USDA Natural Resources Conservation Service

Ecological site F116BY005MO
Low-Base Loamy Upland Woodland

Last updated: 10/06/2020
Accessed: 05/17/2024

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 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, or a Pine Oak Woodland in the historic pine range.

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

The reference state for this ecological site is most similar to a Quercus stellata - Quercus marilandica - Quercus velutina - Carya texana / Schizachyrium scoparium Woodland (CEGL002149).

Geographic relationship to the Missouri Ecological Classification System (Nigh & Schroeder, 2002):
This ecological site occurs primarily within the Spring River Prairie/Savanna Dissected Plain Land Type Association.

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 Loamy Upland Woodlands are not extensive, confined to the Elk River watershed in McDonald county, Missouri, and to scattered locations in the Spring River watershed in Oklahoma. Soils are very deep, acidic, low in bases such as calcium, and are silt loam loess overlying gravelly residuum. 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

F116BY004MO	**Low-Base Chert Upland Woodland** Low-base Chert Upland Woodlands are often downslope.
F116BY018MO	**Loamy Sinkhole Woodland** Loamy Sinkhole Woodlands occur within this site in places.

Similar sites

F116BY004MO	**Low-Base Chert Upland Woodland** Low-base Chert Upland Woodlands are on similar landscape positions but are generally more productive.

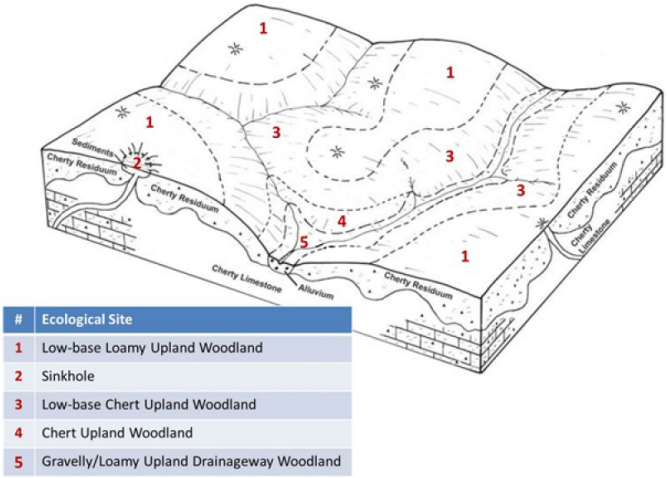
Table 1. Dominant plant species

Tree	(1) *Quercus stellata* (2) *Quercus velutina*
Shrub	(1) *Ceanothus americanus* (2) *Rhus aromatica*
Herbaceous	(1) *Schizachyrium scoparium*

Physiographic features

This site is on upland summit crests with slopes of 1 to 3 percent. The site generates runoff to adjacent, downslope ecological sites. This site does not flood.

The following figure (adapted from Gregg and Woodward, 2006) shows the typical landscape position of this ecological site, and landscape relationships with other ecological sites. The site is within the area labeled “1”, on upland summit crests and shoulders. Low-base Chert Upland Woodland sites are often directly downslope, and are included within the area labeled “3”. Sinkholes are common in many areas, as indicated in the figure.



#	Ecological Site
1	Low-base Loamy Upland Woodland
2	Sinkhole
3	Low-base Chert Upland Woodland
4	Chert Upland Woodland
5	Gravelly/Loamy Upland Drainageway Woodland

Figure 2. Landscape relationships for this ecological site.

Table 2. Representative physiographic features

Landforms	(1) Interfluve (2) Ridge
Flooding frequency	None
Ponding frequency	None
Slope	1–3%
Water table depth	53–107 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)	142-145 days
Freeze-free period (characteristic range)	177-185 days
Precipitation total (characteristic range)	1,143-1,194 mm
Frost-free period (actual range)	141-146 days
Freeze-free period (actual range)	175-186 days
Precipitation total (actual range)	1,118-1,219 mm
Frost-free period (average)	143 days
Freeze-free period (average)	181 days
Precipitation total (average)	1,168 mm

Climate stations used

- (1) CASSVILLE RANGER STN [USC00231383], Cassville, MO
- (2) NEOSHO [USC00235976], Neosho, MO
- (3) ANDERSON [USC00230164], Anderson, MO

Influencing water features

Water features associated with this upland ecological site are influenced by karst landscapes throughout the area. Rainfall enters the groundwater system through the soil or by flowing into sinkholes and streams. Springs form where land drops low enough to meet underground water tables. Dissolution of carbonate rocks along fractures and faults has produced cave systems, sinkholes (closed and open), springs, and natural tunnels in the region. These sinkholes and losing streams can rapidly transfer water from upland recharge areas to spring outlets. The most common mechanism for groundwater recharge occurs by the relatively slow downward movement of water through soil and carbonate bedrock over a large area known as diffuse recharge, which maintains a high storage volume providing a consistent supply of water to springs. In addition to diffuse recharge, aquifers in karst terrain receive the relatively rapid transfer of water through sinkholes or losing streams connected by subsurface conduits. Surface water entering the aquifer in this fashion has very little contact with soil or rock and consequently the chemical nature of the water changes little in route. Discharge variability does not seem to be controlled by drainage area, but rather the conduit capacity of losing stream sections that can transport the entire volume of base-flow during dry periods in the year. High variability in base flow shows the impact of karst in the form of losing and gaining stream sections (Owen and Pavlowsky 2010).

The following graphic depicts the distribution of these karst-related features in the state of Missouri. Relative cave density per USGS 7.5" quadrangle is depicted by shades of red, deeper red signifying a larger number of caves in the quadrangle. Stretches of losing streams are shown in yellow. Known springs are shown as blue dots.

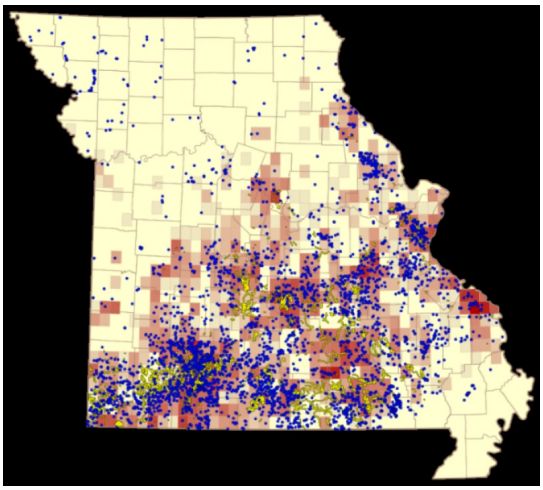


Figure 9. Image from Wikimedia Commons developed from the Missouri Department of Natural Resources, Division of Geology and Land Survey.

Soil features

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 loess over slope alluvium over residuum weathered primarily from cherty limestone. The soils have silt loam surface horizons. Subsoils are silty clay loam in the upper part, and are very gravelly and cobbly silty clay loam in the underlying slope alluvium and residuum. These soils are slightly affected by seasonal wetness. Soil series associated with this site include Viburnum.

The accompanying picture of the Viburnum series shows a thin, light-colored silt loam surface horizon and brown silty clay loam subsoil, over red very gravelly clay at about 30 inches. Scale is in inches (Photo credit-NRCS).

Figure 10. Viburnum series

Table 4. Representative soil features

Parent material	(1) Residuum–cherty limestone (2) Loess (3) Slope alluvium
Surface texture	(1) Silt loam
Family particle size	(1) Clayey
Drainage class	Somewhat poorly drained
Permeability class	Slow
Soil depth	183 cm
Surface fragment cover <=3"	0–3%

Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	15.24 cm
Calcium carbonate equivalent (0-101.6cm)	0%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	4.5–7.3
Subsurface fragment volume <=3" (Depth not specified)	15–50%
Subsurface fragment volume >3" (Depth not specified)	0%

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.

Low-Base Loamy Upland Woodlands were dominated by drought and fire-tolerant trees such as black oak*, post oak and white oak. Soil chert, low soil bases and complicated landscape complexes are unifying soil features of these rather divergent community phases. Woodlands are distinguished from forests by their relatively open understory and the presence of sun-loving ground flora species.

Fire played an important role in the maintenance of these community phases. Their high, flat landscape positions likely supported a high fire frequency of every 3 to 5 years on edge of central plateau to over 10 years on ridges in the river breaks. These periodic fires would have kept woodlands open, removed the litter, and stimulated the growth and flowering of the native grasses and forbs. During fire free intervals, woody species would have increased, and the herbaceous understory diminished. But historically, the return of fire would have opened the woodlands up again and stimulated the abundant ground flora. Grazing by large native herbivores, such as bison, elk and white-tailed deer, also influenced the understory, keeping it more open and structurally diverse. The high, droughty landscape position of Low-Base Loamy Upland Woodlands limited the growth of trees and supported an abundance of native grasses and forbs in the understory. These woodlands ranged from open park-like woodlands on the highest, most exposed landscape positions to more closed woodlands in more dissected topography.

Loamy Upland Woodlands have a moderately tall canopy but are less dense than protected slopes and Chert Upland Woodlands. Increased light from the more open canopy causes a diversity of ground flora species to flourish. Native prairie grasses dominated the open understory, along with a diverse mix of native legumes, asters, sunflowers and other forbs

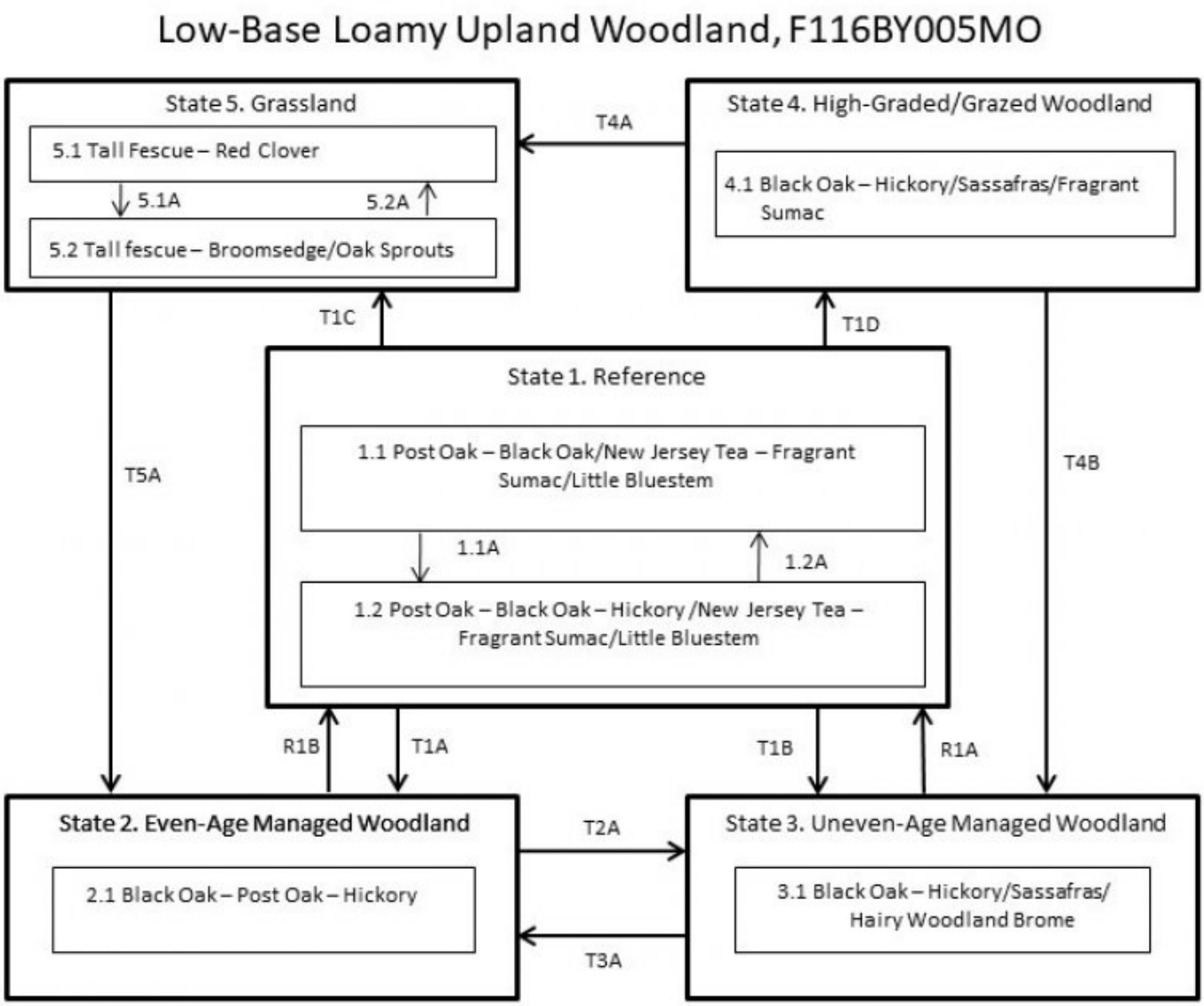
Today, dense, even age stands of oak have replaced much of this community. Most occurrences today exhibit canopy closure of 80 to 100 percent with a greatly diminished ground flora. In the long-term absence of fire, woody species, especially eastern redcedar and hickory have increased in these woodlands. Once established, these woodies can quickly fill the woodland system.

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

These sites are moderately productive. Some areas have been cleared for non-native pasture, but many areas have been repeatedly logged and high graded. However, in the absence of fire and continual management treatments, oak sprouting will be prevalent again shading out the sun-loving ground flora. Removal of the younger understory and the application of prescribed fire have proven to be effective management applications. These managed areas show an exceptional resiliency. This type of management may provide timber products, wildlife habitat, and potential native forage. 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.

* All plant common and scientific names in this document were obtained from the U.S. Department of Agriculture – Natural Resources Conservation Service National PLANTS Database.

State and transition model



Code	Event/Process
T1A	Fire suppression; even-aged management
T1B	Fire suppression; uneven-age management
T2B, T3B	Prescribed fire; clearing; pine planting
T1C, T4A	Clearing; pasture planting; grassland management
T1D	Poorly planned harvest; uncontrolled grazing
T2A	Uneven-age management
T3A	Even-age management
T5A	Tree planting; long-term succession; no grazing
T4B	Uneven-age management; tree planting

Code	Event/Process
1.1A	No disturbance (10+ years)
1.2A	Disturbance (fire, wind, ice) < 10 years
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; fire

Figure 11. State and Transition Model for this ecological site

State 1

Reference

The historical reference state for this ecological site was old growth oak woodland dominated by black oak and post 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. Quality reference sites are rare today.

Community 1.1
Post Oak – Black Oak/New Jersey Tea – Fragrant Sumac/Little Bluestem

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

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

Community 1.2
Post Oak – Black Oak – Hickory /New Jersey Tea – Fragrant Sumac/Little Bluestem

Pathway P1.1A
Community 1.1 to 1.2

No disturbance (10+ years)

Pathway P1.2A
Community 1.2 to 1.1

Disturbance (fire, wind, ice) < 10 years

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. 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.

Community 2.1
Black Oak – Post Oak – Hickory

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.

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

State 4
High-Graded/Grazed Woodland

Timbered 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 (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 cattle from sites in this state coupled with uneven-age management techniques will cause a transition to state 3. This state will be transitioned to a grassland state through clearing and grassland planting or to a pine plantation through clearing, tree planting and fire control.

Community 4.1
Black Oak - Hickory/Sassafras/Fragrant Sumac

State 5
Grassland

Conversion of woodlands to non-native cool season grassland species such as tall fescue has been common. Low available water, abundant surface fragments, low organic matter contents and soil acidity make non-native grasslands difficult to maintain in a healthy, productive state on this ecological site. Occasionally, these pastures will have scattered patches of oaks. If grazing and pasture management is discontinued, oak sprouts will occur, and the site will eventually transition to state 2. Forest stand improvement and tree planting practices can hasten this process.

Community 5.1
Tall Fescue - Broomsedge

Community 5.2
Tall fescue – Broomsedge/Oak Sprouts

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

Transition T1A
State 1 to 2

Even-aged management; fire suppression

Transition T1B
State 1 to 3

Fire suppression; uneven-age management

Transition T1D
State 1 to 4

Poorly planned harvest; uncontrolled grazing

Restoration pathway R1B
State 2 to 1

Forest management; extended rotations; prescribed fire

Transition T2A
State 2 to 3

Uneven-age management

Restoration pathway R1A
State 3 to 1

Prescribed fire; extended rotations

Transition T3A
State 3 to 2

Even-age management

Transition T4B
State 4 to 3

Uneven-age management; tree planting

Transition T4A
State 4 to 5

Clearing; pasture planting; grassland management

Transition T5A
State 5 to 2

Tree planting; long-term succession; no grazing

Additional community tables

Table 5. Community 1.1 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height (M)	Canopy Cover (%)	Diameter (Cm)	Basal Area (Square M/Hectare)
Tree							
post oak	QUST	*Quercus stellata*	Native	–	10–30	–	–
black oak	QUVE	*Quercus velutina*	Native	–	10–30	–	–
white oak	QUAL	*Quercus alba*	Native	–	10–30	–	–
black hickory	CATE9	*Carya texana*	Native	–	10–30	–	–
blackjack oak	QUMA3	*Quercus marilandica*	Native	–	10–30	–	–
shortleaf pine	PIEC2	*Pinus echinata*	Native	–	0–5	–	–

Table 6. Community 1.1 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (M)	Canopy Cover (%)
Grass/grass-like (Graminoids)					
little bluestem	SCSC	*Schizachyrium scoparium*	Native	–	5–20
big bluestem	ANGE	*Andropogon gerardii*	Native	–	5–20
roundseed panicgrass	DISP2	*Dichanthelium sphaerocarpon*	Native	–	5–20
slimleaf panicgrass	DILI2	*Dichanthelium linearifolium*	Native	–	5–20
poverty oatgrass	DASP2	*Danthonia spicata*	Native	–	5–20

reflexed sedge	CARE9	*Carex retroflexa*	Native	–	5–20
fuzzy wuzzy sedge	CAHI6	*Carex hirsutella*	Native	–	5–20
black edge sedge	CANI3	*Carex nigromarginata*	Native	–	5–20
Forb/Herb					
smooth small-leaf ticktrefoil	DEMA2	*Desmodium marilandicum*	Native	–	5–10
prostrate ticktrefoil	DERO3	*Desmodium rotundifolium*	Native	–	5–10
trailing lespedeza	LEPR	*Lespedeza procumbens*	Native	–	5–10
stiff ticktrefoil	DEOB5	*Desmodium obtusum*	Native	–	5–10
hairy lespedeza	LEHI2	*Lespedeza hirta*	Native	–	5–10
common dittany	CUOR	*Cunila origanoides*	Native	–	5–10
Virginia tephrosia	TEVI	*Tephrosia virginiana*	Native	–	5–10
white prairie clover	DACA7	*Dalea candida*	Native	–	5–10
hairy sunflower	HEHI2	*Helianthus hirsutus*	Native	–	5–10
elmleaf goldenrod	SOUL2	*Solidago ulmifolia*	Native	–	5–10
purple prairie clover	DAPU5	*Dalea purpurea*	Native	–	5–10
stiff tickseed	COPA10	*Coreopsis palmata*	Native	–	5–10
calico aster	SYLA4	*Symphyotrichum lateriflorum*	Native	–	5–10
late purple aster	SYPA11	*Symphyotrichum patens*	Native	–	5–10
smooth violet prairie aster	SYTU2	*Symphyotrichum turbinellum*	Native	–	5–10
Parlin's pussytoes	ANPA9	*Antennaria parlinii*	Native	–	5–10
tall blazing star	LIAS	*Liatris aspera*	Native	–	5–10
scaly blazing star	LISQ	*Liatris squarrosa*	Native	–	5–10
royal catchfly	SIRE2	*Silene regia*	Native	–	5–10
buffalo clover	TRRE2	*Trifolium reflexum*	Native	–	5–10
perplexed ticktrefoil	DEPE80	*Desmodium perplexum*	Native	–	5–10
longbract wild indigo	BABR2	*Baptisia bracteata*	Native	–	5–10
wild quinine	PAIN3	*Parthenium integrifolium*	Native	–	5–10
Shrub/Subshrub					
New Jersey tea	CEAM	*Ceanothus americanus*	Native	–	5–20
American hazelnut	COAM3	*Corylus americana*	Native	–	5–20
fragrant sumac	RHAR4	*Rhus aromatica*	Native	–	5–20
leadplant	AMCA6	*Amorpha canescens*	Native	–	5–20
Tree					
sassafras	SAAL5	*Sassafras albidum*	Native	–	10–20
farkleberry	VAAR	*Vaccinium arboreum*	Native	–	10–20
rusty blackhaw	VIRU	*Viburnum rufidulum*	Native	–	10–20
common serviceberry	AMAR3	*Amelanchier arborea*	Native	–	10–20

Table 7. Community 5.1 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height (M)	Canopy Cover (%)	Diameter (Cm)	Basal Area (Square M/Hectare)
Tree							
post oak	QUST	*Quercus stellata*	Native	–	10–30	–	–
black oak	QUVE	*Quercus velutina*	Native	–	10–30	–	–
white oak	QUAL	*Quercus alba*	Native	–	10–30	–	–
black hickory	CATE9	*Carya texana*	Native	–	10–30	–	–
blackjack oak	QUMA3	*Quercus marilandica*	Native	–	10–30	–	–
shortleaf pine	PIEC2	*Pinus echinata*	Native	–	0–5	–	–

Table 8. Community 5.1 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (M)	Canopy Cover (%)
Shrub/Subshrub					
fragrant sumac	RHAR4	*Rhus aromatica*	Native	–	5–20
leadplant	AMCA6	*Amorpha canescens*	Native	–	5–20
New Jersey tea	CEAM	*Ceanothus americanus*	Native	–	5–20
American hazelnut	COAM3	*Corylus americana*	Native	–	5–20
Tree					
sassafras	SAAL5	*Sassafras albidum*	Native	–	10–20
farkleberry	VAAR	*Vaccinium arboreum*	Native	–	10–20
rusty blackhaw	VIRU	*Viburnum rufidulum*	Native	–	10–20
common serviceberry	AMAR3	*Amelanchier arborea*	Native	–	10–20

Animal community

Wildlife (MDC 2006):
Numerous native legumes provide high-quality wildlife food; sedges and native cool-season grasses provide green browse.

Extensive 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 Woodlands are Carolina Chickadee, Great Crested Flycatcher, Pine Warbler, White-breasted Nuthatch, Cooper’s Hawk, Yellow-throated Warbler, Summer Tanager, Black-and-white Warbler, and Northern Bobwhite.

Reptile and amphibian species associated with Woodlands include ornate box turtle, northern fence lizard, five-lined skink, broad-headed skink, six-lined racerunner, rough earth snake, and timber rattlesnake.

Other information

Forestry (NRCS 2002; 2014):
Management: Field measured site index values average 56 for shortleaf pine and 59 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 small group selection cuttings of ½ to 1 acre are other options that can be used if clear cutting is not desired or warranted. Using prescribed fire as a management tool could have a negative impact on timber quality,

may not be fitting, or should be used with caution on a particular site if timber management is the primary objective.

Limitations: No major equipment restrictions or limitations exist. 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 Loamy Upland Woodland

No quality reference sites are known to exist

Concept of this ESD based on the 116A concept

Other references

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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	09/14/2020
Approved by	Nels Barrett
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

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

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

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

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

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

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

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

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

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant:

    Sub-dominant:

    Other:

    Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

14. **Average percent litter cover (%) and depth (in):**

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

17. **Perennial plant reproductive capability:**