

# Ecological site R116BY020MO Claypan Summit Prairie

Last updated: 10/07/2020  
Accessed: 05/06/2024

## 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 Hardpan Prairie.

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

The reference state for this ecological site is most similar to *Schizachyrium scoparium* - *Bouteloua curtipendula* - *Agrostis hyemalis* - *Eleocharis* spp. Hardpan Herbaceous Vegetation (CEGL002249).

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

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

Spring River Prairie/Savanna Dissected Plain  
 Springfield Karst Prairie Plain  
 Buffalo Prairie/Savanna Plain

## 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”.

Claypan Summit Prairies occur on the broad nearly level surface of the Springfield Plain, primarily in the west on interfluves above Spring River and Shoal Creek. Soils have root-restricting fragipans and seasonal perched water tables. The reference plant community is prairie dominated by Indiangrass, big bluestem, little bluestem and sideoats grama, with a wide variety of prairie wildflowers and wet-tolerant sedges.

## Associated sites

R116BY021MO	<b>Chert Upland Prairie</b> Chert Upland Prairies are downslope, on shoulders and upper backslopes.
R116BY022MO	<b>Loamy Upland Prairie</b> Loamy Upland Prairies are on convex summits and shoulders.

## Similar sites

R116BY021MO	<b>Chert Upland Prairie</b> Chert Upland Prairies are downslope, on shoulders and upper backslopes from Claypan Prairies but have similar species composition and in some cases have a fragipan. These sites are usually drier and less productive.
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Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Amorpha canescens</i> (2) <i>Rosa carolina</i>
Herbaceous	(1) <i>Schizachyrium scoparium</i> (2) <i>Andropogon gerardii</i>

## Physiographic features

This site is on broad upland summit interfluves and divides, with slopes of 0 to 2 percent. The site generates runoff to adjacent, downslope ecological sites. This site does not flood.

The following figure (adapted from Aldrich, 1989) shows the typical landscape position of this ecological site, and landscape relationships with other ecological sites. It is within the area labeled “1” on the figure, on broad summits. Chert Upland Prairie sites, labeled “2”, are typically downslope.

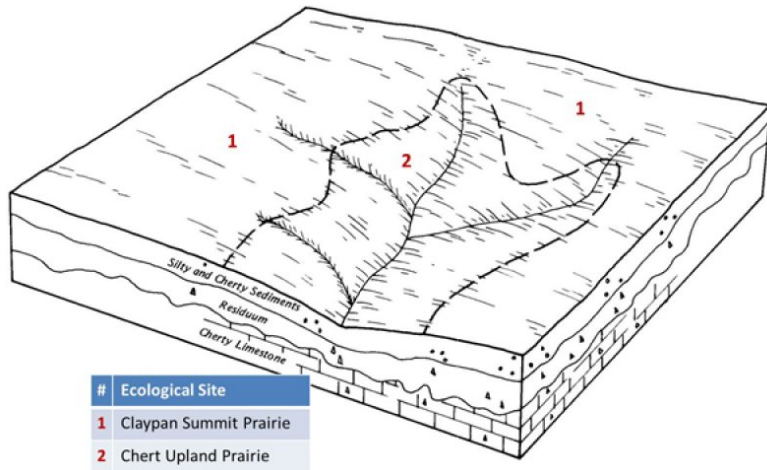


Figure 2. Landscape relationships for this ecological site.

Table 2. Representative physiographic features

Landforms	(1) Interfluve (2) Divide
Flooding frequency	None
Ponding frequency	None to occasional
Slope	0–2%
Water table depth	46–76 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)	151-163 days
Freeze-free period (characteristic range)	182-188 days
Precipitation total (characteristic range)	1,168 mm
Frost-free period (actual range)	145-163 days
Freeze-free period (actual range)	180-189 days
Precipitation total (actual range)	1,168 mm
Frost-free period (average)	156 days
Freeze-free period (average)	185 days
Precipitation total (average)	1,168 mm

### Climate stations used

- (1) DIAMOND 2W [USC00232240], Diamond, MO
- (2) MT VERNON M U SW CTR [USC00235862], Mount Vernon, MO
- (3) SPRINGFIELD [USW00013995], Springfield, MO

### Influencing water features

This ecological site is influenced by a seasonal high water table, perched on the clayey subsoil and underlying fragipan. Some depressional areas pond for short periods of time, mostly in the spring. These shallow depressional areas were more common prior to the conversion of nearly all areas of this ecological site from prairie to cropland. Leveling and surface drainage have reduced or eliminated the shallow depressions. These areas were Emergent Palustrine wetlands (Cowardin et al., 1979).

This ecological site contains wetlands which fit into the MINERAL FLAT class in the Hydrogeomorphic (HGM) system (Brinson, 1993). The water source is direct precipitation, because there are no upslope contributing sites. Vertical water percolation in the soil is impeded by the clayey subsoil (the "claypan"), resulting in significant lateral discharge to adjacent downslope ecological sites.

### Soil features

These soils have a root-restricting fragipan at about 24 inches, below the claypan subsoil. The soils were formed under prairie vegetation, and have dark, organic-rich surface horizons. They have silt loam surface horizons, and silty clay subsoils above the fragipan. Parent material is loess in the upper part, underlain with residuum. A seasonal high water table is perched above the fragipan during the spring months in most years. Soil series associated with this site include Gerald.

The accompanying picture of the Gerald series shows a dark silt loam surface horizon over a light-colored leached layer called an albic horizon. Below this is a brown silty clay subsoil, underlain by a fragipan in the lower part of the picture. Both the fragipan and the clayey subsoil impede water movement and root penetration.



Figure 9. Gerald series

Table 4. Representative soil features

Parent material	(1) Residuum—cherty limestone (2) Loess (3) Colluvium
Surface texture	(1) Silt loam
Family particle size	(1) Clayey
Drainage class	Somewhat poorly drained
Permeability class	Very slow
Soil depth	183 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	15.24–17.78 cm
Calcium carbonate equivalent (0-101.6cm)	0%
Electrical conductivity (0-101.6cm)	0 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)	0–15%
Subsurface fragment volume >3" (Depth not specified)	0–15%

## Ecological dynamics

Information contained in this section was developed using historical data, professional experience, field reviews, and scientific studies. The information presented is representative of very complex vegetation communities. Key indicator plants, animals and ecological processes are described to help inform land management decisions. Plant communities will differ across the MLRA because of the naturally occurring variability in weather, soils, and aspect. The Reference Plant Community is not necessarily the management goal. The species lists are representative and are not botanical descriptions of all species occurring, or potentially occurring, on this site. They are not intended to cover every situation or the full range of conditions, species, and responses for the site.

Claypan Summit Prairies were dominated by tallgrass native prairie grasses and forbs, but also had a substantial component of wet tolerant sedges. This expanse of grass occurred on upland summit interfluvies and divides and was interrupted by shallow drainages whose wetness lessened the influence frequent, intense fires. Here the prairie transitioned into shrubby thickets and savannas with scattered trees. Leadplant and New Jersey tea were typical low growing shrubs that occurred over the site. Unlike most shrubs, these plants are both quite tolerant to fire. Islands of other shrubs such as dogwood, redroot, coralberry and Carolina rose were also found on the site.

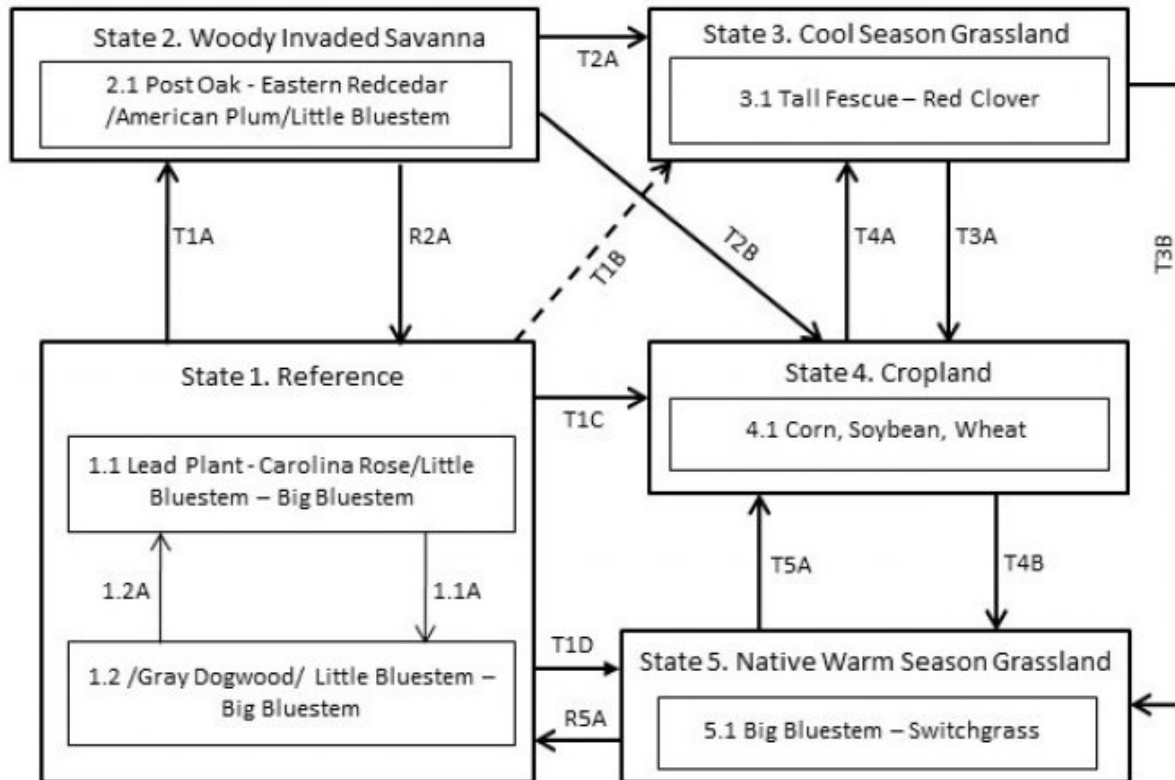
With little to interrupt fire, this ecological site burned every 1 to 3 years. Fire removed dead plant litter and provided room for a lush growth of prairie vegetation. Fire also kept woody species at bay. During fire free intervals woody species would have increased in abundance and spread out onto the prairie. Grazing by native large herbivores, such as bison, elk, and white-tailed deer, also impacted these sites. Their activities would have altered composition and structure of the vegetation. Fuel loads would have been altered by heavy grazing and fire behavior affected, providing for a diversity of structure and composition. The partially wooded draws would have burned less intensely and frequently.

Today, Claypan Summit Prairies are nearly extirpated from the region as the former prairies have been converted to intensive agriculture. Few known remnants exist and are degraded by fire suppression and grazing by domestic livestock.

A state-and-transition model 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 may change as knowledge increases.

## **State and transition model**

## Claypan Summit Prairie, R116BY020MO



Code	Event/Activity/Process
T1A	Fire suppression > 20 years; woody invasion
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
T4A	Vegetative seeding; grassland management
T3B, T4B	Vegetative seeding; prescribed fire; grassland management
1.1A	Fire-free interval 10+ years
1.2A	Fire interval 1-3 years
R2A	Woody removal; prescribed fire 1-3 years
R5A	Vegetative seeding; prescribed fire 1-3 years

Figure 10. State and transition diagram for this ecological site

### State 1

## Reference

This state is native tall grass prairie dominated by little bluestem, big bluestem and forbs, but also a substantial component of wet tolerant sedges. This state occurs on level to gently sloping soils that have a seasonal high water table that is perched above the abrupt textural change or clayey subsoil during the spring months in most years. This condition influences the species composition and site productivity. 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 gray dogwood and eastern redcedar. When fire intervals shorten these woody species will decrease. This state is extremely rare. Nearly all remaining sites have been converted to cool season grassland, cropland, or have been degraded through uncontrolled domestic livestock grazing.

## Community 1.1

### Lead Plant - Carolina Rose/Little Bluestem - Big Bluestem



**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.

#### Dominant resource concerns

- Seasonal high water table

## Community 1.2

### Gray Dogwood/Little Bluestem - Big Bluestem

#### Dominant resource concerns

- Seasonal high water table

## Pathway P1.1A

### Community 1.1 to 1.2

Fire-free interval 10+ years

## Pathway P1.2A

### Community 1.2 to 1.1

Fire interval 1-3 years

## State 2

### Woody Invaded Savanna

Degraded reference states that have experienced fire suppression for 20 or more years will transition to this state. With fire suppression, woody species such as elm and eastern redcedar will begin to dominate transitioning this state from a prairie to a Woody Invaded Savanna. Native ground cover will also decrease and invasive species such



as tall fescue may begin to dominate. Transition to cool season grasslands (State 3) or intensive cropland (State 4) is very common.

#### **Dominant resource concerns**

- Seasonal high water table
- Plant productivity and health
- Plant structure and composition
- Terrestrial habitat for wildlife and invertebrates

### **Community 2.1**

#### **Post Oak - Eastern Redcedar/American Plum/Little Bluestem**

#### **State 3**

##### **Cool Season Grassland**

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

#### **Dominant resource concerns**

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

### **Community 3.1**

#### **Tall Fescue - Red Clover**

#### **State 4**

##### **Cropland**

This is the dominant state that exists currently with intensive cropping of corn, soybeans, and wheat 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.

### **Community 4.1**

#### **Corn, Soybean, Wheat**

#### **State 5**

##### **Native Warm Season Grassland**

Conversion from the 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 is the most easily transformable state back to a reference state. Substantial restoration time and management inputs will still be needed.

#### **Dominant resource concerns**

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

### **Community 5.1**

#### **Big Bluestem - Switchgrass**

#### **Transition T1A**

## **State 1 to 2**

Fire suppression > 20 years; woody invasion

## **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

## **Transition T2A**

### **State 2 to 3**

Woody removal; tillage; vegetative seeding; grassland management

## **Transition T2B**

### **State 2 to 4**

Woody removal; tillage; conservation cropping system

## **Transition T3A**

### **State 3 to 4**

Tillage; conservation cropping system

## **Transition T4A**

### **State 4 to 3**

Vegetative seeding ; grassland management

## **Transition T4B**

### **State 4 to 5**

Vegetative seeding; prescribed fire; grassland management

## **Restoration pathway R5A**

### **State 5 to 1**

Vegetative seeding; prescribed fire 1-3 years; limited grazing

## **Transition T5A**

### **State 5 to 4**

Tillage; conservation cropping system

## **Additional community tables**

**Table 5. 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	–	5–20
little bluestem	SCSC	<i>Schizachyrium scoparium</i>	Native	–	5–20
Indiangrass	SONU2	<i>Sorghastrum nutans</i>	Native	–	5–20
eastern gamagrass	TRDA3	<i>Tripsacum dactyloides</i>	Native	–	5–10
porcupinegrass	HESP11	<i>Hesperostipa spartea</i>	Native	–	5–10
Bush's sedge	CABU5	<i>Carex bushii</i>	Native	–	5–10
winter bentgrass	AGHY	<i>Agrostis hyemalis</i>	Native	–	5–10
Mead's sedge	CAME2	<i>Carex meadii</i>	Native	–	5–10
whip nutrush	SCTR	<i>Scleria triglomerata</i>	Native	–	5–10
tapered rosette grass	DIAC2	<i>Dichanthelium acuminatum</i>	Native	–	5–10
spikerush	ELEOC	<i>Eleocharis</i>	Native	–	5–10
inland rush	JUIN2	<i>Juncus interior</i>	Native	–	5–10
switchgrass	PAVI2	<i>Panicum virgatum</i>	Native	–	5–10
globe beaksedge	RHRE8	<i>Rhynchospora recognita</i>	Native	–	5–10
<b>Forb/Herb</b>					
prairie milkweed	ASSU3	<i>Asclepias sullivantii</i>	Native	–	1–10
button eryngo	ERYU	<i>Eryngium yuccifolium</i>	Native	–	1–10
ashy sunflower	HEMO2	<i>Helianthus mollis</i>	Native	–	1–10
prairie blazing star	LIPY	<i>Liatris pycnostachya</i>	Native	–	1–10
wild quinine	PAIN3	<i>Parthenium integrifolium</i>	Native	–	1–10
Missouri goldenrod	SOMI2	<i>Solidago missouriensis</i>	Native	–	1–10
white wild indigo	BAAL	<i>Baptisia alba</i>	Native	–	1–10
longbract wild indigo	BABR2	<i>Baptisia bracteata</i>	Native	–	1–10
field pussytoes	ANNE	<i>Antennaria neglecta</i>	Native	–	1–10
groovestem Indian plantain	ARPL4	<i>Arnoglossum plantagineum</i>	Native	–	1–10
Illinois bundleflower	DEIL	<i>Desmanthus illinoensis</i>	Native	–	1–10
arrowleaf violet	VISA2	<i>Viola sagittata</i>	Native	–	1–10
purple milkwort	POSA3	<i>Polygala sanguinea</i>	Native	–	1–10
whorled milkwort	POVE	<i>Polygala verticillata</i>	Native	–	1–10
Texas goldentop	EUGY	<i>Euthamia gymnospermoides</i>	Native	–	1–10
winecup	CADI2	<i>Callirhoe digitata</i>	Native	–	1–10
narrowleaf mountainmint	PYTE	<i>Pycnanthemum tenuifolium</i>	Native	–	1–10
blackeyed Susan	RUHI2	<i>Rudbeckia hirta</i>	Native	–	1–10
fringeleaf wild petunia	RUHU	<i>Ruellia humilis</i>	Native	–	1–10
scarlet Indian paintbrush	CACO17	<i>Castilleja coccinea</i>	Native	–	1–10
common sneezeweed	HEAU	<i>Helenium autumnale</i>	Native	–	1–10
largeflower tickseed	COGR5	<i>Coreopsis grandiflora</i>	Native	–	1–10
<b>Shrub/Subshrub</b>					
leadplant	AMCA6	<i>Amorpha canescens</i>	Native	–	5–10
New Jersey tea	CEAM	<i>Ceanothus americanus</i>	Native	–	5–10
Carolina rose	ROCA4	<i>Rosa carolina</i>	Native	–	5–10

## Animal community

### Wildlife

Game species that utilize this ecological site include:

Northern Bobwhite will utilize this ecological site for food (seeds, insects) and cover needs (escape, nesting and roosting cover).

Cottontail rabbits will utilize this ecological site for food (seeds, soft mast) and cover needs.

Turkey will utilize this ecological site for food (seeds, green browse, soft mast, insects) and nesting and brood-rearing cover. Turkey poult feed heavily on insects provided by this site type.

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.

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

Breeding birds as related to vegetation structure (related to time since fire, grazing, haying, and mowing):

Vegetation Height Short (< 1.5 feet, low litter levels, bare ground visible):

Grasshopper Sparrow, Horned Lark, Upland Sandpiper, Greater Prairie Chicken, Northern Bobwhite

Vegetation Height Moderate (1.5 – 3 feet, moderate litter levels, some bare ground visible): Eastern Meadowlark, Dickcissel, Field Sparrow, Upland Sandpiper, Greater Prairie Chicken, Northern Bobwhite, Blue Grosbeak, Scissor-Tailed Flycatcher, Eastern Kingbird, Lark Sparrow

Vegetation Height Tall (> 3 feet, moderate-high litter levels, little bare ground visible):

Henslow's Sparrow, Dickcissel, Greater Prairie Chicken, Field Sparrow, Northern Bobwhite, Sedge Wren, Northern Harrier

Brushy – Mix of grasses, forbs, native shrubs (e.g., *Rhus copallina*, *Prunus americana*), native vines (*Rubus* spp., *Rosa carolina*) and small trees (e.g., *Cornus racemosa*):

Bell's Vireo, Yellow-Breasted Chat, Loggerhead Shrike, Brown Thrasher, Common Yellowthroat

Winter Resident: Short-Eared Owl, Northern Harrier

Amphibian and reptile species associated with this ecological site's reference state condition: prairies with crawfish burrows may have Northern Crawfish Frog (*Rana areolata circumlocosa*); ornate box turtle (*Terrapene ornata ornata*), western slender glass lizard (*Ophisaurus attenuatus attenuatus*), prairie ring-necked snake (*Diadophis punctatus arnyi*), prairie kingsnake (*Lampropeltis calligaster calligaster*), and bullsnake (*Pituophis catenifer sayi*).

Prairies with ephemeral vernal fishless wetlands: western chorus frog (*Pseudacris triseriata triseriata*), southern leopard frog (*Rana sphenoccephala*), and eastern tiger salamander (*Ambystoma tigrinum*).

Small mammals associated with this ecological site's reference state condition:

least shrew (*Cryptotis parva*), plains pocket gopher (*Geomys bursarius*), prairie vole (*Microtus ochrogaster*), meadow jumping mouse (*Zapus hudsonius*), and badger (*Taxidea taxus*).

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: regal fritillary butterfly (*Speyeria idalia*) whose larvae feed primarily on native prairie violets (*Viola pedata*, *V. pedatifida*, and *V. sagittata*); mottled dusky wing butterfly (*Erynnis martialis*), ottoe skipper butterfly (*Hesperia ottoe*), arogo skipper butterfly (*Atrytone arogo iowa*), golden byssus butterfly (*Problema byssus kumskaka*), Delaware skipper butterfly (*Atrytone logan logan*), and crossline skipper butterfly (*Polites origenes*). The larvae of the moth *Eucosma bipunctella* bore into compass plant (*Silphium laciniatum*) roots and feed and the larvae of the moth *Eucosma giganteana* bore into a number of *Silphium* species roots and feed. Native bees, important pollinators, that may be associated with this

ecological site's reference condition include: *Colletes brevicornis*, *Andrena beameri*, *A. helianthiformis*, *Protandrena rudbeckiae*, *Halictus parallelus*, *Lasioglossum albipennis*, *L. coreopsis*, *L. disparilis*, *L. nymphaeum*, *Ashmeadiella buconis*, *Megachile addenda*, *Anthidium psoraleae*, *Eucera hamata*, *Melissodes coloradensis*, *M. coreopsis*, and *M. vernoniae*. The short-winged katydid (*Amblycorypha parvipennis*), prairie mole cricket (*Gryllotalpa major*), green grasshopper (*Hesperotettix speciosus*) and two-voiced conehead katydid (*Neoconcephalus bivocatus*) are possible orthopteran associates of this ecological site.

Other invertebrate associates include the 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: Claypan Summit Prairie

### Plot HIPRCA01 – Gerald soil

Located in Shelton L. Cook Meadow (The Nature Conservancy), Barton County, Missouri

Latitude: 37.418300

Longitude: -94.128900

### Plot KIPRCA02 – Gerald soil

Located in Kickapoo Prairie CA, Lawrence County, MO

Latitude: 37.225696

Longitude: -93.963407

## Other references

Aldrich, M. W. 1989. Soil Survey of Newton County, Missouri. U.S. Dept. of Agric. Soil Conservation Service.

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

Batek, M.J., A.J. Rebertus, W.A. Schroeder, T.L. Haithcoat, E. Compas, and R.P. Guyette. 1999. Reconstruction of early nineteenth-century vegetation and fire regimes in the Missouri Ozarks. *Journal of Biogeography* 26:397-412.

Brinson, M.M. 1993. A hydrogeomorphic classification for wetlands. Technical Report WRP-DE-4, U.S. Army Corps of Engineers, Engineer Waterways Experiment Station, Vicksburg, MS.

Cowardin, L.M., V. Carter, F.C. Golet, & E.T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Dept. of Interior, Fish & Wildlife Service, Office of Biological Services, Washington DC.

Fitzgerald, J.A. and D.N. Pashley. 2000a. Partners in Flight bird conservation plan for the Ozark/Ouachitas. American Bird Conservancy.

Fitzgerald, J.A. and D.N. Pashley. 2000b. Partners in Flight bird conservation plan for the Dissected Till Plains. American Bird Conservancy.

Heitzman, J.R. and J.E. Heitzman. 1996. Butterflies and moths of Missouri. 2nd ed. Missouri Department of Conservation, Jefferson City.

Jacobs, B. 2001. Birds in Missouri. Missouri Department of Conservation, Jefferson City.

Johnson, T.R. 2000. The amphibians and reptiles of Missouri. 2nd ed. Missouri Department of Conservation, Jefferson City.

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

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

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

Pitts, D.E. and W.D. McGuire. 2000. Wildlife management for Missouri landowners. 3rd ed. Missouri Department of Conservation, Jefferson City.

Schwartz, C.W., E.R. Schwartz and J.J. Conley. 2001. The wild mammals of Missouri. University of Missouri Press, Columbia and Missouri Department of Conservation, Jefferson City.

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

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

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## Approval

Nels Barrett, 10/07/2020

## Acknowledgments

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

## Rangeland health reference sheet

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

Author(s)/participant(s)	
Contact for lead author	
Date	10/05/2020

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

## Indicators

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

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

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

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

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

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

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

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

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

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

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

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

Dominant:



Sub-dominant:

Other:

Additional:

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

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

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:**
-