

Ecological site R113XY004MO Wet Terrace Prairie

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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): 113X–Central Claypan Areas

The western, Missouri portion of the Central Claypan (area outlined in red on the map) is a weakly dissected till plain. Elevation ranges from about 1,000 feet in the north along the divide between the Missouri and Mississippi River watersheds to about 625 feet where the North Fork of the Salt River flows out of the area. Relief is generally low, with low slope gradients and relatively narrow drainageways. Most of the Central Claypan is in the Salt River watershed. The characteristic “claypan” occurs in the loess that caps the pre-Illinoian aged till on the broad interfluvial areas that characterize this region. Till is exposed on lower slopes. The underlying Mississippian aged limestone and Pennsylvanian aged shale is exposed in only a few places along lower slopes above the Salt 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* - *Panicum virgatum* - *Helianthus grosseserratus* Herbaceous Vegetation (CEGL002024).

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

This ecological site occurs throughout the Claypan Till Plains Subsection, and in adjacent Land Type Associations of the Wyaconda River Dissected Till Plains, Mississippi River Hills, and Chariton River Hills 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”.

Wet Terrace Prairies (green area on the map) are scattered throughout the MLRA and adjacent areas in river valleys of the major streams of the area, such as the Salt River and its tributaries. They are associated with floodplain ecological sites such as Loamy Floodplain Forest and Wet Floodplain Woodland, which are on lower positions closer to the stream channel. Adjacent upland sites are typically Till Savanna or Loess Prairie. Soils have a silty clay subsoil that perches water in the spring, and affects rooting depth and species composition. The reference plant community is prairie dominated by a dense cover of wetland species, including prairie cord grass, sedges, and wetness-tolerant forbs.

Associated sites

F109XY030MO	Loamy Floodplain Forest Loamy Floodplain Forests are often on adjacent, lower floodplain positions.
R109XY031MO	Wet Floodplain Prairie Wet Floodplain Prairies are often on adjacent, lower floodplain positions.
R109XY046MO	Till Upland Savanna Till Upland Savannas are often upslope.
R113XY002MO	Loess Upland Prairie Loess Upland Prairies are often upslope.

Similar sites

R113XY004MO	Wet Terrace Prairie There are no similar Wet Terrace Prairie ecological sites in this MLRA.
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Table 1. Dominant plant species

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

Physiographic features

This site is on footslopes and stream terraces with slopes of 0 to 9 percent. The site receives runoff from adjacent upland sites. A few areas are subject to rare flooding.

The following figure (adapted from Young and Geller, 1995) shows the typical landscape position of this ecological site, and landscape relationships with the dominant floodplain ecological sites in this MLRA.

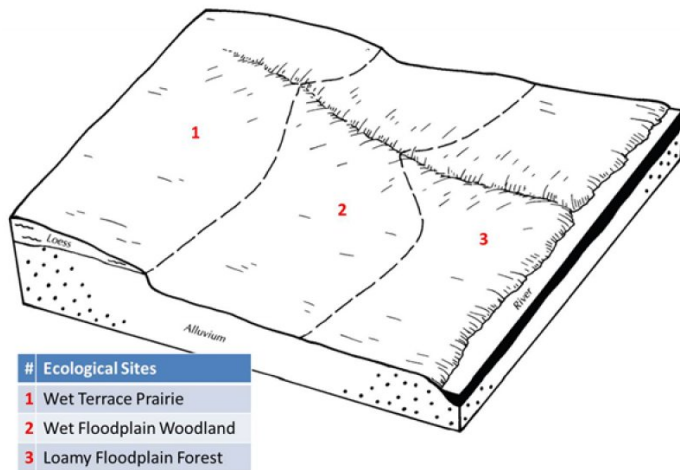


Figure 2. Landscape sequence of ecological sites

Table 2. Representative physiographic features

Landforms	(1) Stream terrace
Flooding frequency	None to rare
Ponding frequency	None to rare
Slope	0–9%
Water table depth	23–38 cm
Aspect	Aspect is not a significant factor

Climatic features

The western part of the Central Claypan Area 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 convective 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 western part of the MLRA experiences regional differences in climates that grade across the region. The basic gradient for most mean annual climatic characteristics is along a line from north to south. Both mean annual temperature and precipitation exhibit modest gradients along this line.

Mean January minimum temperature follows a 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 also varies along the north to south gradient – lower annual precipitation in the north, somewhat higher in the south. Seasonality in precipitation is very pronounced due to strong continental influences. June precipitation, for example, averages three to four 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 microclimate. 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 especially the moister valleys in the region. 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 (average)	172 days
Freeze-free period (average)	193 days
Precipitation total (average)	1,168 mm

Climate stations used

- (1) MEXICO [USC00235541], Mexico, MO
- (2) MOBERLY [USC00235671], Moberly, MO
- (3) KIRKSVILLE [USC00234544], Kirksville, MO
- (4) VANDALIA [USC00238577], Vandalia, MO

Influencing water features

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

This ecological site is on footslopes, and on high stream terraces of perennial streams. They are not adjacent to the current stream channel. A few areas on stream terraces are subject to rare flooding, typically of short duration and low intensity. Constructed levees, often accompanied by stream channelization, have altered the flooding dynamics in many places. This ecological site is influenced by a seasonal high water table, resulting from a combination of high groundwater levels and slow hydraulic conductivity, which impedes throughflow from precipitation and flood events. The water table is typically near the surface in late fall through spring, receding in the summer.

This site is in the RIVERINE wetlands class of the Hydrogeomorphic (HGM) classification system (Brinson, 1993), and are Emergent Palustrine wetlands (Cowardin et al., 1979).

This ecological site contains first-order streams, which originate from headslope positions at the upper reaches of the units, and are fed from smaller headslopes in the adjacent uplands. The lower reaches of units often contain second-order streams. These streams are ephemeral in most years, with flow in the late fall, winter, and spring months, generally disappearing in the summer, or reduced to isolated pools in the lower reaches. Stream levels typically respond quickly to storm events, especially in watersheds where surface runoff is dominant. Short-duration flooding is common in many areas. Streambeds are typically incised into the surrounding floodplain by as much as 10 feet may be a sign of an alternative state.

Sites that flood are in the RIVERINE wetlands class of the Hydrogeomorphic (HGM) classification system (Brinson, 1993), whereas footslopes and high stream terrace areas are best considered as MINERAL FLAT wetlands. These areas are Emergent Palustrine wetlands (Cowardin et al., 1979).

Soil features

These soils have an abrupt textural change to silty clay at about 12 inches, or a clayey subsoil that is similar to an abrupt textural change. Abrupt textural changes impede but do not exclude rooting. The soils were formed under prairie vegetation, and have dark, organic-rich surface horizons. Parent material is loess over alluvium or colluvium from loess and till. They have silt loam surface horizons and clayey subsoils. A seasonal high water table is perched

above the clayey subsoil during the spring months. Soil series associated with this site include Chariton, Edinburg and Gifford.

Table 4. Representative soil features

Surface texture	(1) Silt loam (2) Silty clay loam
Family particle size	(1) Clayey
Drainage class	Poorly drained
Permeability class	Very slow
Soil depth	183 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	15.24–17.78 cm
Calcium carbonate equivalent (0-101.6cm)	0%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	5.1–7.3
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.

Wet Terrace Prairie ecological sites exist because of their association with wet conditions and heavy, clayey soils. These conditions along with periodic fire have a strong influence on excluding trees. Wet Terrace Prairies are dominated by a dense cover of wet tolerant grasses and forbs. On slightly higher areas within the ecological site occasional widely scattered bur oak, pin oak, and shellbark hickory also occurred.

These sites were on relatively stable former floodplain positions that rarely flooded, probably once every 25 or so years. In addition to site wetness, periodic fire also played a role in keeping woody species at bay. Fire during dry periods removed the dense mat of leaf litter creating opportunities for plants less aggressive than the grasses and sedges.

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

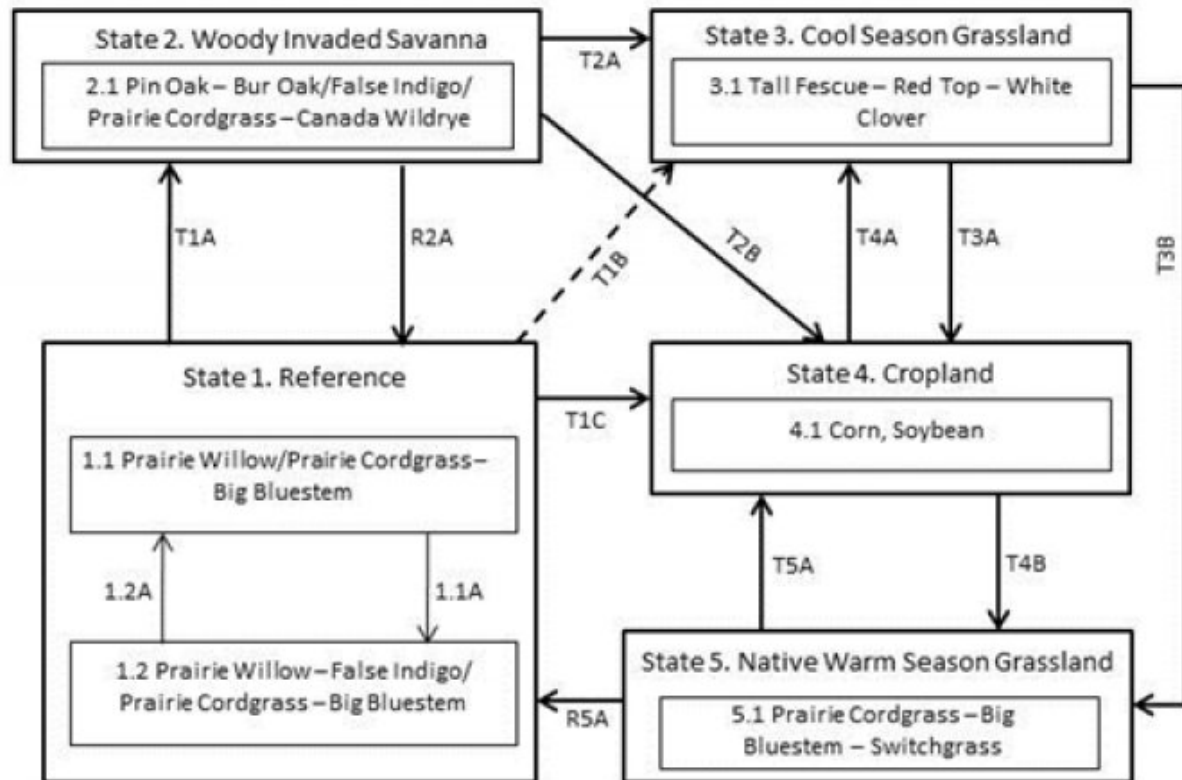
Today almost all of these ecological sites have been drained and farmed. However, during wet years, they do act as ephemeral farmed wetlands in the agricultural landscape. While their flood regime usually has been altered, their

position and soil properties still make them good candidates for wet prairie and savanna development management. Quality remnants are very rare.

A State and Transition Diagram is depicted below. Detailed descriptions of each state, transition, plant community, and pathway follow the model. This model is based on available experimental research, field observations, professional consensus, and interpretations. It is likely to change as knowledge increases.

State and transition model

Wet Terrace Prairie, R113XY004MO



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 1-3 years
R2A	Woody removal; prescribed fire 1-3 years
R5A	Vegetative seeding; prescribed fire 1-3 years

Figure 7. State and Transition Model for this ecological sit

State 1

Reference

This state is native tall grass prairie dominated by prairie cordgrass, big bluestem and a wide variety of prairie forbs. This state occurs on level to gently sloping soils. In some cases, bur oak, swamp white oak, elm, American hazelnut, prairie willow and wild plum occurred in small groves or as scattered individuals across the prairie 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 such as prairie willow, dogwoods and wild plum. When fire intervals shorten these woody species will decrease. This State is extinct. Most sites have been converted to cool season grassland and intensive agriculture cropland.

Community 1.1

Prairie Willow/Prairie Cordgrass-Big Bluestem

This phase is a wet prairie dominated by big bluestem, prairie cord grass, Eastern gamagrass and a wide variety of prairie wildflowers and sedges. Occasional bur oak, swamp white oak, pin oak, elm, American hazelnut, prairie willow and wild plum occurred as scattered individuals across the open landscape.

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

Community 1.2

Prairie Willow-False Indigo/Prairie Cordgrass-Big Bluestem

This phase is similar to community phase 1.1 but 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 woody canopy cover.

State 2

Woody Invaded Savanna

Degraded reference states that have experienced fire suppression for 20 or more years will transition to this state. With fire suppression, woody species such as bur oak and eastern redcedar will begin to increase transitioning this state from a prairie to a Woody Invaded Savanna. Native ground cover will also decrease and invasive species such as tall fescue may begin to dominate. Today, this State is probably nonexistent. Transition from this state to cool season grasslands (State 3) or intensive cropland (State 4) was very common in the late 1800's to early 1900's.

Community 2.1

Pin Oak-Bur Oak/False Indigo/Prairie Cordgrass-Canada Wildrye

This phase is a degraded state that have experienced fire suppression for 20 or more years. With fire suppression, woody species such as pin oak, shingle oak, and eastern redcedar will begin to dominate transitioning this state from a prairie to a Woody Invaded Savanna. Native ground cover will also decrease and invasive species such as tall fescue may begin to dominate.

State 3

Cool Season Grassland

Conversion of other states to non-native cool season species such as tall fescue, red top and white 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 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

Conversion of other states to non-native cool season species such as tall fescue and red top has been common in the Missouri Central Claypan area. Occasionally, these pastures will have scattered pin oaks. Long term uncontrolled grazing can cause significant soil erosion and compaction.

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 occurs 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 - Soybean

This phase has intensive cropping of corn and soybeans. Tillage operations generally leave little residue on the surface over winter. Surface drainage has usually been altered.

State 5
Native Warm Season Grassland

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

Community 5.1
Prairie Cordgrass - Big Bluestem - Switchgrass

This phase is increasing due to renewed interest in warm season grasses as a supplement to cool season grazing systems or as a native restoration activity.

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							
pin oak	QUPA2	<i>Quercus palustris</i>	Native	—	0–5	—	—
bur oak	QUMA2	<i>Quercus macrocarpa</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 (M)	Canopy Cover (%)
Grass/grass-like (Graminoids)					
big bluestem	ANGE	<i>Andropogon gerardii</i>	Native	—	10–40
prairie cordgrass	SPPE	<i>Spartina pectinata</i>	Native	—	10–40
switchgrass	PAVI2	<i>Panicum virgatum</i>	Native	—	10–30
fox sedge	CAVU2	<i>Carex vulpinoidea</i>	Native	—	5–20
fescue sedge	CAFE3	<i>Carex festucacea</i>	Native	—	5–20
hop sedge	CALU4	<i>Carex lupulina</i>	Native	—	5–20
Canada wildrye	ELCA4	<i>Elymus canadensis</i>	Native	—	5–20
bluejoint	CACA4	<i>Calamagrostis canadensis</i>	Native	—	5–20
Forb/Herb					
white doll's daisy	BOAS	<i>Boltonia asteroides</i>	Native	—	5–20
sweet coneflower	RUSU	<i>Rudbeckia subtomentosa</i>	Native	—	5–20
bearded beggarticks	BIAR	<i>Bidens aristosa</i>	Native	—	5–20
prairie ironweed	VEFA2	<i>Vernonia fasciculata</i>	Native	—	5–20
Virginia bunchflower	VEVI5	<i>Veratrum virginicum</i>	Native	—	5–20
Culver's root	VEVI4	<i>Veronicastrum virginicum</i>	Native	—	5–20
water knotweed	POAM8	<i>Polygonum amphibium</i>	Native	—	5–20
harvestlice	AGPA6	<i>Agrimonia parviflora</i>	Native	—	5–20
hemlock waterparsnip	SISU2	<i>Sium suave</i>	Native	—	5–20
Virginia iris	IRVI	<i>Iris virginica</i>	Native	—	5–20
sawtooth sunflower	HEGR4	<i>Helianthus grosseserratus</i>	Native	—	5–20
swamp milkweed	ASIN	<i>Asclepias incarnata</i>	Native	—	5–20
smooth white oldfield aster	SYRA5	<i>Symphotrichum racemosum</i>	Native	—	5–20
sawtooth sunflower	HEGR4	<i>Helianthus grosseserratus</i>	Native	—	5–20
winged lythrum	LYAL4	<i>Lythrum alatum</i>	Native	—	5–20
Shrub/Subshrub					
prairie willow	SAHU2	<i>Salix humilis</i>	Native	—	5–20
false indigo bush	AMFR	<i>Amorpha fruticosa</i>	Native	—	5–20

Animal community

Wildlife*

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

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

Turkey will utilize this ecological site for food (seeds, green browse, soft mast, insects) and nesting and brood-rearing cover. Turkey 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.

Migratory Waterbirds include: Sora, Common Snipe and Virginia Rail

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

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, Red-Winged Blackbird, American Bittern

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

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

Amphibian and reptile species associated with this ecological site's reference state condition include: 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*); Northern Crawfish Frog (*Rana areolata circulosa*), 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 amnyi*), and Bullsnake (*Pituophis catenifer sayi*).

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

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 include: 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*).

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

Hydrological functions

Influencing Water Features

Cowardin wetland types include: Palustrine Emergent Temporarily Flooded and Intermittently Flooded (high-water table may cause soil saturation in late winter and early spring).

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

EXTINCT in reference state – no plots

Other references

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Contributors

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

Rangeland health reference sheet

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

Author(s)/participant(s)	
Contact for lead author	
Date	
Approved by	
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:**
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17. **Perennial plant reproductive capability:**
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