

Ecological site R116BY026MO Loamy Terrace 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): 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* - *Sorghastrum nutans* - (*Sporobolus heterolepis*) - *Liatris* spp. - *Ratibida pinnata* Herbaceous Vegetation (CEGL002203).

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

This ecological site occurs primarily within the Stockton Prairie/Savanna Dissected Plain Land Type Association.

Ecological site concept

NOTE: This is a “provisional” Ecological Site Description (ESD) that is under development. It contains basic ecological information that can be used for conservation planning, application and land management. After additional information is collected, analyzed and reviewed, this ESD will be refined and published as “Approved”.

Loamy Terrace Savannas occur in the northern Springfield Plain in Cedar County, Missouri on stream terraces. Soils are very deep and loamy, and are subject to rare flooding. The reference plant community is savanna with scattered bur oak, pin oak, shellbark hickory, willow 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

F116BY002MO	Loamy Floodplain Forest Loamy Floodplain Forests are on lower, active floodplain positions.
R116BY023MO	Sandstone/Shale Upland Prairie Sandstone/Shale Upland Prairies and other upland ecological sites are upslope.

Similar sites

R116BY037MO	Wet Upland Drainageway Prairie Wet Upland Drainageway Prairies have similar species composition but tree cover is very scattered and lower in density. These sites are also higher on the landscape in narrower drainageways.
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Table 1. Dominant plant species

Tree	(1) <i>Quercus macrocarpa</i>
Shrub	(1) <i>Salix humilis</i>
Herbaceous	(1) <i>Andropogon gerardii</i> (2) <i>Tripsacum dactyloides</i>

Physiographic features

This site is on floodplain steps and low stream terraces with slopes of 0 to 2 percent. The site generates some runoff to adjacent lower floodplain sites, and receives some runoff from higher stream terraces and uplands. Although this site is subject to flooding, ecological processes more closely resemble those of stream terrace systems.

The following figure shows the typical landscape position of this ecological site, and landscape relationships with other ecological sites. This site is within the area labeled “4”, and is typically on floodplain terraces, above the level of the most active floodplain, labeled “5”, and adjacent to the uplands, labeled “1”. In some areas a Loamy Footslope Woodland ecological site, labeled on the figure as “3”, is present directly above the Loamy Terrace site.

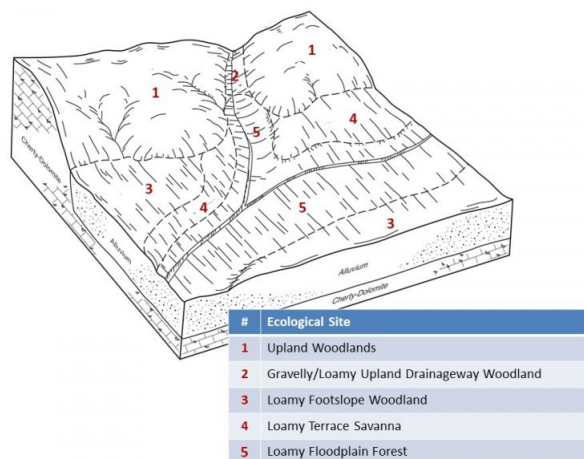


Figure 2. Landscape relationships for this ecological site.

Table 2. Representative physiographic features

Landforms	(1) Stream terrace (2) Flood-plain step
Flooding duration	Brief (2 to 7 days)
Flooding frequency	None to rare
Ponding frequency	None
Slope	0–2%
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)	164-168 days
Freeze-free period (characteristic range)	192-194 days
Precipitation total (characteristic range)	1,118-1,194 mm
Frost-free period (actual range)	162-170 days
Freeze-free period (actual range)	192-194 days
Precipitation total (actual range)	1,118-1,219 mm
Frost-free period (average)	166 days
Freeze-free period (average)	193 days
Precipitation total (average)	1,168 mm

Climate stations used

- (1) ASH GROVE 4S [USC00230304], Ash Grove, MO
- (2) LOCKWOOD [USC00235027], Lockwood, MO
- (3) STOCKTON DAM [USC00238082], Stockton, MO

Influencing water features

This ecological site is typically associated with, but not adjacent to, a perennial stream. Stream levels typically respond quickly to storm events, especially in watersheds where surface runoff is dominant. Short- to medium-duration flooding is rare but does occur in some areas, particularly during spring and early summer storm events. However, scour and deposition are uncommon, so the effects on ground flora are minimal. Constructed levees, often accompanied by stream channelization, have altered the hydrology and flooding dynamics in many places.

Soil features

These soils have no rooting restriction. They were formed under a mixture of prairie and woodland vegetation. Parent material is alluvium. They have silt loam surface horizons and loamy subsoils. They are not affected by seasonal wetness. Soil series associated with this site include Cotter.

Table 4. Representative soil features

Parent material	(1) Alluvium
Surface texture	(1) Silt loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately slow
Soil depth	183 cm
Surface fragment cover <=3"	0%

Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	20.32 cm
Calcium carbonate equivalent (0-101.6cm)	0%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	5.1–6.5
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

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

The reference community is characterized as a savanna unit dominated by big bluestem, Indiangrass, switchgrass, eastern gamagrass and a wide variety of prairie wildflowers while other species such as Culver's root, Michigan lily, and Virginia bunchflower added to the mix of upland drainageway prairie species. Slightly higher areas within or at the edge of the ecological site supported a savanna with scattered bur oak, pin oak, shellbark hickory and willow.

This ecological site occurs at the base of slopes below upland prairies and woodlands, or as high, isolated terraces surrounded by floodplain forest. The higher position and loamy soil texture created a better drainage situation. Consequently, the site is less wet than adjacent sites. These areas occasionally flooded.

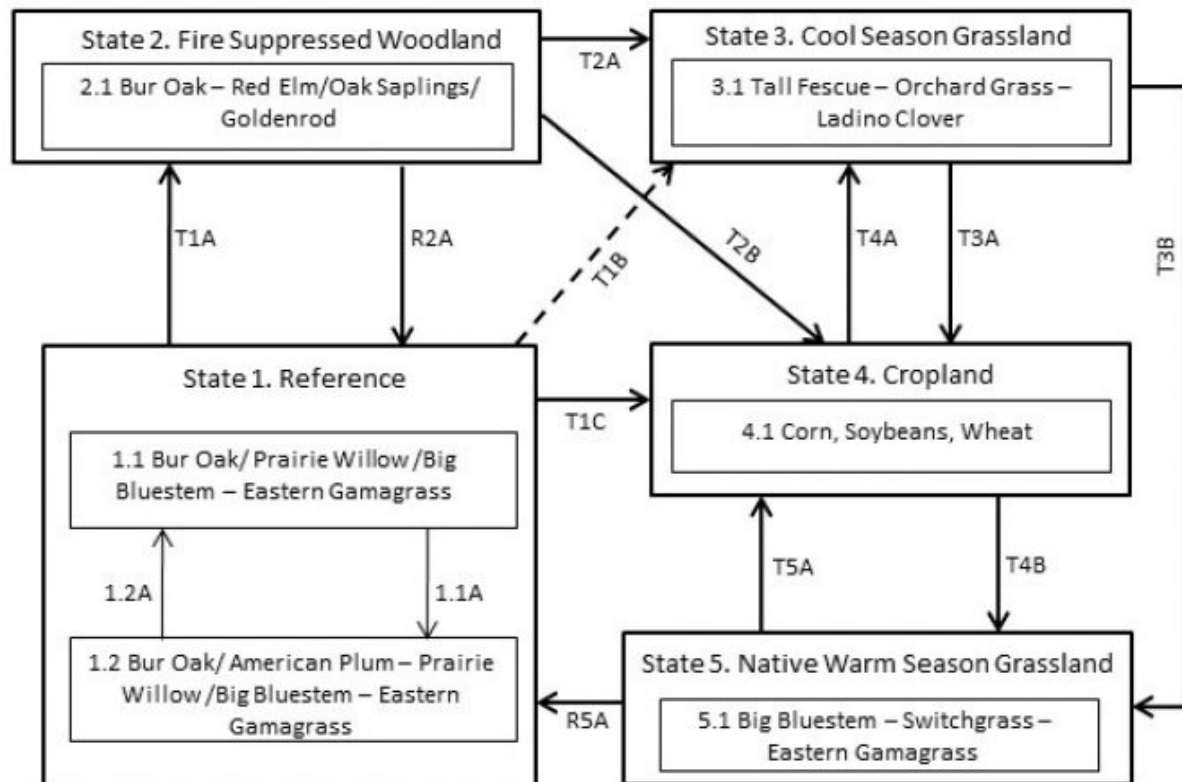
Fire also played a key role in maintaining this ecological site, likely occurring at least once every 3 years. Fire removed dead plant litter and provided room for a lush growth of prairie vegetation. Fire also controlled woody species. During fire free intervals woody species would have increased in abundance and spread out onto the main prairie. Grazing by native large herbivores, such as bison, elk, and white-tailed deer furthermore impacted these sites. Their activities altered the composition, fuel loads and structure of the vegetation, adding to the diversity of structure and composition.

These sites are very productive. Today, Loamy Terrace Savannas are extirpated from the region as the former terrace prairies and savannas have been converted to intensive agriculture. 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 is depicted in Figure 1. 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

Loamy Terrace Savanna, R116BY026MO



Code	Event/Activity/Process
T1A	Fire suppression > 20 years; woody invasion
T1B	Tillage; vegetative seeding; grassland management
T1C, T3A, T5A	Tillage; conservation cropping system
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 2-5 years
R2A	Thinning; prescribed fire 2-5 years
R5A	Vegetative seeding; prescribed fire 2-5 years; tree planting; long rotation

Figure 9. State and transition diagram for this ecological site

State 1

Reference

This state is a native oak savanna dominated by big bluestem and a wide variety of prairie forbs. This state occurs on level to gently sloping soils. Bur oak, pin oak, elm, American hazelnut, prairie willow and American plum occurred in small groves or as scattered individuals across the landscape. Two phases can occur that will transition back and forth depending on fire frequencies. Longer fire free intervals will allow woody species to increase. When fire intervals shorten these woody species will decrease. All former reference states have been converted to cool season grassland and intensive agriculture cropland. Small acres remain as a fire suppressed woodland community.

Community 1.1

Bur Oak/ Prairie Willow /Big Bluestem – Eastern Gamagrass

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

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

Community 1.2

Bur Oak/ American Plum – Prairie Willow /Big Bluestem – Eastern Gamagrass

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 2-5 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, pin oak and slippery elm will begin to increase transitioning this state from a savanna to a woodland. Native herbaceous ground cover will also decrease.

Dominant resource concerns

- Plant productivity and health
- Plant structure and composition
- Plant pest pressure
- Wildfire hazard from biomass accumulation
- Terrestrial habitat for wildlife and invertebrates

Community 2.1

Bur Oak – Slippery Elm/Oak Saplings/ Goldenrod

State 3

Cool Season Grassland

Conversion of other states to non-native cool season species such as tall fescue and ladino clover has been common in this area. Occasionally, these pastures will have scattered bur oaks. 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 broomsedge and weedy forbs such as ironweed. A return to the reference state may be impossible, requiring a very long term series of management options.

Community 3.1

Tall Fescue – Orchard Grass – Ladino Clover

State 4

Cropland

This is the dominant State that exists currently with intensive cropping of corn, wheat and soybeans occurring. Some conversion to cool season hay land occurs for a limited period of time before transitioning back to cropland. Limited acres are sometimes converted to native warm season grassland for extended summer grazing and haying periods.

Community 4.1

Corn, Soybeans, 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 can be transformed back to a reference state. Substantial restoration time and management inputs will still be needed.

Community 5.1

Big Bluestem – Switchgrass – Eastern Gamagrass

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

Restoration pathway R2A

State 2 to 1

Thinning; prescribed fire 2-5 years

Transition T2B

State 2 to 4

Woody removal; tillage; conservation cropping system

Transition T3A

State 3 to 4

Tillage; conservation cropping system

Transition T3B
State 3 to 5

Vegetative seeding; prescribed fire; grassland management

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 2-5 years; tree planting; long rotation

Transition T5A
State 5 to 4

Tillage; conservation cropping system

Additional community tables

Table 5. Community 1.1 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height (M)	Canopy Cover (%)	Diameter (Cm)	Basal Area (Square M/Hectare)
Tree							
bur oak	QUMA2	<i>Quercus macrocarpa</i>	Native	–	5–20	–	–
pin oak	QUPA2	<i>Quercus palustris</i>	Native	–	5–20	–	–
shellbark hickory	CALA21	<i>Carya laciniosa</i>	Native	–	5–20	–	–

Table 6. Community 1.1 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (M)	Canopy Cover (%)
Grass/grass-like (Graminoids)					
big bluestem	ANGE	<i>Andropogon gerardii</i>	Native	–	10–20
Indiangrass	SONU2	<i>Sorghastrum nutans</i>	Native	–	10–20
switchgrass	PAVI2	<i>Panicum virgatum</i>	Native	–	10–20
eastern gamagrass	TRDA3	<i>Tripsacum dactyloides</i>	Native	–	10–20
prairie dropseed	SPHE	<i>Sporobolus heterolepis</i>	Native	–	10–20
little bluestem	SCSC	<i>Schizachyrium scoparium</i>	Native	–	2–10
Forb/Herb					
wild quinine	PAIN3	<i>Parthenium integrifolium</i>	Native	–	2–10
hoary puccoon	LICA12	<i>Lithospermum canescens</i>	Native	–	2–10
wild bergamot	MOFI	<i>Monarda fistulosa</i>	Native	–	2–10
Culver's root	VEVI4	<i>Veronicastrum virginicum</i>	Native	–	2–10
Virginia bunchflower	VEVI5	<i>Veratrum virginicum</i>	Native	–	2–10
Michigan lily	LIMI9	<i>Lilium michiganense</i>	Native	–	2–10
little bluestem	SCSC	<i>Schizachyrium scoparium</i>	Native	–	5–10
prairie milkweed	ASSU3	<i>Asclepias sullivantii</i>	Native	–	2–10
purple milkwort	POSA3	<i>Polygala sanguinea</i>	Native	–	2–10
wholeleaf rosinweed	SIIN2	<i>Silphium integrifolium</i>	Native	–	2–10
purple prairie clover	DAPU5	<i>Dalea purpurea</i>	Native	–	2–10
eastern purple coneflower	ECPU	<i>Echinacea purpurea</i>	Native	–	2–10
compassplant	SILA3	<i>Silphium laciniatum</i>	Native	–	2–10
butterfly milkweed	ASTU	<i>Asclepias tuberosa</i>	Native	–	2–10
prairie blazing star	LIPY	<i>Liatris pycnostachya</i>	Native	–	2–10
Missouri goldenrod	SOMI2	<i>Solidago missouriensis</i>	Native	–	2–10
ashy sunflower	HEMO2	<i>Helianthus mollis</i>	Native	–	2–10
button erylgo	ERYU	<i>Eryngium yuccifolium</i>	Native	–	2–10
white wild indigo	BAAL	<i>Baptisia alba</i>	Native	–	2–10
Shrub/Subshrub					
prairie willow	SAHU2	<i>Salix humilis</i>	Native	–	5–10
American plum	PRAM	<i>Prunus americana</i>	Native	–	5–10
American hazelnut	COAM3	<i>Corylus americana</i>	Native	–	5–10
New Jersey tea	CEAM	<i>Ceanothus americanus</i>	Native	–	5–10
leadplant	AMCA6	<i>Amorpha canescens</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, and 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 (0.5 meter, low litter levels, bare ground visible):

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

Vegetation Height Moderate (0.5 – 1 meter, 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 (> 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*), 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 circulosia*); 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*), Ottoo Skipper butterfly (*Hesperia ottoe*), Arogos Skipper butterfly (*Atrytone arogos iowa*), 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*), 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*).

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, Scissor-tailed Flycatcher

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*), and Least Shrew (*Cryptotis parva*).

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. 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: Loamy Terrace Savanna

No quality reference sites are known to exist

Other references

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Contributors

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Approval

Nels Barrett, 10/07/2020

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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:**

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

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

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

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

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

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

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**
-
9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**
-
10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**
-
11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**
-
12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**
- Dominant:
- Sub-dominant:
- Other:
- Additional:
-
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**
-
14. **Average percent litter cover (%) and depth (in):**
-
15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**
-
16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**
-
17. **Perennial plant reproductive capability:**
-