increases in broomsedge densities. If grazing and active pasture management is discontinued, the site will eventually transition to State 2 from this phase.

Dominant resource concerns

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

Community 5.2
Tall Fescue - Broomsedge/Oak Sprouts

Two community phases are recognized in the Grassland state, with shifts between phases based on types of management. Poor management will result in a shift to community 5.2 that shows an increase in oak sprouting and increases in broomsedge densities. If grazing and active pasture management is discontinued, the site will eventually transition to State 2 from this phase.

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

States that were subjected to repeated, high-grading timber harvests and uncontrolled domestic grazing transitioned to a High-Graded, Grazed Woodland state. This state exhibits an over-abundance of hickory and other less desirable tree species, and weedy understory species such as buckbrush, gooseberry, poison ivy and Virginia creeper. The existing vegetation offers little nutritional value for cattle, and excessive cattle stocking damages tree boles, degrades understory species composition and results in soil compaction and accelerated erosion and runoff. Two common transitions from this state are woody clearing and conversion to State 5, Grassland or removing livestock, limited harvesting, and allowing long term succession to occur to some other woodland state.

Community 6.1
Black Oak-Hickory/Sassafras/Buckbrush

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

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 cessation.

Transition T1B
State 1 to 3

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

Restoration pathway R1B
State 1 to 3

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 150 years. Prescribed fire is part of the restoration process. Mechanical thinning may be necessary in dense woodlands.

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 cattle grazing after the understory has been damaged.

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, thinning, and grazing management

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, thinning, and grazing management

Transition T5A
State 5 to 2

This transition results from tree planting; long-term succession; no grazing

Transition T6B
State 6 to 3

This transition typically results from uneven-age timber management practices, such as single tree or group selection harvest. Tree planting, mechanical thinning and other timber stand improvement techniques may be helpful to decrease the transition time. Access control; no grazing

Transition T6A
State 6 to 5

This transition is the result of clearing the woodland communities 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.

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							
white oak	QUAL	*Quercus alba*	Native	–	30–60	–	–
black oak	QUVE	*Quercus velutina*	Native	–	30–60	–	–
post oak	QUST	*Quercus stellata*	Native	–	10–30	–	–
mockernut hickory	CATO6	*Carya tomentosa*	Native	–	10–30	–	–
shagbark hickory	CAOV2	*Carya ovata*	Native	–	10–20	–	–

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	–	5–20
Pennsylvania sedge	CAPE6	*Carex pensylvanica*	Native	–	5–20
hairy woodland brome	BRPU6	*Bromus pubescens*	Native	–	5–20
oval-leaf sedge	CACE	*Carex cephalophora*	Native	–	5–20
Virginia wildrye	ELVI3	*Elymus virginicus*	Native	–	5–20
fuzzy wuzzy sedge	CAHI6	*Carex hirsutella*	Native	–	5–20
Bosc's panicgrass	DIBO2	*Dichanthelium boscii*	Native	–	5–20
rock muhly	MUSO	*Muhlenbergia sobolifera*	Native	–	5–20
Forb/Herb					
American lopseed	PHLE5	*Phryma leptostachya*	Native	–	5–20
three-lobe violet	VITR2	*Viola triloba*	Native	–	5–20
Baldwin's ironweed	VEBA	*Vernonia baldwinii*	Native	–	5–20
hairy sunflower	HEHI2	*Helianthus hirsutus*	Native	–	5–20
eastern purple coneflower	ECPU	*Echinacea purpurea*	Native	–	5–20
Virginia spiderwort	TRVI	*Tradescantia virginiana*	Native	–	5–20
elmleaf goldenrod	SOUL2	*Solidago ulmifolia*	Native	–	5–20
manyray aster	SYAN2	*Symphyotrichum anomalum*	Native	–	5–20
pointedleaf ticktrefoil	DEGL5	*Desmodium glutinosum*	Native	–	5–20
smooth small-leaf ticktrefoil	DEMA2	*Desmodium marilandicum*	Native	–	5–20
fourleaf milkweed	ASQU	*Asclepias quadrifolia*	Native	–	5–20
eastern beebalm	MOBR2	*Monarda bradburiana*	Native	–	5–20
nakedflower ticktrefoil	DENU4	*Desmodium nudiflorum*	Native	–	5–20
Shrub/Subshrub					
fragrant sumac	RHAR4	*Rhus aromatica*	Native	–	5–20
American hazelnut	COAM3	*Corylus americana*	Native	–	5–20
New Jersey tea	CEAM	*Ceanothus americanus*	Native	–	5–20

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.

Reptile and amphibian species associated with this site include tiger salamander, small-mouthed salamander,

ornate box turtle, northern fence lizard, five-lined skink, broad-headed skink, flat-headed snake, and rough earth snake.

Other information

Forestry (NRCS 2002; 2014):
Management: Field measured site index values for oak range from 51 for post oak, 62 for red oak and 54 for white oak. Timber management opportunities are fair to 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 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: Clay in lower portion of soil profile; Exposed clayey soils have reduced traction and compact easily when wet. Unsurfaced roads and skid trails may be impassable during rainy periods. 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: Interbedded Sedimentary Upland Woodland

Plot STLACE02 – Boskydell soil
Located in Stockton Lake COE/CA, Cedar County, MO
Latitude: 37.606618
Longitude: -93.702388

Other references

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Contributors

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Approval

Nels Barrett, 10/06/2020

Acknowledgments

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

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	09/16/2020
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:**

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):**

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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:**
