

## Ecological site R109XY012MO Interbedded Sedimentary Backslope Savanna

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### 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.

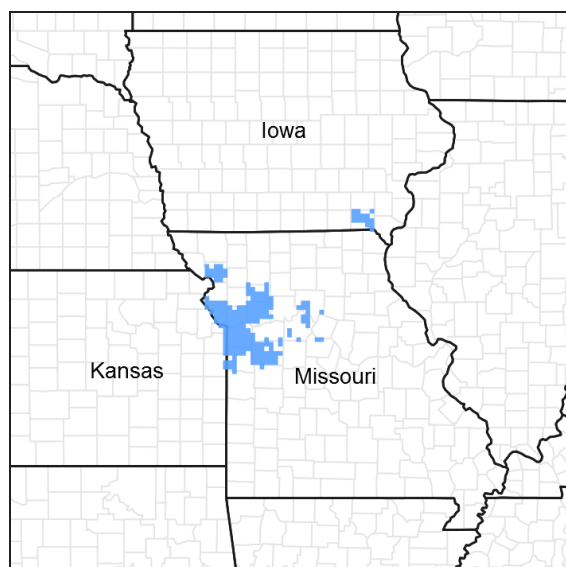


Figure 1. Mapped extent

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): 109X—Iowa and Missouri Heavy Till Plain

The Iowa and Missouri Heavy Till Plain is an area of rolling hills interspersed with interfluvial divides and alluvial valleys. Elevation ranges from about 660 feet (200 meters) along the lower reaches of rivers, to about 980 feet (300 meters) on stable interfluvial summits in southern Iowa. Relief is about 80 to 160 feet (25 to 50 meters) between major streams and adjacent interfluvial summits. Most of the till plain drains south to the Missouri River via the Grand and Chariton River systems, but the northeastern portion drains southeast to the Mississippi River. Loess caps the pre-Illinoian aged till on interfluvial divides, whereas the till is exposed on side slopes. Mississippian aged limestone and Pennsylvanian aged sandstone and shale crop out on lower slopes in some areas.

### Classification relationships

Terrestrial Natural Community Type in Missouri (Nelson, 2010):

The reference state for this ecological site is most similar to a Sandstone/Shale Savanna.

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

The reference state for this ecological site is most similar to *Quercus stellata* - *Quercus marilandica* / *Schizachyrium scoparium* Wooded Herbaceous Vegetation (CEGL002391).

Geographic relationship to the Missouri Ecological Classification System (Nigh & Schroeder, 2002):  
 This ecological site occurs in several Land Type Associations, primarily within the following Subsections:  
 Grand River Hills  
 Loess 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. As additional information is collected, analyzed and reviewed, this ESD will be refined and published as “Approved”.

Interbedded Sedimentary Backslope Savannas are on steep, dissected slopes. These sites are on Pennsylvanian aged sediments that are typically interbedded shale, sandstone, siltstone and limestone. They are primarily in the southwestern part of the MLRA and on similar landscapes south of the Missouri River, and in the northeastern portion of the MLRA. Soils are moderately deep to deep over interbedded sedimentary bedrock, and typically have sedimentary fragments in clayey subsoils. The reference plant community is savanna with scattered bur oak, swamp white oak, post oak, American hazelnut, prairie willow and wild plum, shrubs, and a ground flora of grasses such as big bluestem, little bluestem, Indiangrass, switchgrass, and eastern gamagrass, and a wide variety of prairie wildflowers.

## Associated sites

F109XY030MO	<b>Loamy Floodplain Forest</b> Loamy Floodplain Forests and other floodplain ecological sites are downslope.
R109XY002MO	<b>Loess Upland Prairie</b> Loess Upland Prairies are upslope, above the shale, on summits and shoulders.
R109XY010MO	<b>Interbedded Sedimentary Upland Savanna</b> Interbedded Sedimentary Upland Savannas are upslope, on gently sloping upper backslopes.
R109XY046MO	<b>Till Upland Savanna</b> Till Upland Savannas are upslope, above the shale, on gently sloping upper backslopes.

## Similar sites

R109XY010MO	<b>Interbedded Sedimentary Upland Savanna</b> Interbedded Sedimentary Upland Savannas are similar in composition and structure and are usually adjacent to Interbedded Sedimentary Backslope Savannas but occur higher on the landscape. Canopy levels may be lower because of higher fire frequencies.
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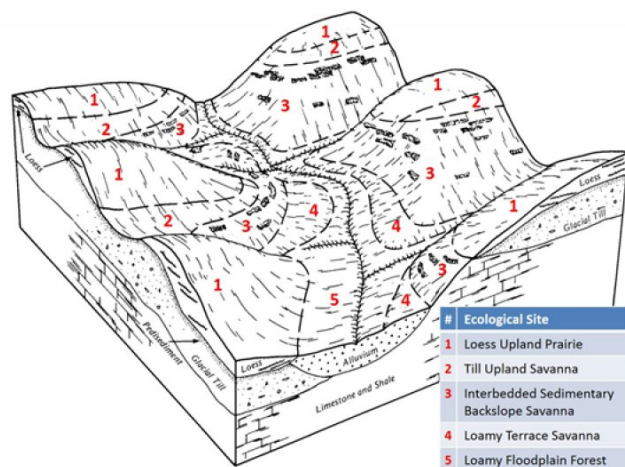
**Table 1. Dominant plant species**

Tree	(1) <i>Quercus macrocarpa</i>
Shrub	(1) <i>Amorpha canescens</i> (2) <i>Ceanothus americanus</i>
Herbaceous	(1) <i>Schizachyrium scoparium</i> (2) <i>Andropogon gerardii</i>

## Physiographic features

This site is on upland backslopes with slopes of 14 to 30 percent. The site receives runoff from upslope summit and shoulder sites, and generates runoff to adjacent, downslope ecological sites. This site does not flood.

The following figure (adapted from Preston, 1985) shows the typical landscape position of this ecological site, and landscape relationships among the major ecological sites of the uplands and adjacent stream terraces and floodplains. The site is within the area labeled “3”, and is typically downslope from Till Upland Savanna or Loess Upland Prairie ecological sites. In most areas, Upland Drainageway or Terrace and Floodplain ecological sites are directly downslope.



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

**Table 2. Representative physiographic features**

Landforms	(1) Hill
Flooding frequency	None
Ponding frequency	None
Elevation	650–1,225 ft
Slope	9–30%
Water table depth	12–48 in
Aspect	Aspect is not a significant factor

## Climatic features

The Iowa and Missouri Heavy Till Plain MLRA 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.

This MLRA experiences small regional differences in climates that grade inconspicuously into each other. The basic gradient for most climatic characteristics is along a line from north to south. Both mean annual temperature and precipitation exhibit fairly minor gradients along this line. Mean January minimum temperature follows the north-to-south gradient. However, mean July maximum temperature shows hardly any geographic variation in the region. Mean July maximum temperatures have a range of only two to three degrees across the region.

Mean annual precipitation varies along the same gradient as temperature – lower annual precipitation in the north, higher in the south. Seasonality in precipitation is very pronounced due to strong continental influences. June precipitation, for example, averages four to five times greater than January precipitation. 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 influences ecological communities by limiting water supplies, especially at times of high temperatures and high evaporation rates. Drought indirectly affects ecological communities by increasing plant and animal susceptibility to the probability and severity of fire. Frequent fires encourage the development of grass/forb dominated communities and understories.

Superimposed upon the basic MLRA climatic patterns are local topographic influences that create topoclimatic, or

microclimatic variations. 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. Slope orientation is an important topographic influence on climate. Summits and south-and-west-facing slopes are regularly warmer and drier, supporting more grass dominated communities than adjacent north- and-east-facing slopes that are cooler and moister that support more woody dominated communities. Finally, the cooler microclimate within a canopied forest is measurably different from the climate of a more open and warmer grassland or savanna area.

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)	144-153 days
Freeze-free period (characteristic range)	172-182 days
Precipitation total (characteristic range)	37-41 in
Frost-free period (actual range)	142-155 days
Freeze-free period (actual range)	168-184 days
Precipitation total (actual range)	36-41 in
Frost-free period (average)	149 days
Freeze-free period (average)	177 days
Precipitation total (average)	39 in

## Climate stations used

- (1) KEOSAUQUA [USC00134389], Keosauqua, IA
- (2) KEARNEY 3E [USC00234382], Kearney, MO
- (3) MEMPHIS [USC00235492], Memphis, MO

## Influencing water features

This ecological site is not influenced by wetland or riparian water features. However, seeps may occur in headslope positions, particularly in the spring, and following heavy rainfall events. These seeps are source areas for first-order ephemeral streams, typically within Upland Drainageway ecological sites downslope. Where present, these headslope seeps are in the Slope wetlands class of the Hydrogeomorphic (HGM) classification system (Brinson, 1993).

## Soil features

These soils are underlain with interbedded sedimentary bedrock at 20 to 40 inches deep. The soils were formed under prairie vegetation, and have dark, organic-rich surface horizons. Parent material is slope alluvium and residuum weathered from interbedded shale, sandstone, siltstone and limestone, overlying sedimentary bedrock. In most areas the shale strata are acidic, but some areas are calcareous. They have silty clay loam surface layers, with silty clay subsoils. Soils in areas with interbedded sandstone have more sand in the subsoil. They are slightly affected by seasonal wetness. Soil series associated with this site include Newcomer, Rosendale and Snead.

**Table 4. Representative soil features**

Parent material	(1) Residuum–limestone, sandstone, and shale
Surface texture	(1) Silty clay loam
Family particle size	(1) Clayey
Drainage class	Somewhat poorly drained to moderately well drained

Permeability class	Very slow
Soil depth	20–72 in
Surface fragment cover <=3"	0–3%
Surface fragment cover >3"	0–10%
Available water capacity (0-40in)	3–6 in
Calcium carbonate equivalent (0-40in)	0–10%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	5.6–8.2
Subsurface fragment volume <=3" (Depth not specified)	0–10%
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.

The reference plant community is characterized as a savanna unit dominated by little and big bluestem, Indian grass, sideoats grama, and a wide variety of prairie wildflowers. Trees and shrubs such as bur oak, swamp white oak, post oak, American hazelnut, prairie willow and American plum occur in groves or as scattered individuals throughout the site.

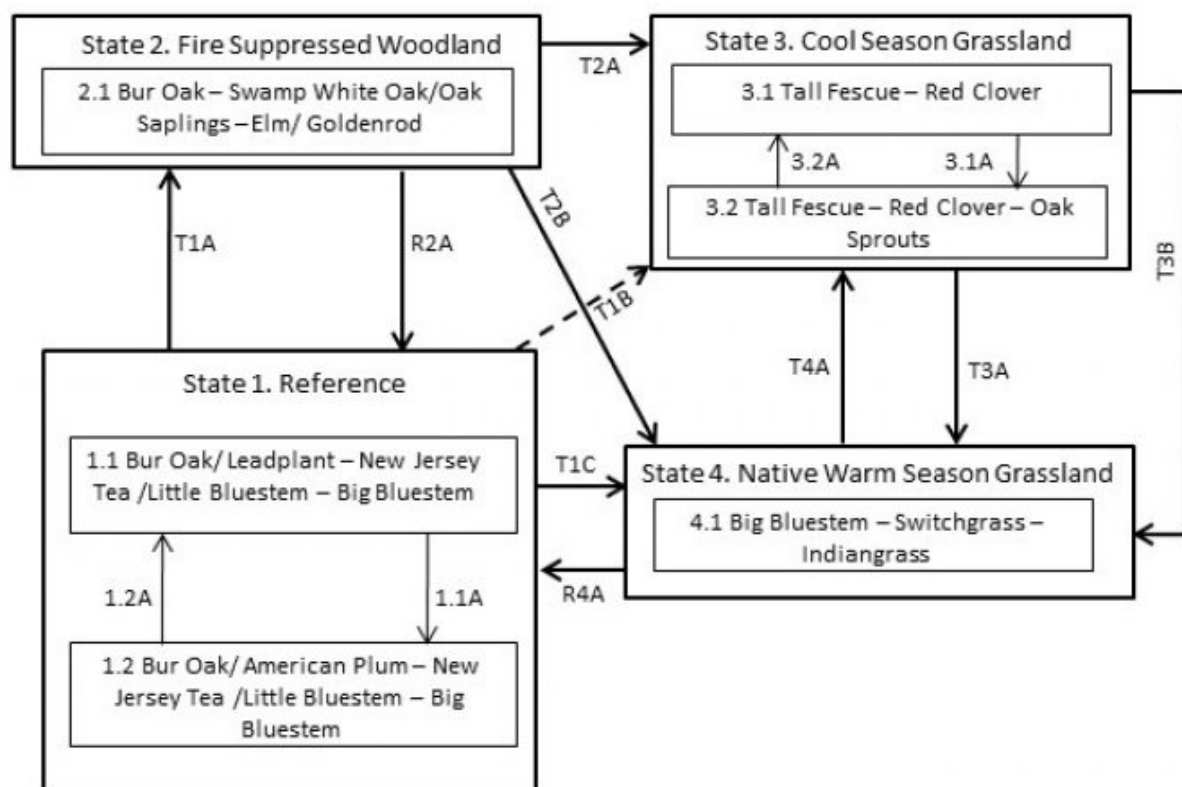
While not as typically high, dry and fire prone as Claypan and Loess Prairies, this ecological site burned every 2 to 5 years. Fire removed dead plant litter and provided room for a lush growth of prairie vegetation. Fire also kept woody species at bay. Grazing by native large herbivores, such as bison, elk, and white-tailed deer, also impacted these sites. Their activities altered the composition, fuel loads and structure of the vegetation, creating a diversity of structure and composition. The partially wooded draws would have burned less intensely and less frequently. During fire free intervals woody species would have increased in abundance and spread out onto the prairie.

These sites are moderately productive. Today, Interbedded Sedimentary Backslope Savannas are nearly extirpated from the region as the former prairies and savannas have been converted to intensive agriculture. A few known remnants exist but are degraded by fire suppression and grazing by domestic livestock. While re-establishing prairie and savanna on converted agriculture sites is beneficial to wildlife, restoration to the reference state from agricultural land is a long term proposition with uncertain outcomes.

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

## Interbedded Sedimentary Backslope Savanna, R109XY012MO



Code	Event/Activity/Process
T1A	Fire suppression > 20 years; woody invasion
T1B, T2A	Woody removal; tillage; vegetative seeding; grassland management
T1C, T2B	Woody removal; vegetative seeding; grassland management; prescribed fire
T3A, T4A	Vegetative seeding; grassland management
T3B	Vegetative seeding; prescribed fire; grassland management
1.1A	Fire-free interval 10+ years
1.2A	Fire interval 1-3 years
3.1A	Woody invasion; poor grassland management
3.2A	Brush management; grassland management; vegetative reseeding
R2A	Thinning; prescribed fire 1-3 years
R4A	Vegetative seeding; prescribed fire 1-3 years; tree planting; long rotation

Figure 9. State and transition diagram for this ecological site

## Reference

This state is native oak savanna dominated by little bluestem, big bluestem and a wide variety of prairie forbs. This state occurs on sloping backslopes. Bur oak, swamp white oak, post oak, American hazelnut, prairie willow and wild plum occurred in small groves or as scattered individuals across the prairie landscape. Canopy covers ranged from 10 to 30 percent with higher canopy covers on protected north and east slopes. 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 oaks, prairie willow, dogwoods and wild plum. When fire intervals shorten these woody species will decrease. This state is very rare. Nearly all former reference states have been converted to cool season grassland and intensive agriculture cropland or reverted to a woodland community.

### Dominant plant species

- bur oak (*Quercus macrocarpa*), tree
- leadplant (*Amorpha canescens*), shrub
- New Jersey tea (*Ceanothus americanus*), shrub
- American plum (*Prunus americana*), shrub
- little bluestem (*Schizachyrium*), other herbaceous
- big bluestem (*Andropogon gerardii*), other herbaceous

## Community 1.1

### Bur Oak/ Lead Plant – New Jersey Tea /Little Bluestem – Big Bluestem

This phase is a savanna dominated by little bluestem, big bluestem and a wide variety of prairie wildflowers. Bur oak, swamp white oak, post oak, elm, American hazelnut, prairie willow and wild plum occur in small groves or as scattered individuals across the open landscape.

**Forest overstory.** The Forest Overstory Species list is based on commonly occurring species listed in Nelson (2010).

**Forest understory.** The Forest Understory list is based on commonly occurring species listed in Nelson (2010).

### Dominant plant species

- bur oak (*Quercus macrocarpa*), tree
- leadplant (*Amorpha canescens*), shrub
- New Jersey tea (*Ceanothus americanus*), shrub
- little bluestem (*Schizachyrium*), other herbaceous
- big bluestem (*Andropogon gerardii*), other herbaceous

## Community 1.2

### Bur Oak/ Wild Plum – New Jersey Tea /Little Bluestem – Big Bluestem

This phase is similar to community phase 1.1 but oaks and shrubs are increasing due to longer periods of fire suppression. Some displacement of grasses and forbs may be occurring due to shading and competition from the increased canopy cover.

### Dominant plant species

- bur oak (*Quercus macrocarpa*), tree
- American plum (*Prunus americana*), shrub
- New Jersey tea (*Ceanothus americanus*), shrub
- little bluestem (*Schizachyrium*), other herbaceous
- big bluestem (*Andropogon gerardii*), other herbaceous

## Pathway 1.1A

### Community 1.1 to 1.2

Fire free interval 10+ years

## **Pathway 1.2A**

### **Community 1.2 to 1.1**

Fire interval 1-3 years

## **State 2**

### **Fire Suppressed Woodland**

Degraded reference states that have experienced fire suppression and woody invasion for 20 or more years will transition to this state. With fire suppression, woody species such as bur oak, post oak and swamp white oak will begin to increase transitioning this state from a savanna to a woodland. Native herbaceous ground cover will also decrease.

#### **Dominant plant species**

- bur oak (*Quercus macrocarpa*), tree
- swamp white oak (*Quercus bicolor*), tree
- oak (*Quercus*), shrub
- elm (*Ulmus*), shrub
- goldenrod (*Oligoneuron*), other herbaceous

## **Community 2.1**

### **Bur Oak – Swamp White Oak/Oak Saplings – Elm/ Goldenrod**

#### **Dominant plant species**

- bur oak (*Quercus macrocarpa*), tree
- swamp white oak (*Quercus bicolor*), tree
- oak (*Quercus*), shrub
- elm (*Ulmus*), shrub
- goldenrod (*Oligoneuron*), other herbaceous

## **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 in this area. Occasionally, these pastures will have scattered bur oaks and/or swamp white oak. Long term uncontrolled grazing and a lack of grassland management can cause significant soil erosion and compaction and increases in less productive species such as Kentucky bluegrass and weedy forbs such as ironweed along with increases of oak sprouts. A return to the reference state may be impossible, requiring a very long term series of management options and high implementation costs.

#### **Dominant plant species**

- oak (*Quercus*), shrub
- tall fescue (*Schedonorus arundinaceus*), other herbaceous
- red clover (*Trifolium pratense*), other herbaceous

## **Community 3.1**

### **Tall Fescue – Red Clover**

#### **Dominant plant species**

- tall fescue (*Schedonorus arundinaceus*), other herbaceous
- red clover (*Trifolium pratense*), other herbaceous

## **Community 3.2**

### **Tall Fescue – Red Clover – Oak Sprouts**



### **Dominant plant species**

- oak (*Quercus*), shrub
- tall fescue (*Schedonorus arundinaceus*), other herbaceous
- red clover (*Trifolium pratense*), other herbaceous

### **Pathway 3.1A**

#### **Community 3.1 to 3.2**

Woody invasion; poor grassland management

### **Pathway 3.2A**

#### **Community 3.2 to 3.1**

Brush management; grassland management; vegetative reseeding

## **State 4**

### **Native Warm Season Grassland**

Conversion from the Cool Season Grassland (State 3) 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. The thinning of trees and shrubs to reduce canopy cover from the fire suppressed woodland state (State 2) will cause a transition to this state. Additional native grass and forb plantings along with reintroduction of periodic fire may be needed to meet anticipated use needs for this state. This state can be transformed back to a Reference State. Substantial restoration time and management inputs will still be needed.

### **Dominant plant species**

- big bluestem (*Andropogon gerardii*), other herbaceous
- switchgrass (*Panicum virgatum*), other herbaceous
- Indiangrass (*Sorghastrum*), other herbaceous

### **Community 4.1**

#### **Big Bluestem – Switchgrass – Indiangrass**

### **Dominant plant species**

- big bluestem (*Andropogon gerardii*), other herbaceous
- switchgrass (*Panicum virgatum*), other herbaceous
- Indiangrass (*Sorghastrum*), other herbaceous

### **Transition T1A**

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

Fire suppression >20 years; woody invasion

### **Transition T1B**

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

Woody removal; tillage; vegetative seeding; grassland management

### **Transition T1C**

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

Woody removal; vegetative seeding; grassland management; prescribed fire

## **Restoration pathway R2A**

State 2 to 1

Thinning; 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; vegetative seeding; grassland management; prescribed fire

Transition T3A

State 3 to 4

Vegetative seeding; grassland management

Restoration pathway R4A

State 4 to 1

Vegetative seeding; prescribed fire 1-3 years; tree planting; long rotation

Restoration pathway T4A

State 4 to 3

Vegetative seeding; grassland management

Additional community tables

Table 5. Community 1.1 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)	Diameter (In)	Basal Area (Square Ft/Acre)
Tree							
swamp white oak	QUBI	<i>Quercus bicolor</i>	Native	—	5–10	—	—
bur oak	QUMA2	<i>Quercus macrocarpa</i>	Native	—	5–10	—	—
post oak	QUST	<i>Quercus stellata</i>	Native	—	5–10	—	—

Table 6. Community 1.1 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)
<b>Grass/grass-like (Graminoids)</b>					
little bluestem	SCSC	<i>Schizachyrium scoparium</i>	Native	–	30–50
big bluestem	ANGE	<i>Andropogon gerardii</i>	Native	–	30–50
sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	Native	–	10–20
Indiangrass	SONU2	<i>Sorghastrum nutans</i>	Native	–	10–20
eastern gamagrass	TRDA3	<i>Tripsacum dactyloides</i>	Native	–	5–10
switchgrass	PAVI2	<i>Panicum virgatum</i>	Native	–	5–10
Mead's sedge	CAME2	<i>Carex meadii</i>	Native	–	5–10
Bush's sedge	CABU5	<i>Carex bushii</i>	Native	–	5–10
slender spikerush	ELTET	<i>Eleocharis tenuis</i> var. <i>tenuis</i>	Native	–	5–10
<b>Forb/Herb</b>					
wild quinine	PAIN3	<i>Parthenium integrifolium</i>	Native	–	5–20
butterfly milkweed	ASTU	<i>Asclepias tuberosa</i>	Native	–	5–20
prairie blazing star	LIPY	<i>Liatris pycnostachya</i>	Native	–	5–20
Missouri goldenrod	SOMI2	<i>Solidago missouriensis</i>	Native	–	5–20
ashy sunflower	HEMO2	<i>Helianthus mollis</i>	Native	–	5–20
button erylgo	ERYU	<i>Eryngium yuccifolium</i>	Native	–	5–20
prairie milkweed	ASSU3	<i>Asclepias sullivantii</i>	Native	–	5–20
longbract wild indigo	BABR2	<i>Baptisia bracteata</i>	Native	–	5–20
wholeleaf rosinweed	SIIN2	<i>Silphium integrifolium</i>	Native	–	5–20
purple milkwort	POSA3	<i>Polygala sanguinea</i>	Native	–	5–10
white wild indigo	BAAL	<i>Baptisia alba</i>	Native	–	5–10
Illinois bundleflower	DEIL	<i>Desmanthus illinoensis</i>	Native	–	5–10
<b>Shrub/Subshrub</b>					
leadplant	AMCA6	<i>Amorpha canescens</i>	Native	–	5–20
prairie willow	SAHU2	<i>Salix humilis</i>	Native	–	5–10
American plum	PRAM	<i>Prunus americana</i>	Native	–	5–10
Carolina rose	ROCA4	<i>Rosa carolina</i>	Native	–	5–10
New Jersey tea	CEAM	<i>Ceanothus americanus</i>	Native	–	5–10
American hazelnut	COAM3	<i>Corylus americana</i>	Native	–	5–10

## Animal community

### Wildlife

#### Prairie Phase:

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 poults 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 ( 0.5 meter, low litter levels, bare ground visible):

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

Mid-Vegetation Height (0.5 – 1 meter, moderate litter levels, some bare ground visible):

Eastern Meadowlark, Dickcissel, Field Sparrow, Upland Sandpiper, Greater Prairie Chicken, Northern Bobwhite, Eastern Kingbird, Bobolink, Lark Sparrow

Tall Vegetation Height (> 1 meter, 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*, *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, Le Conte's Sparrow

Amphibian and reptile species associated with this ecological site's reference state condition: prairies with or nearby to fishless ponds/pools (may be ephemeral) may have Eastern Tiger Salamander (*Ambystoma tigrinum tigrinum*) and Western Chorus Frog (*Pseudacris triseriata triseriata*); prairies with crawfish burrows may have Northern Crawfish Frog (*Rana areolata circulosa*); other species include Northern Prairie Skink (*Eumeces septentrionalis septentrionalis*), Ornate Box Turtle (*Terrapene ornata ornata*), Western Slender Glass Lizard (*Ophisaurus attenuatus attenuatus*), Eastern Yellow-bellied Racer (*Coluber constrictor flaviventris*), Prairie Ring-necked Snake (*Diadophis punctatus arnyi*), and Bullsnake (*Pituophis catenifer sayi*).

Small mammals associated with this ecological site's reference state condition: Least Shrew (*Cryptotis parva*), Franklin's Ground Squirrel (*Spermophilus franklinii*), Plains Pocket Gopher (*Geomys bursarius*), Prairie Vole (*Microtus ochrogaster*), Southern Bog Lemming (*Synaptomys cooperi*), Meadow Jumping Mouse (*Zapus hudsonius*), Thirteen-lined Ground Squirrel (*Spermophilus tridecemlineatus*) and Badger (*Taxidea taxus*).

Invertebrates:

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*), Golden Byssus butterfly (*Problema byssus kumskaka*), Delaware Skipper butterfly (*Atryone 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*), 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*).

Savanna Phase:

Oaks and hickories provide an important food source for many animals including White-tailed Deer, Wild Turkey, and Fox Squirrel.

Both snags and live cavity or den trees provide important food and cover for vertebrate wildlife. Snags are also very important to invertebrate species. Fox Squirrel, Red-headed Woodpecker and Eastern Bluebird utilize snags and den trees for foraging, nesting or shelter. "Wolf" trees are a particularly valuable type of live cavity tree. These large diameter, often open-grown, old-ages, hollow trees provide both cavities for wildlife and usually hard or soft mast food sources. Large diameter snags and den trees are particularly important wildlife habitat features to retain.

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: Northern Bobwhite, Eastern Kingbird, Eastern Bluebird, Brown Thrasher, White-eyed Vireo, Prairie Warbler, Field Sparrow, Eastern Towhee, Red-headed Woodpecker, Great Crested Flycatcher, Loggerhead Shrike

Winter resident: American Tree Sparrow, Harris' Sparrow

Amphibian and reptile species likely associated with this ecological site's reference state condition: Ornate Box Turtle (*Terrapene ornata ornata*), Northern Fence Lizard (*Sceloporus undulatus hyacinthinus*), Five-lined Skink (*Eumeces fasciatus*), Western Slender Glass Lizard (*Ophisaurus attenuatus attenuatus*), Eastern Yellow-bellied Racer (*Coluber constrictor flaviventris*), Prairie Ring-necked Snake (*Diadophis punctatus arnyi*), and Rough Green Snake (*Opheodrys aestivus aestivus*). Sites containing or nearby to fishless or ephemeral ponds/pools may support the Eastern Tiger Salamander (*Ambystoma tigrinum tigrinum*).

Small mammals likely associated with this ecological site's reference state condition: Fox Squirrel (*Sciurus niger*), Woodland Vole (*Microtus pinetorum*), Least Shrew (*Cryptotis parva*), and Indiana Bat (*Myotis sodalis*). Indiana bats utilize suitable live, dying or dead roost trees for summer habitat and raising young. Suitable roost trees typically have exfoliating or flaking bark and are larger in diameter.

Invertebrates – Many native insect species are likely associated with this phase of this ecological site's reference state condition, especially native bees, ants, beetles, butterflies and moths, and crickets, grasshoppers and katydids. However we don't have enough information on these groups to assign them to this phase of this ecological site's reference state condition at this time.

(This section prepared by Mike Leahy, Natural Areas Coordinator, Missouri Department of Conservation, 2013. 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 with scattered open grown trees. Altered states 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: Interbedded Sedimentary Backslope Savanna

ISPAWO01 - Snead soil

Isley Park Woods NA; Clay County, MO  
Latitude: 39.337533  
Longitude: -94.214914

HONCRCA01 - Rosendale soil  
Honey Creek CA; Andrew County, MO  
Latitude: 39.946981  
Longitude: -94.984135

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## **Contributors**

Doug Wallace  
Fred Young

## Approval

Suzanne Mayne-Kinney, 7/02/2024

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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	05/11/2025
Approved by	Suzanne Mayne-Kinney
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):**

- 
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:**
-



