USDA Natural Resources Conservation Service

Ecological site F116BY016MO
Dry Footslope Woodland

Last updated: 10/07/2020
Accessed: 05/15/2024

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-Mesic 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 Mixed Oak Woodland.

National Vegetation Classification System Vegetation Association (NatureServe, 2010):
The reference state for this ecological site is most similar to a Quercus alba - Quercus stellata - Quercus velutina /

Schizachyrium scoparium Woodland (CEGL002150).

Geographic relationship to the Missouri Ecological Classification System (Nigh & Schroeder, 2002):
This ecological site occurs primarily within the following Land Type Associations:
Big Sugar Creek Oak Woodland/Forest hills
Elk River Oak Woodland Dissected Plain
Jenkins Oak Savanna/Woodland Basin
Shoal Creek Oak Savanna/Woodland Low Hills
Spring River 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”.

Dry Footslope Woodlands occur primarily in the central and southwestern part of the Springfield Plain, on narrow footslopes associated with gravelly floodplains and upland drainageways. Soils are very gravelly. 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

F116BY010MO	**Low-Base Chert Protected Backslope Woodland** Low-base Chert Protected Backslope Woodlands and other upland ecological sites are upslope.
F116BY029MO	**Sandy/Gravelly Floodplain Forest** Sandy/Gravelly Floodplain Forests and other floodplain ecological sites are downslope.
F116BY033MO	**Low-Base Chert Exposed Backslope Woodland** Low-base Chert Exposed Backslope Woodlands and other upland ecological sites are upslope.

Similar sites

F116BY013MO	**Loamy Footslope Woodland** Loamy Footslope Woodlands are on similar landscape positions with similar species composition. These sites generally have a higher water holding capacity and are more productive.

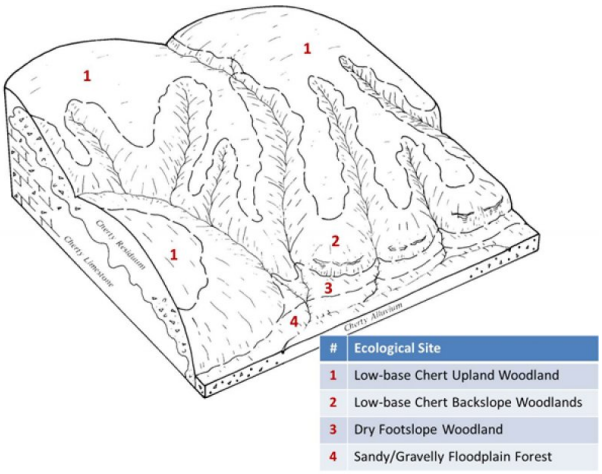
Table 1. Dominant plant species

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

Physiographic features

This site is on footslopes with slopes of 1 to 5 percent. The site receives runoff from adjacent upland sites. This site does not flood.

The following figure (adapted from Aldrich and Meinert, 1994) shows the typical landscape position of this ecological site, and landscape relationships with other ecological sites. The site is within the area labeled as “3” on the figure, on footslopes typically at the base of Low-base Chert Backslope or other very gravelly ecological sites. This site is typically adjacent to Sandy/Gravelly Floodplain Forest sites, labeled “4”.



#	Ecological Site
1	Low-base Chert Upland Woodland
2	Low-base Chert Backslope Woodlands
3	Dry Footslope Woodland
4	Sandy/Gravelly Floodplain Forest

Figure 2. Landscape relationships for this ecological site.

Table 2. Representative physiographic features

Landforms	(1) Hillslope
Flooding frequency	None
Ponding frequency	None
Slope	1–5%
Water table depth	51–152 cm
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)	142-152 days
Freeze-free period (characteristic range)	181-188 days
Precipitation total (characteristic range)	1,168-1,194 mm
Frost-free period (actual range)	141-160 days
Freeze-free period (actual range)	180-190 days
Precipitation total (actual range)	1,168-1,219 mm
Frost-free period (average)	148 days
Freeze-free period (average)	185 days
Precipitation total (average)	1,194 mm

Climate stations used

- (1) SPRINGFIELD [USW00013995], Springfield, MO
- (2) MT VERNON M U SW CTR [USC00235862], Mount Vernon, MO
- (3) CASSVILLE RANGER STN [USC00231383], Cassville, MO
- (4) NEOSHO [USC00235976], Neosho, 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 have low plant-available water capacity, due to an abundance of coarse fragments. The soils were formed under woodland vegetation, and have thin, light-colored surface horizons. Parent material is mixed colluvium and alluvium. Surface horizons are very gravelly silt loam. Subsurface horizons are loamy, and are skeletal with abundant gravel and cobbles. These soils are not affected by seasonal wetness. Soil series associated with this site include Waben.

The accompanying picture of the Waben series shows the abundant gravel and cobble content that characterizes these skeletal soils. Scale is in feet. Picture courtesy of Dennis Meinert, Missouri Department of Natural Resources.

Figure 9. Waben series

Table 4. Representative soil features

Parent material	(1) Colluvium (2) Alluvium
Surface texture	(1) Very gravelly silt loam (2) Loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Slow
Soil depth	183 cm
Surface fragment cover <=3"	0–20%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	5.08–7.62 cm
Calcium carbonate equivalent (0-101.6cm)	0%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	4.5–6.5
Subsurface fragment volume <=3" (Depth not specified)	35–75%
Subsurface fragment volume >3" (Depth not specified)	0–20%

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 well developed woodland dominated by an overstory of white oak, black oak and post oak. The canopy is 60 to 70 feet tall but less dense (55 to 75 percent canopy) than protected slopes and the understory is open with less structural diversity. Increased light from the open canopy causes a diversity of ground flora species to flourish. In addition, proximity to shallow soil glades and woodlands provides additional opportunity for increased light and species diversity. Woodlands are distinguished from forest, by their relatively open understory, and the presence of sun-loving ground flora species.

Fire played an important role in the maintenance of these systems. It is likely that these ecological sites burned at least once every 5 to 10 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.

Dry Footslope Woodlands were also subjected to occasional disturbances from wind and ice, as well as grazing by native large herbivores, such as bison, elk, and white-tailed deer. Wind and ice would have periodically opened the canopy up by knocking over trees or breaking substantial branches off canopy trees. Grazing by native herbivores would have effectively kept understory conditions more open, creating conditions more favorable to oak reproduction and sun-loving ground flora species.

Today, these ecological sites have been cleared and converted to pasture or have undergone repeated timber harvest and domestic grazing. Most existing forested ecological sites have a younger (50 to 80 years) canopy layer whose species composition and quality has been altered by timber harvesting practices. In the long term absence of fire, woody species, especially hickory, encroach into these woodlands. Once established, these woody plants can quickly fill the existing understory increasing shade levels with a greatly diminished ground flora. Removal of the younger understory and the application of prescribed fire have proven to be effective restoration means.

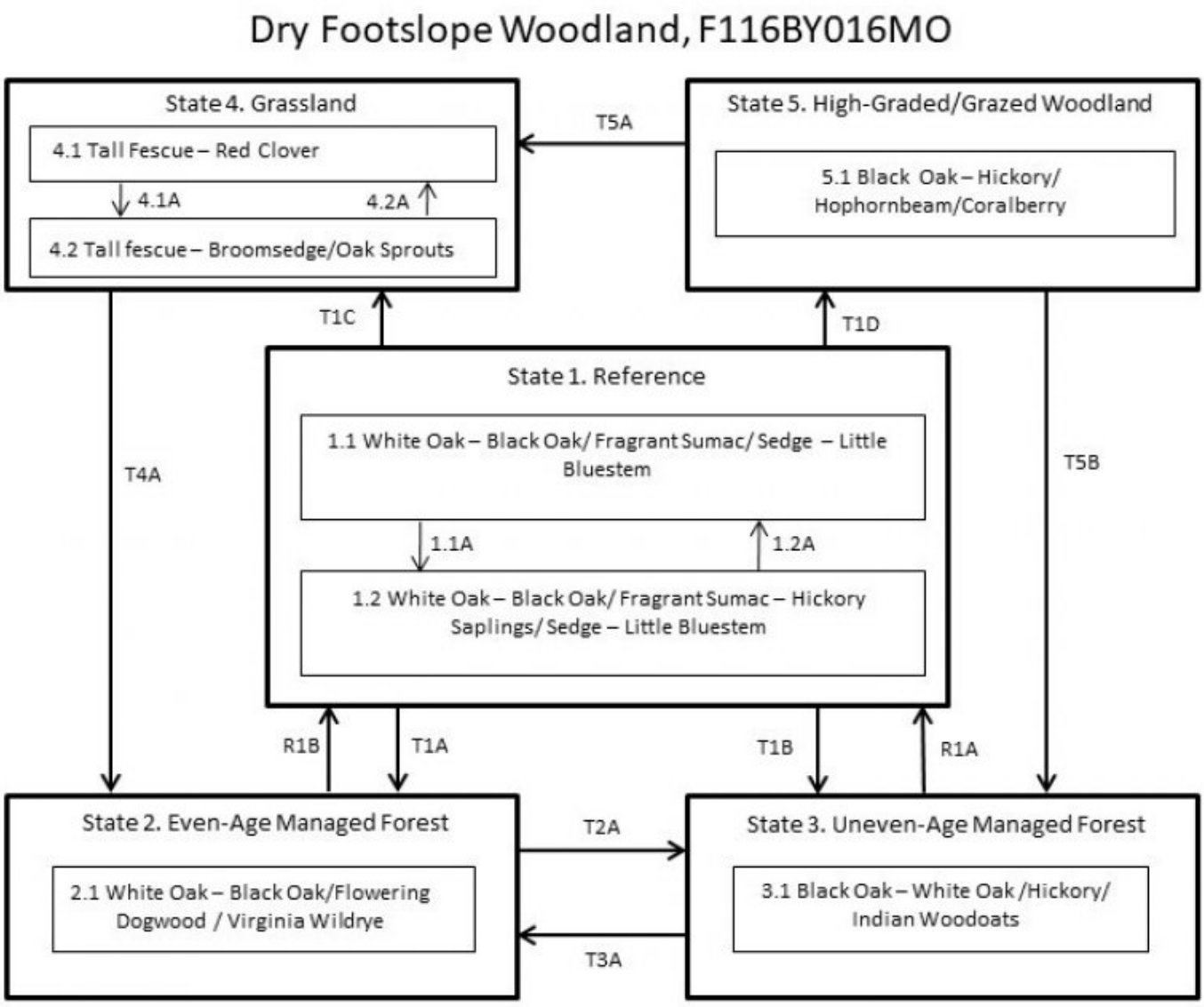
Uncontrolled domestic grazing has also impacted these communities, further diminishing the diversity of native plants and introducing species that are tolerant of grazing, such as fragrant sumac, coralberry, gooseberry, and Virginia creeper. Grazed sites also have a more open understory. In addition,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

Dry Footslope Woodlands are moderately productive. Oak regeneration is typically problematic. Sugar maple, red maple, and hickory are often dominant competitors in the understory. Maintenance of the oak component will require disturbances that will encourage more sun adapted species and reduce shading effects. Single tree selection timber harvests are common in this region and often results in removal of the most productive trees (high grading) in the stand leading to poorer quality timber and a shift in species composition away from more valuable oak species.

Better planned single tree selection or the creation of group openings can help regenerate and maintain more desirable oak species and increase vigor on the residual trees. Clearcutting also occurs and results in dense, even-aged stands dominated by oak. This may be most beneficial for existing stands whose composition has been highly altered by past management practices.

A State and Transition Diagram follows. Detailed descriptions of each state, transition, plant community, and pathway follow the model. This model is based on available experimental research, field observations, professional consensus, and interpretations. It is likely to change as knowledge increases.

State and transition model



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

Code	Activity/Event/Process
1.1A	No disturbances (10+ years)
1.2A	Disturbances (fire, wind, ice) 3-5 years
4.1A	Over grazing; no fertilization
4.2A	Brush management; grassland seeding; grassland management

Code	Activity/Event/Process
R1A, R1B	Extended rotations; prescribed fire; forest stand improvement

Figure 10. State and transition diagram for this ecological site

State 1

Reference

The reference state was dominated by white oak and black oak. Periodic disturbances from fire, wind or ice maintained the dominance of oaks by opening the canopy and allowing more light for oak reproduction. Long disturbance-free periods allowed an increase in more shade tolerant species such as hickory. The reference state is rare today and may be extinct. 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 uncontrolled domestic livestock grazing (State 5). Fire suppression has also 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 – Black Oak/ Fragrant Sumac/ Sedge – Little Bluestem

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/ Fragrant Sumac – Hickory Saplings/ Sedge – Little Bluestem

Pathway P1.1A
Community 1.1 to 1.2

No disturbances (10+ years)

Pathway P1.2A
Community 1.2 to 1.1

Disturbances (fire, wind, ice) every 3-5 years

State 2
Even-Age Managed Forest

These former woodland are now rather dense, with 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.

Dominant resource concerns

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

Community 2.1
White Oak – Black Oak/Flowering Dogwood / Wildrye

State 3
Uneven-Age Managed Forest

Composition and age are 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 and use of prescribed fire, they will slowly increase in more shade tolerant species such as hickory, and white oak will become less dominant.

Dominant resource concerns

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

Community 3.1
Black Oak – White Oak /Hickory/ Indian Woodoats

State 4
Grassland

Conversion of forests to planted, non-native pasture species such as tall fescue has been common in this MLRA. 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

Dominant resource concerns

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

Community 4.2
Tall fescue - Broomsedge/Oak Sprouts

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

Pathway P4.1A
Community 4.1 to 4.2

Over grazing; no fertilization

Pathway P4.2A
Community 4.2 to 4.1

Brush management; grassland seeding; grassland management

State 5
High-Graded/Grazed Woodland

Woodland 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 buckbrush, 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
Tall Fescue - Red Clover

Transition T1A
State 1 to 2

Harvesting; even-aged management; fire exclusion

Transition T1B
State 1 to 3

Harvesting; uneven-age management; fire exclusion

Transition T1C
State 1 to 4

Clearing; grassland planting; grassland management

Transition T1D
State 1 to 5

High-grade harvesting; uncontrolled grazing

Restoration pathway R1B
State 2 to 1

Extended rotations; prescribed fire; forest stand improvement

Transition T2A
State 2 to 3

Uneven-age management; thinning

Restoration pathway R1B
State 3 to 1

Extended rotations; prescribed fire; forest stand improvement

Transition T3A
State 3 to 2

Even-age management; thinning

Transition T4A
State 4 to 2

Tree planting; long-term succession; no grazing

Transition T5B
State 4 to 3

Uneven-age management; tree planting; no grazing

Transition T5B
State 5 to 3

Uneven-age management; tree planting; no grazing

Restoration pathway T5A

State 5 to 4

Clearing; grassland planting; grassland management

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							
white oak	QUAL	*Quercus alba*	Native	–	30–60	–	–
black oak	QUVE	*Quercus velutina*	Native	–	30–60	–	–
mockernut hickory	CATO6	*Carya tomentosa*	Native	–	10–20	–	–
post oak	QUST	*Quercus stellata*	Native	–	10–20	–	–
shagbark hickory	CAOV2	*Carya ovata*	Native	–	10–20	–	–
sassafras	SAAL5	*Sassafras albidum*	Native	–	10–20	–	–
Shumard's oak	QUSH	*Quercus shumardii*	Native	–	10–20	–	–

Table 6. Community 1.1 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (M)	Canopy Cover (%)
Grass/grass-like (Graminoids)					
eastern bottlebrush grass	ELHY	*Elymus hystrix*	Native	–	5–20
whitetinge sedge	CAAL25	*Carex albicans*	Native	–	5–20
oval-leaf sedge	CACE	*Carex cephalophora*	Native	–	5–20
little bluestem	SCSC	*Schizachyrium scoparium*	Native	–	5–20
hairy woodland brome	BRPU6	*Bromus pubescens*	Native	–	5–20
poverty oatgrass	DASP2	*Danthonia spicata*	Native	–	–
Forb/Herb					
manyray aster	SYAN2	*Symphyotrichum anomalum*	Native	–	5–20
pointedleaf ticktrefoil	DEGL5	*Desmodium glutinosum*	Native	–	5–20
elmleaf goldenrod	SOUL2	*Solidago ulmifolia*	Native	–	5–20
smooth small-leaf ticktrefoil	DEMA2	*Desmodium marilandicum*	Native	–	5–20
nakedflower ticktrefoil	DENU4	*Desmodium nudiflorum*	Native	–	5–20
eastern beebalm	MOBR2	*Monarda bradburiana*	Native	–	5–20
eastern purple coneflower	ECPU	*Echinacea purpurea*	Native	–	5–20
hairy sunflower	HEHI2	*Helianthus hirsutus*	Native	–	5–20
Virginia spiderwort	TRVI	*Tradescantia virginiana*	Native	–	5–20
fourleaf milkweed	ASQU	*Asclepias quadrifolia*	Native	–	5–20
Shrub/Subshrub					
fragrant sumac	RHAR4	*Rhus aromatica*	Native	–	5–20
Blue Ridge blueberry	VAPA4	*Vaccinium pallidum*	Native	–	5–20
leadplant	AMCA6	*Amorpha canescens*	Native	–	5–20
Tree					
flowering dogwood	COFL2	*Cornus florida*	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 game species of this type.

Bird species associated with early-successional woodlands are Prairie Warbler, Field Sparrow, Brown Thrasher, Blue-winged Warbler, White-eyed Vireo, Blue-gray Gnatcatcher, Yellow-breasted Chat, Indigo Bunting, and Eastern Towhee.

Birds associated with mid-successional Forests are Whip-poor-will, Ovenbird, and Yellow-billed Cuckoo.

Birds associated with late-successional woodlands are Worm-eating warbler, Whip-poor-will, Great Crested Flycatcher, Ovenbird, Pileated Woodpecker, Yellow-billed Cuckoo, Summer Tanager, Red-eyed Vireo, Scarlet Tanager, Black-and-white Warbler, and Broad-winged Hawk.

Reptiles and amphibians associated with mature woodlands include: long-tailed salamander, dark-sided salamander, southern red-backed salamander, three-toed box turtle, ground skink, western worm snake, western earth snake, American toad, and timber rattlesnake.

Other information

Forestry (NRCS 2002; 2014)
Management: Field measured site index values average 56 for black oak. 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.

Limitations: Coarse fragments in profile; excessive drainage. Disturbing the surface excessively in harvesting operations and building roads increases soil losses, which may leave a greater amount of coarse fragments on the surface. Mechanical tree planting may be limited due to coarse fragments on surface.

Inventory data references

Potential Reference Sites: Dry Footslope Woodland

No quality reference sites are known to exist

Other references

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Contributors

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Approval

Nels Barrett, 10/07/2020

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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	09/24/2020
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):**

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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:**
