

## Ecological site R116BY027MO Wet Footslope Prairie

Last updated: 10/07/2020  
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.

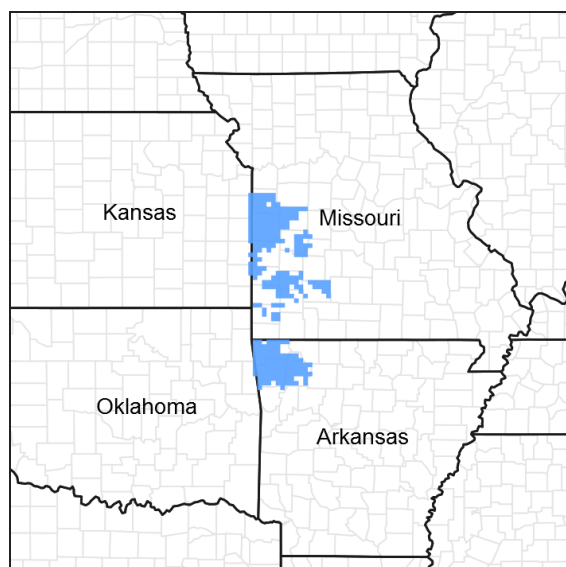


Figure 1. Mapped extent

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 Wet-Mesic Bottomland Prairie.

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

The reference state for this ecological site is most similar to *Andropogon gerardii* - *Panicum virgatum* - *Helianthus grosseserratus* Herbaceous Vegetation (CEGL002024).

Geographic relationship to the Missouri Ecological Classification System (Nigh & Schroeder, 2002):

This ecological site occurs primarily within the following Land Type Associations:

Lamar Smooth Prairie Plain  
Lockwood Smooth Prairie Plain  
Springfield Karst Prairie Plain  
Little 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”.

Wet Footslope Prairies occur on footslopes throughout the Springfield Plain. Particularly in the western counties, and adjacent areas in the Cherokee Prairie. Soils are very deep, with clayey subsoils and seasonal high water tables. The reference plant community is prairie dominated by a dense cover of wetland species, including prairie cordgrass, sedge, and wet-tolerant forbs.

## Associated sites

R116BY020MO	<b>Claypan Summit Prairie</b> Claypan Summit Prairies are upslope in broad prairie landscapes with low relief.
R116BY021MO	<b>Chert Upland Prairie</b> Chert Upland Prairies are upslope, on gently sloping backslopes.
R116BY022MO	<b>Loamy Upland Prairie</b> Loamy Upland Prairies are upslope, on broad convex upland prairie landscapes.

## Similar sites

R116BY027MO	<b>Wet Footslope Prairie</b> There are no similar sites to Wet Footslope Prairies in this MLRA.
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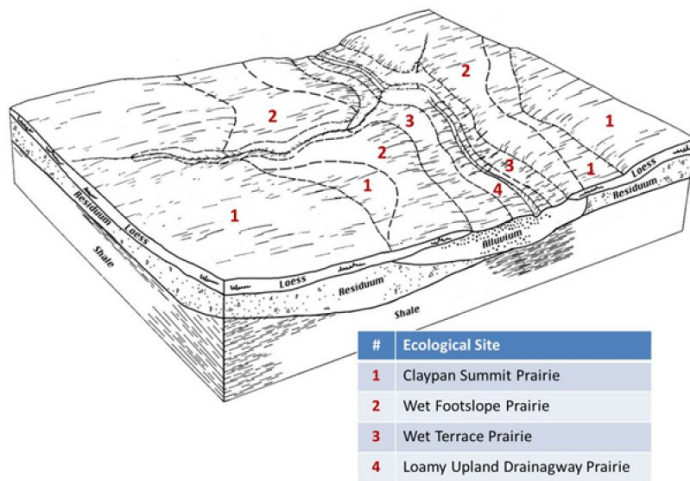
Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Salix humilis</i>
Herbaceous	(1) <i>Panicum virgatum</i> (2) <i>Andropogon gerardii</i>

## Physiographic features

This site is on footslopes, stream terraces, and/or terrace flats with slopes of 0 to 3 percent. The site receives runoff from adjacent upland sites. A few areas are subject to rare flooding.

The following figure (adapted from Peer, 2004) shows the typical landscape position of this ecological site, and landscape relationships with other ecological sites. It is within the area labeled “2” on the figure, shown here on footslopes. The area shown in the figure is near the Cherokee Prairies (MLRA 112), where Claypan Summit Prairie sites, labeled “1”, are often directly upslope from Wet Footslope sites. The dashed lines within the Claypan Summit Prairie area indicate the various soils included in that ecological site.



**Figure 2. Landscape relationships for this ecological site.**

**Table 2. Representative physiographic features**

Landforms	(1) Stream terrace (2) Paleoterrace
Flooding duration	Brief (2 to 7 days)
Flooding frequency	None to rare
Ponding frequency	None
Slope	0–3%
Water table depth	15–76 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)	149-167 days
Freeze-free period (characteristic range)	185-191 days
Precipitation total (characteristic range)	1,168-1,219 mm
Frost-free period (actual range)	143-169 days
Freeze-free period (actual range)	182-192 days
Precipitation total (actual range)	1,168-1,219 mm
Frost-free period (average)	158 days
Freeze-free period (average)	188 days
Precipitation total (average)	1,194 mm

## Climate stations used

- (1) NEOSHO [USC00235976], Neosho, MO
- (2) LOCKWOOD [USC00235027], Lockwood, MO
- (3) SPRINGFIELD [USW00013995], Springfield, MO

## Influencing water features

This ecological site is influenced by a seasonal high water table from high groundwater levels, as well as slow hydraulic conductivity, which impedes throughflow from precipitation and flood events. The water table is typically near the surface in late fall through spring, receding in the summer.

This ecological site is on footslopes, and on stream terraces of perennial streams. They are not adjacent to the current stream channel. Areas on stream terraces are subject to flooding, typically of short duration and low intensity. Constructed levees, often accompanied by stream channelization, have altered the flooding dynamics in many places.

Footslopes, and stream terraces not subject to flooding, are in the MINERAL SOIL FLAT wetlands of the Hydrogeomorphic (HGM) classification system class (Brinson, 1993). Sites on stream terraces subject to flooding are in the RIVERINE wetlands class. Both footslope and stream terrace sites are Emergent Palustrine wetlands (Cowardin et al., 1979).

## Soil features

Some of these soils have an abrupt textural change rooting restriction. The soils were formed under prairie vegetation, and have dark, organic-rich surface horizons. Parent material is alluvium on stream terraces, paleoterraces, and colluviums on footslopes. Some soils are underlain by shale residuum, and some soils have a loess surface layer. They have silt loam or silty clay loam surface horizons, and clayey subsoils. They are affected by a seasonal high water table during the spring months. Soil series associated with this site include Carytown, Cherokee, Parsons, Sacville, Summit, and Woodson.

The accompanying picture of the Cherokee series shows a dark silt loam surface horizon over a thin, light-colored leached layer called an albic horizon, at about one foot. Below this is the claypan, a clay horizon that impedes water movement and root penetration. Indicators of seasonal wetness (redoximorphic features) are visible in the picture at about three feet. Picture from Peer (2004).



**Figure 9. Cherokee series**

**Table 4. Representative soil features**

Parent material	(1) Alluvium (2) Colluvium
Surface texture	(1) Silt loam (2) Silty clay loam
Family particle size	(1) Clayey
Drainage class	Somewhat poorly drained to poorly drained
Permeability class	Very slow
Soil depth	183 cm
Surface fragment cover <=3"	0–4%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	12.7–15.24 cm
Calcium carbonate equivalent (0-101.6cm)	0%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–15
Soil reaction (1:1 water) (0-101.6cm)	4.5–7.8
Subsurface fragment volume <=3" (Depth not specified)	0–5%
Subsurface fragment volume >3" (Depth not specified)	0–5%

## 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.

Wet Foothill Prairie ecological sites exist because of their association with wet, poorly drained conditions. These conditions along with periodic fire had a strong influence on excluding trees. Wet Foothill Prairies are dominated by a dense cover of wet tolerant grasses and forbs. On slightly higher areas within or at the edge of the prairie matrix scattered bur oak, pin oak, shellbark hickory and willow occurred amid the grass-dominated landscape. These seasonally wet sites are on relatively stable terraces, former floodplain positions that rarely flood, probably once every 25 or so years. In addition to site wetness, periodic fire also played a role in keeping woody species at bay, likely occurring at least once every 3 years. Fire during dry periods removed the dense mat of leaf litter creating opportunities for plants less aggressive than the grasses and sedges.

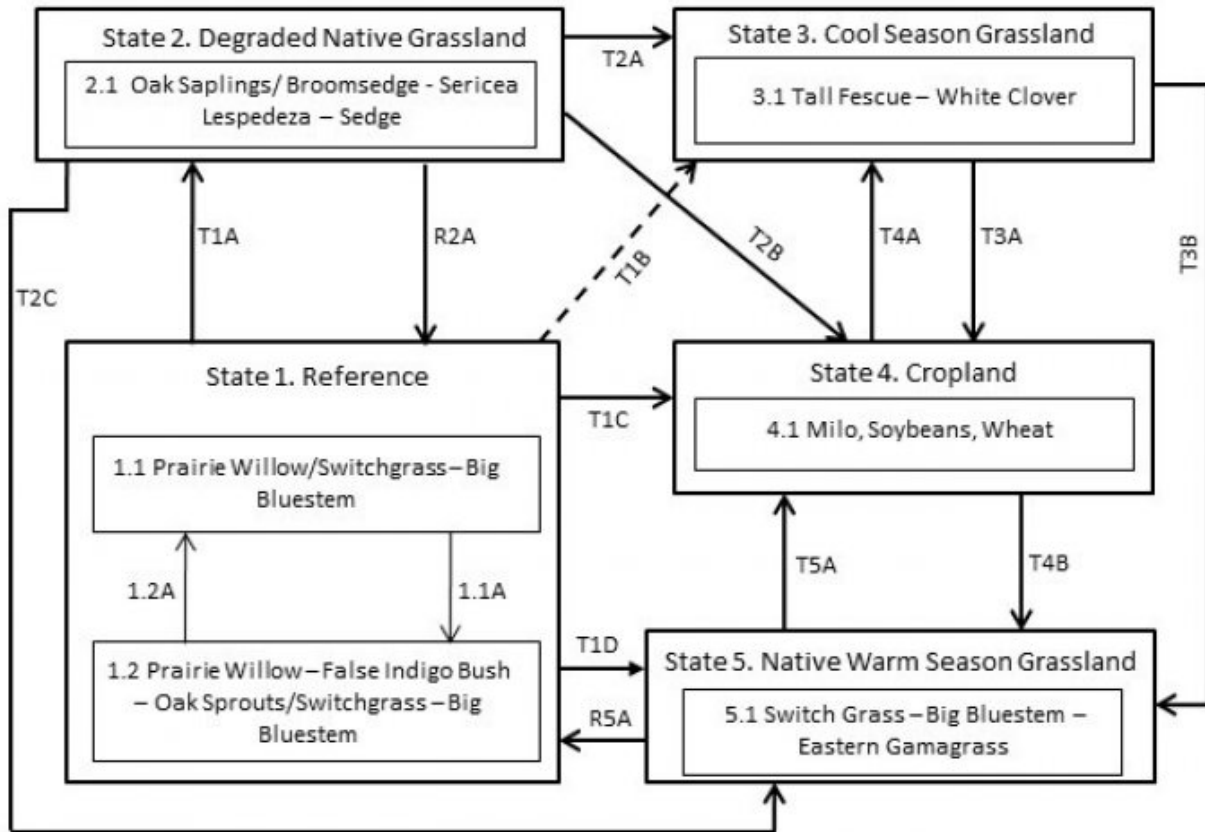
Wet Foothill Prairies were also subjected to grazing by native large herbivores, such as bison, elk, and white-tailed deer. Grazing by native herbivores would have effectively kept understory conditions open, creating conditions more favorable to ground flora species and minimizing woody trees and shrubs.

Today most of these ecological sites have been drained and farmed. Only a few quality remnants exist. However, during wet years, they do act as ephemeral farmed wetlands in the agricultural landscape. While their flood regime usually has been altered, their position and soil properties still make them good candidates for wet prairie and savanna development management.

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**

## Wet Footslope Prairie, R116BY027MO



Code	Event/Activity/Process
T1A	Fire suppression > 10 years; woody invasion; domestic grazing
T1B	Tillage; vegetative seeding; grassland management
T1C, T3A, T5A	Tillage; conservation cropping system
T1D	Prescribed grazing; prescribed fire
T2A	Woody removal; tillage; vegetative seeding; grassland management
T2B	Woody removal; tillage; conservation cropping system
T2C	Woody removal; grassland management; prescribed fire
T4A	Vegetative seeding; grassland management
T3B, T4B	Vegetative seeding; prescribed fire; grassland management
1.1A	Fire-free interval 5-10 years
1.2A	Fire interval 1-3 years
R2A	Woody removal; prescribed fire 1-3 years; limited grazing
R5A	Vegetative seeding; prescribed fire 1-3 years

Figure 10. STM for this ecological site

### State 1

## Reference

This state is a native prairie dominated by switchgrass, big bluestem and forbs along with numerous shrubs and occasional, widely scattered trees such as pin oak and bur oak. Two phases can occur that will transition back and forth depending on fire frequencies. Longer fire free intervals will allow woody species to increase such as pin oak and bur oak. When fire intervals shorten these woody species will decrease. This undisturbed state is uncommon but some excellent examples still exist. Most sites, however, have been converted to cool season grasslands, cropland, or degraded by domestic grazing.

## Community 1.1

### Prairie Willow/Switchgrass – Big Bluestem



**Forest understory.** The Forest Understory species list is based on reconnaissance-level plots, as well as commonly occurring species listed in Nelson (2010). Species identified from plot data include cover percentages. Species not found in plots, but listed in Nelson, do not include cover percentages. Names and symbols are from the USDA PLANTS database.

## Community 1.2

### Prairie Willow – False Indigo Bush – Oak Sprouts/Switchgrass – Big Bluestem

#### Pathway P1.1A

##### Community 1.1 to 1.2

Fire-free interval 5-10 years

#### Pathway P1.2A

##### Community 1.2 to 1.1

Fire interval 1-3 years

## State 2

### Degraded Native Grassland

Reference states that have experienced fire suppression for 20 or more years and heavy domestic grazing will transition to this state. With fire suppression, woody species such as pin oak and bur oak will begin to increase transitioning this state from a prairie to a degraded woody invaded state. Native ground cover will also decrease and invasive species such as tall fescue, broomsedge and sericea lespedeza may begin to dominate. Transition to cool season grasslands (State 3) or cropland (State 4) is very common. Transition back to a reference state may be difficult if fire suppression and other disturbances have been long term. It may be easier to move to a re-established native warm season grassland and then over time move back to a reference state.

### Dominant resource concerns

- Plant productivity and health



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

## **Community 2.1**

### **Oak Saplings/ Broomsedge - Sericea Lespedeza – Sedge**

## **State 3**

### **Cool Season Grassland**

Conversion of other states to non-native cool season species such as tall fescue and white clover has been common in this area. Occasionally, these pastures will have a few scattered oaks. Long term uncontrolled grazing can cause significant soil erosion and compaction. A return to the reference state may require a very long series of management options.

#### **Dominant resource concerns**

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

## **Community 3.1**

### **Tall Fescue – White Clover**

## **State 4**

### **Cropland**

This is a common state that currently exists in the region with soybeans, milo, wheat, and hay land production occurring. Some conversion to cool season grassland occurs for a limited period of time before transitioning back to cropland. Limited acres are sometimes converted to native warm season grassland.

#### **Dominant resource concerns**

- Sheet and rill erosion
- Ephemeral gully erosion
- Organic matter depletion
- Plant structure and composition
- Plant pest pressure
- Terrestrial habitat for wildlife and invertebrates
- Energy efficiency of farming/ranching practices and field operations

## **Community 4.1**

### **Milo, Soybeans, Wheat**

## **State 5**

### **Native Warm Season Grassland**

Conversion from Cool Season Grassland (State 3) or the Cropland (State 4) to this State is increasing due to renewed interest in warm season grasses as a supplement to cool season grazing systems or as a native restoration activity. This state, once established, can be transformed back to a Reference State. Substantial restoration time and management inputs will still be needed.

#### **Dominant resource concerns**

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

## **Community 5.1**

## **Switch Grass – Big Bluestem – Eastern Gamagrass**

### **Transition T1A**

#### **State 1 to 2**

Fire suppression > 10 years; woody invasion; domestic grazing

### **Transition T1B**

#### **State 1 to 3**

Tillage; vegetative seeding; grassland management

### **Transition T1C**

#### **State 1 to 4**

Tillage; conservation cropping system

### **Transition T1D**

#### **State 1 to 5**

Prescribed grazing; prescribed fire

### **Restoration pathway R2A**

#### **State 2 to 1**

Woody removal; prescribed fire 1-3 years; limited grazing

### **Transition T2B**

#### **State 2 to 4**

Woody removal; tillage; conservation cropping system

### **Transition T2C**

#### **State 2 to 5**

Woody removal; grassland management; prescribed fire

### **Transition T3A**

#### **State 3 to 4**

Tillage; conservation cropping system

### **Transition T3B**

#### **State 3 to 5**

Vegetative seeding; prescribed fire; grassland management

### **Restoration pathway T4A**

#### **State 4 to 3**

Vegetative seeding ; grassland management

### **Restoration pathway R5A**

#### **State 5 to 1**

Vegetative seeding; prescribed fire 1-3 years

## 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)
<b>Tree</b>							
shellbark hickory	CALA21	<i>Carya laciniosa</i>	Native	–	0–5	–	–
pin oak	QUPA2	<i>Quercus palustris</i>	Native	–	0–5	–	–
bur oak	QUMA2	<i>Quercus macrocarpa</i>	Native	–	0–5	–	–

Table 6. Community 1.1 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (M)	Canopy Cover (%)
<b>Grass/grass-like (Graminoids)</b>					
big bluestem	ANGE	<i>Andropogon gerardii</i>	Native	–	–
switchgrass	PAVI2	<i>Panicum virgatum</i>	Native	–	–
little bluestem	SCSC	<i>Schizachyrium scoparium</i>	Native	–	–
prairie dropseed	SPHE	<i>Sporobolus heterolepis</i>	Native	–	–
Indiangrass	SONU2	<i>Sorghastrum nutans</i>	Native	–	–
prairie cordgrass	SPPE	<i>Spartina pectinata</i>	Native	–	–
sedge	CAREX	<i>Carex</i>	Native	–	–
bluejoint	CACA4	<i>Calamagrostis canadensis</i>	Native	–	–
eastern gamagrass	TRDA3	<i>Tripsacum dactyloides</i>	Native	–	–
ravenfoot sedge	CACR8	<i>Carex crus-corvi</i>	Native	–	–
awlfruit sedge	CAST5	<i>Carex stipata</i>	Native	–	–
Oklahoma sedge	CAOK	<i>Carex oklahomensis</i>	Native	–	–
<b>Forb/Herb</b>					
ashy sunflower	HEMO2	<i>Helianthus mollis</i>	Native	–	–
prairie milkweed	ASSU3	<i>Asclepias sullivantii</i>	Native	–	–
white heath aster	SYER	<i>Symphyotrichum ericoides</i>	Native	–	–
slender lespedeza	LEVI7	<i>Lespedeza virginica</i>	Native	–	–
Texas goldentop	EUGY	<i>Euthamia gymnospermoides</i>	Native	–	–
Illinois bundleflower	DEIL	<i>Desmanthus illinoensis</i>	Native	–	–
blackeyed Susan	RUHI2	<i>Rudbeckia hirta</i>	Native	–	–
fringeleaf wild petunia	RUHU	<i>Ruellia humilis</i>	Native	–	–
Missouri goldenrod	SOMI2	<i>Solidago missouriensis</i>	Native	–	–
skyblue aster	SYOO	<i>Symphyotrichum oolentangiense</i>	Native	–	–
Arkansas ironweed	VEAR3	<i>Vernonia arkansana</i>	Native	–	–
white wild indigo	BAAL	<i>Baptisia alba</i>	Native	–	–
white prairie clover	DACA7	<i>Dalea candida</i>	Native	–	–
grooved flax	LISU4	<i>Linum sulcatum</i>	Native	–	–
narrowleaf mountainmint	PYTE	<i>Pycnanthemum tenuifolium</i>	Native	–	–
roundhead lespedeza	LECA8	<i>Lespedeza capitata</i>	Native	–	–
common sneezeweed	HEAU	<i>Helenium autumnale</i>	Native	–	–
prairie blazing star	LIPY	<i>Liatris pycnostachya</i>	Native	–	–

bluejacket	TROH	<i>Tradescantia ohiensis</i>	Native	–	–
sessileleaf ticktrefoil	DESE	<i>Desmodium sessilifolium</i>	Native	–	–
groovestem Indian plantain	ARPL4	<i>Arnoglossum plantagineum</i>	Native	–	–
Virginia bunchflower	VEVI5	<i>Veratrum virginicum</i>	Native	–	–
lanceleaf loosestrife	LYLA	<i>Lysimachia lanceolata</i>	Native	–	–
foxtongue beardtongue	PEDI	<i>Penstemon digitalis</i>	Native	–	–
button eryngo	ERYU	<i>Eryngium yuccifolium</i>	Native	–	–
Culver's root	VEVI4	<i>Veronicastrum virginicum</i>	Native	–	–
slender sunflower	HEGR3	<i>Helianthus gracilentus</i>	Native	–	–
purple meadow-rue	THDA	<i>Thalictrum dasycarpum</i>	Native	–	–
stiff cowbane	OXRI	<i>Oxypolis rigidior</i>	Native	–	–
common boneset	EUPE3	<i>Eupatorium perfoliatum</i>	Native	–	–
obedient plant	PHVI8	<i>Physostegia virginiana</i>	Native	–	–
Canada germander	TECA3	<i>Teucrium canadense</i>	Native	–	–
Allegheny monkeyflower	MIRI	<i>Mimulus ringens</i>	Native	–	–
golden zizia	ZIAU	<i>Zizia aurea</i>	Native	–	–
fourflower yellow loosestrife	LYQU	<i>Lysimachia quadriflora</i>	Native	–	–
sweet coneflower	RUSU	<i>Rudbeckia subtomentosa</i>	Native	–	–
spotted water hemlock	CIMA2	<i>Cicuta maculata</i>	Native	–	–
seedbox	LUAL2	<i>Ludwigia alternifolia</i>	Native	–	–
compassplant	SILA3	<i>Silphium laciniatum</i>	Native	–	–
velvetbells	BAAL4	<i>Bartsia alpina</i>	Native	–	–
Canadian lousewort	PECA	<i>Pedicularis canadensis</i>	Native	–	–
winged lythrum	LYAL4	<i>Lythrum alatum</i>	Native	–	–
<b>Shrub/Subshrub</b>					
Carolina rose	ROCA4	<i>Rosa carolina</i>	Native	–	–
prairie willow	SAHU2	<i>Salix humilis</i>	Native	–	–
false indigo bush	AMFR	<i>Amorpha fruticosa</i>	Native	–	–

## Animal community

### Wildlife

Game species that utilize this ecological site include:

White-tailed Deer will utilize this ecological site for browse (plant leaves in the growing season, seeds and soft mast in the fall/winter). This site type also can provide escape cover.

Migratory Waterbirds: Sora, Common Snipe

Furbearers: Muskrat, Beaver, and Mink.

Bird species associated with this ecological site's reference state condition:

Breeding birds: Red-Winged Blackbird, Least Bittern, and Common Yellowthroat.

Migratory birds: Sora, Sedge Wren, Least Bittern, Yellow Rail and Common Snipe.

Amphibian and reptile species associated with this ecological site's reference state condition: Western Chorus Frog (*Pseudacris triseriata triseriata*), Southern Leopard Frog (*Rana sphenoccephala*), Midland Brown Snake (*Storeria dekayi wrightorum*), and prairies with crawfish burrows may have Northern Crawfish Frog (*Rana areolata circulosa*).

Small mammals associated with this ecological site's reference state condition: Muskrat (*Ondatra zibethicus*), Southern Bog Lemming (*Synaptomys cooperi*), and Mink (*Mustela vison*).

Many native insect species are likely associated with this ecological site, especially native bees, ants, beetles, butterflies and moths, and crickets, grasshoppers and katydids. However information on these groups is often lacking enough resolution to assign them to individual ecological sites.

Insect species known to be associated with this ecological site's reference state condition: Swamp Milkweed Leaf Beetle (*Labidomera clivicollis*), Cordgrass Planthopper (*Prokelisia crocea*), Dion Skipper butterfly (*Euphyes dion*), Duke's Skipper butterfly (*Euphyes dukesi*), native bees (*Lasioglossum hartii*, *Hesperapis carinata*, *Svastra atripes* and *Cemolobus ipomoeae*), Bullate Meadow katydid (*Orchelimum bullatum*) and Sedge Grasshopper (*Stethophyma celatum*).

Other invertebrates: Grassland Crayfish (*Procambarus gracilis*)

(This section prepared by Mike Leahy, Natural Areas Coordinator, Missouri Department of Conservation, 2013. References for this section: Fitzgerald and Pashley 2000b; Heitzman and Heitzman 1996; Jacobs 2001; Johnson 2000; Pitts and McGuire 2000; Schwartz and others 2001)

## Other information

### Forestry

Management: This ecological site is not recommended for traditional timber management activity. Historically this site was dominated by a ground cover of native prairie grasses and forbs. Some scattered open grown trees may have also been present. Altered sites may be suitable for non-traditional forestry uses such as windbreaks, environmental plantings, alley cropping (a method of planting, in which rows of trees or shrubs are interspersed with rows of crops) or woody bio-fuels.

## Inventory data references

Potential Reference Sites: Wet Footslope Prairie

Plot COMENC03 - Parsons soil

Cook Meadow (Nature Conservancy), Barton County, MO

Latitude: 37.41753

Longitude: -94.130978

Plot COMENC05 – Sacville soil

Cook Meadow (Nature Conservancy), Barton County, MO

Latitude: 37.418087

Longitude: -94.130776

Plot COMENC06 - Summit soil

Cook Meadow (Nature Conservancy), Barton County, MO

Latitude: 37.415683

Longitude: -94.129003

Plot GOPRPF02 - Summit soil

Golden Prairie (Missouri Prairie Foundation), Barton County, MO

Latitude: 37.3542222

Longitude: - 94.151639

## Other references

Anderson, R.C. 1990. The historic role of fire in North American grasslands. Pp. 8-18 in S.L. Collins and L.L. Wallace (eds.). Fire in North American tallgrass prairies. University of Oklahoma Press, Norman.

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## Contributors

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## Approval

Nels Barrett, 10/07/2020

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## Rangeland health reference sheet

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

Author(s)/participant(s)	
Contact for lead author	
Date	10/06/2020
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):**
- 
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:**
-