

Ecological site R115XB037MO

Loamy Terrace Prairie

Accessed: 04/26/2024

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): 115X–Central Mississippi Valley Wooded Slopes

The Central Mississippi Valley Wooded Slopes, Western Part (area outlined in red on the map) consists mainly of the deeply dissected, loess-covered hills bordering the Missouri and Mississippi Rivers as well as the floodplains and terraces of these rivers. It wraps around the northeast corner of the Ozark Uplift, and constitutes the southern border of the Pre-Illinoian-aged till plain. Elevation ranges from about 320 feet along the Mississippi River near Cape Girardeau in the south to about 1,020 feet on the highest ridges near Hillsboro, MO in the east. Local relief varies from 10 to 20 feet in the major river floodplains, to 50 to 100 feet in the dissected uplands, with bluffs of 200 to 350 feet along the Mississippi and Missouri Rivers. Underlying bedrock is mainly Ordovician-aged dolomite and sandstone, with Mississippian-aged limestone north of the Missouri River.

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 in the Marais Temps Clair Alluvial Plain Land Type Association of the Missouri River Alluvial Plain Subsections.

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 Prairies (green areas on the map) are on Mississippi and Missouri river alluvium near the confluence of the two rivers. Sites are associated with Wet Terrace Prairie ecological sites, as well as both Loamy and Clayey Floodplain Forest sites. Soils are very deep and loamy. The reference plant community is prairie dominated by Indiangrass, big bluestem, little bluestem switch grass, eastern gamagrass, and a wide variety of prairie wildflowers.

Associated sites

F115XB015MO	Sandy/Loamy Floodplain Forest Sandy/Loamy Floodplain Forests are on lower positions adjacent to the main channel.
R115XB038MO	Wet Terrace Prairie Wet Terrace Prairies are commonly adjacent to these ecological sites.

Similar sites

R115XB038MO	Wet Terrace Prairie Wet Terrace Prairies are on similar landscape positions but have seasonal high water table wetness issues.
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Table 1. Dominant plant species

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

Physiographic features

This site is on stream terraces of the Missouri and Mississippi Rivers. Slopes are 0 to 2 percent. The site generates some runoff to adjacent terrace and floodplain sites. This site is subject to rare flooding.

The following figure (adapted from Tummons, 1982) shows the typical landscape position of this ecological site, and landscape relationships among the major ecological sites near the confluence of the Missouri and Mississippi Rivers. This site is within the area labeled as "1" on the figure, and is typically on high stream terrace positions of the Missouri and Mississippi rivers. These sites are commonly adjacent to Wet Terrace Prairie sites (labeled "2"), and are on higher positions adjacent to Floodplain Forest sites as shown in the figure.

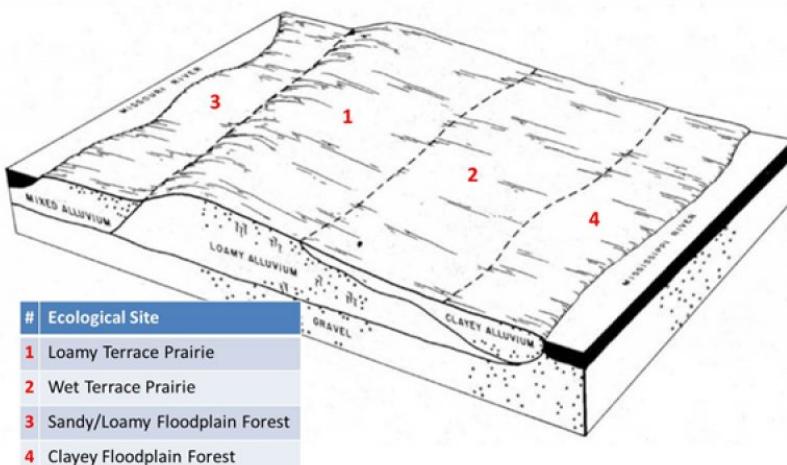


Figure 2. Landscape relationships for this ecological site.

Table 2. Representative physiographic features

Landforms	(1) Stream terrace
Flooding duration	Brief (2 to 7 days)
Flooding frequency	Rare
Ponding frequency	None
Slope	0–2%
Water table depth	60 in

Aspect	Aspect is not a significant factor
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Climatic features

The Central Mississippi Valley Wooded Slopes, Western Part 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 Central Mississippi Valley Wooded Slopes, Western Part experiences regional differences in climates, but these differences do not have obvious geographic boundaries. Regional climates grade inconspicuously into each other. The basic gradient for most climatic characteristics is along a line diagonally crossing the MLRA from northwest to southeast. Both mean annual temperature and precipitation exhibit gradients along this line.

The average annual precipitation in most of this area is 38 to 48 inches. The average annual temperature is 53 to 57 degrees F. Mean January minimum temperature follows the northwest-to-southeast gradient. However, mean July maximum temperature shows hardly any geographic variation in the MLRA. Mean July maximum temperatures have a range of only two or three degrees across the area.

Mean annual precipitation varies along the same gradient as temperature. 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. Snowfall is common in winter.

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. 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>; accessed June 2012

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 (average)	175 days
Freeze-free period (average)	199 days
Precipitation total (average)	44 in

Climate stations used

- (1) ALTON MELVIN PRICE L&D [USC00110137], West Alton, IL
- (2) KASKASKIA RVR NAV LOCK [USC00114629], Ellis Grove, IL

Influencing water features

This ecological site is on stream terraces and floodplain steps of perennial streams. They are not adjacent to the current stream channel. Short duration, rare flooding can occur in some areas, particularly during spring and early summer storm events. Constructed levees, often accompanied by stream channelization, have altered the flooding dynamics in many places and may be a sign of an alternative state.

The site generates some runoff to adjacent terrace and floodplain sites.

Soil features

These soils have no rooting restriction. The soils were formed under prairie vegetation, and have thick, dark-colored surface horizons. Parent material is alluvium. Surface horizons are primarily loam. Subsurface horizons are loamy. These soils are not affected by seasonal wetness. Soil series associated with this site include DeSioux, Littleton, Monarga, Raddle, and Worthen.

The accompanying picture of the DeSioux series shows a dark, organic-rich surface horizon grading into the loamy substrata. Roots can be seen in the picture throughout the soil profile. Scale is in centimeters. Picture courtesy of Grant Butler, NRCS.



Figure 7. DeSioux series

Table 4. Representative soil features

Surface texture	(1) Loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately slow
Soil depth	72 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	7 in
Calcium carbonate equivalent (0-40in)	0%

Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	5.6–7.8
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 tallgrass prairie unit dominated by big and little bluestem, Indian grass, switch grass, eastern gamagrass and a wide variety of prairie wildflowers while other species such as Culver's root, Michigan lily, and bunchflower added to the mix of upland drainageway prairie species. Slightly higher areas within or at the edge of the ecological site supported scattered bur oak, pin oak, elm, shellbark hickory and willow.

This ecological site occurred back from the main river channel and was the highest area in the floodplain. The higher position and loamy soil texture created a better drainage situation. Consequently, the site is less wet than adjacent sites. These areas rarely flooded.

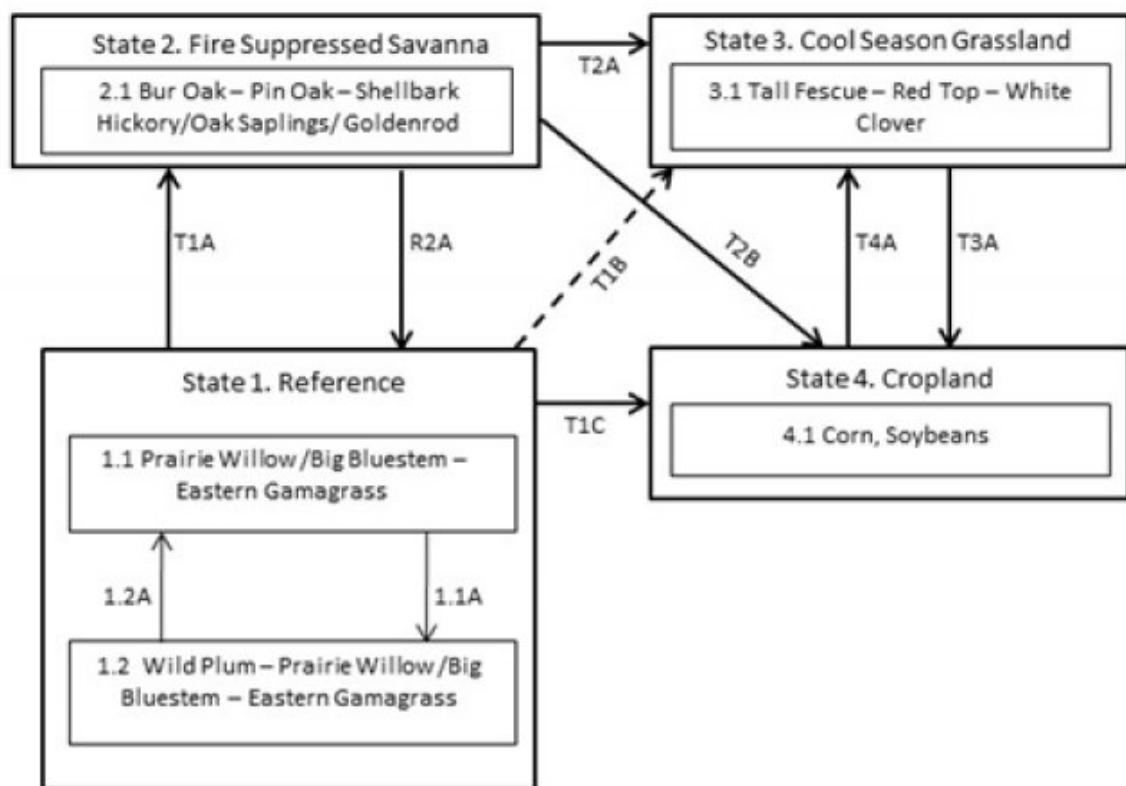
Fire played a key role in maintaining this ecological site, likely occurring at least once every three years. Fire removed dead plant litter and provided room for a lush growth of prairie vegetation. Fire also controlled woody species. During fire free intervals woody species would have increased in abundance and spread out onto the main prairie. Grazing by native large herbivores, such as bison, elk, and 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 are productive sites. Today, Loamy Terrace Prairies are nearly extirpated from the region as the former terrace prairies and savannas have been converted to intensive agriculture. Few quality remnants exist. 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

Loamy Terrace Prairie, R115BY037MO



Code	Event/Activity/Process
T1A	Fire suppression > 20 years; woody invasion
T1B	Tillage; vegetative seeding; grassland management
T1C, T3A	Tillage; conservation cropping system
T2A	Woody removal; tillage; vegetative seeding; grassland management
T2B	Woody removal; tillage; conservation cropping system
T4A	Vegetative seeding; grassland management
1.1A	Fire-free interval 10+ years
1.2A	Fire interval 1-3 years
R2A	Woody removal; thinning; prescribed fire 1-3 years

Figure 8. State and transition diagram for this ecological s

State 1

Reference

This state is tall grass prairie dominated by big bluestem, eastern gamagrass and a wide variety of prairie forbs. This state occurs on level to gently sloping soils. Bur oak, pin oak, shellbark hickory, American elm, American hazelnut, prairie willow and wild plum occurred as scattered individuals across the landscape. Two phases occurred that will transition back and forth depending on fire frequencies. Longer fire free intervals will allow woody species to increase such as prairie willow, dogwoods and wild plum. When fire intervals shorten these woody species will decrease. This state is extinct. All former reference states have been converted to cool season grassland and intensive agriculture cropland.

Community 1.1

Prairie Willow /Big Bluestem – Eastern Gamagrass

This phase is dominated by big bluestem, Indian grass, switch grass, eastern gama grass and a wide variety of prairie wildflowers while other species such as Culver's root, Michigan lily, and bunchflower added to the mix of prairie species. These areas flooded periodically. In addition to the occasional flooding, fire played a key role, likely occurring at least once every 3 years.

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).

Community 1.2

Wild Plum – Prairie Willow /Big Bluestem – Eastern Gamagrass

This phase is characterized by fire free intervals of greater than 10 years. Woody species have increased in abundance and spread out onto the prairie.

State 2

Fire Suppressed Savanna

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 shellbark hickory will begin to increase transitioning this state from a prairie to an open savanna. Native herbaceous ground cover will also decrease. This state is extinct.

Community 2.1

Bur Oak – Pin Oak – Shellbark Hickory/Oak Saplings/ Goldenrod

This is the only phase associated with this state at this time. See the corresponding state narrative for details.

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 may 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 Kentucky bluegrass 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 – Red Top – White Clover

This is the only phase associated with this state at this time. See the corresponding state narrative for details.

State 4

Cropland

This is the dominant State that exists currently with intensive cropping of corn and soybeans occurring. Some conversion to cool season hayland may occur for a limited period of time before transitioning back to cropland. Limited acres are sometimes converted to native warm season grassland through federal set-aside programs.

Community 4.1

Corn, Soybeans

This is the only phase associated with this state at this time. See the corresponding state narrative for details.

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

Table 6. Community 1.1 forest understory composition

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

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, 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, Northern Bobwhite

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

Eastern Meadowlark, Dickcissel, Field Sparrow, Northern Bobwhite, Eastern Kingbird,

Tall Vegetation Height (> 1 meter, moderate-high litter levels, little bare ground visible):

Henslow's Sparrow, Dickcissel, Field Sparrow, Northern Bobwhite, Sedge Wren

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

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*); other species include 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*), Plains Pocket Gopher (*Geomys bursarius*), Prairie Vole (*Microtus ochrogaster*), Southern Bog Lemming (*Synaptomys cooperi*), Meadow Jumping Mouse (*Zapus hudsonius*), 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*), 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 (*Neoconocephalus bivocatus*) are possible orthopteran associates of this ecological site.

*This section prepared by Mike Leahy, Natural Areas Coordinator, Missouri Department of Conservation, 2013

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. 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

No known reference sites.

Other references

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Contributors

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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	
Approved by	
Approval date	

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:
