Ecological site R115XB038MO
Wet Terrace Prairie

Last updated: 12/30/2024
Accessed: 05/12/2025

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

This MLRA is characterized by deeply dissected, loess-covered hills bordering well defined valleys of the Illinois, Mississippi, Missouri, Ohio, and Wabash Rivers and their tributaries. It is used to produce cash crops and livestock. About one-third of the area is forested, mostly on the steeper slopes. This area is in Illinois (50 percent), Missouri (36 percent), Indiana (13 percent), and Iowa (1 percent) in two separate areas. It makes up about 25,084 square miles (64,967 square kilometers).

Most of this area is in the Till Plains section and the Dissected Till Plains section of the Central Lowland province of the Interior Plains. The Springfield-Salem plateaus section of the Ozarks Plateaus province of the Interior Highlands occurs along the Missouri River and the Mississippi River south of the confluence with the Missouri River. The nearly level to very steep uplands are dissected by both large and small tributaries of the Illinois, Mississippi, Missouri, Ohio, and Wabash Rivers. The Ohio River flows along the southernmost boundary of this area in Indiana. Well defined valleys with broad flood plains and numerous stream terraces are along the major streams and rivers. The flood plains along the smaller streams are narrow. Broad summits are nearly level to undulating. Karst topography is common in some parts along the Missouri and Mississippi Rivers and their tributaries. Well-developed karst areas have hundreds of sinkholes, caves, springs, and losing streams. In the St. Louis area, many of the karst features have been obliterated by urban development.

Elevation ranges from 90 feet (20 meters) on the southernmost flood plains to 1,030 feet (320 meters) on the highest ridges. Local relief is mainly 10 to 50 feet (3 to 15 meters) but can be 50 to 150 feet (15 to 45 meters) in the steep, deeply dissected hills bordering rivers and streams. The bluffs along the major rivers are generally 200 to 350 feet (60 to 105 meters) above the valley floor.

The uplands in this MLRA are covered almost entirely with Peoria Loess. The loess can be more than 7 feet (2 meters) thick on stable summits. On the steeper slopes, it is thin or does not occur. In Illinois, the loess is underlain mostly by Illinoian-age till that commonly contains a paleosol. Pre-Illinoian-age till is in parts of this MLRA in Iowa and Missouri and to a minor extent in the western part of Illinois. Wisconsin-age outwash, alluvial deposits, and sandy eolian material are on some of the stream terraces and on dunes along the major tributaries. The loess and glacial deposits are underlain by several bedrock systems. Pennsylvanian and Mississippian bedrock are the most extensive. To a lesser extent are Silurian, Devonian, Cretaceous, and Ordovician bedrock. Karst areas have formed where limestone is near the surface, mostly in the southern part of the MLRA along the Mississippi River and some of its major tributaries. Bedrock outcrops are common on the bluffs along the Mississippi, Ohio, and Wabash Rivers and their major tributaries and at the base of some steep slopes along minor streams and drainageways.

The annual precipitation ranges from 35 to 49 inches (880 to 1,250 millimeters) with a mean of 41 inches (1,050 millimeters). The annual temperature ranges from 48 to 58 degrees F (8.6 to 14.3 degrees C) with a mean of 54 degrees F (12.3 degrees C). The freeze-free period ranges from 150 to 220 days with a mean of 195 days.

Soils The dominant soil orders are Alfisols and, to a lesser extent, Entisols and Mollisols. The soils in the area have a mesic soil temperature regime, an aquic or udic soil moisture regime, and mixed or smectitic mineralogy. They are shallow to very deep, excessively drained to poorly drained, and loamy, silty, or clayey.

The soils on uplands in this area support natural hardwoods. Oak, hickory, and sugar maple are the dominant species. Big bluestem, little bluestem, and scattered oak and eastern redcedar grow on some sites. The soils on flood plains support mixed forest vegetation, mainly American elm, eastern cottonwood, river birch, green ash, silver maple, sweetgum, American sycamore, pin oak, pecan, and willow. Sedge and grass meadows and scattered trees are on some low-lying sites. (United States Department of Agriculture, Natural Resources Conservation Service, 2022)

LRU notes

The Central Mississippi Valley Wooded Slopes, Western Part consists of deeply dissected, loess-covered hills bordering the Missouri and Mississippi Rivers as well as floodplains and terraces of these rivers. The Northern boundary runs along the South Fabius River valley separating it from the broad rounded interfluves of the northern till plain. A major physiographic feature within the LRU (Land Resource Unit) includes the Lincoln Hills region. The Lincoln Hills extend along the Mississippi River in Missouri, starting about 40 miles (64 kilometers) northwest of St. Louis and extending north to Hannibal. The Lincoln Hills partially escaped the most recent glaciation in the region during the Pleistocene. In geology and biology, they resemble the rugged and forested hills of the Ozark Highlands (MLRA 116A) more than the rolling plains of northern Missouri. The underlying limestone bedrock has formed bluffs, glades, caves, springs, and sinkholes. Elevation ranges from about 420 feet (128 meters) along the Mississippi River near Cape Girardeau, Missouri to about 830 feet (253 meters) near Clarksville along the Mississippi River upstream from St. Louis. High ridges near Hillsboro, Missouri can reach over 1,000 feet (305 meters). Underlying bedrock is mainly Ordovician-aged dolomite and sandstone, with Mississippian-aged limestone north of the Missouri River. Loess caps both stream and glacial outwash terraces along the major rivers along with Pre-Illinoisan till near the edges of the area.

Classification relationships

Major Land Resource Area (MLRA) (USDA-NRCS, 2022):
115X–Central Mississippi Valley Wooded Slopes

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.

Geographic relationship to the Missouri Ecological Classification System (Nigh & Schroeder, 2002):
This ecological site occurs primarily in Land Type Associations of the following Subsections:
Inner Ozark Border
Outer Ozark Border
Missouri River Alluvial Plain

Ecological site concept

Wet Terrace Prairies are on Mississippi and Missouri river alluvium near the confluence of the two rivers. Sites are associated with Loamy Terrace Prairie ecological sites, as well as both Loamy and Clayey Floodplain Forest sites. Soils are very deep and loamy or clayey, with seasonal high water tables. Some areas are subject to rare flooding. The reference plant community is prairie dominated by a dense cover of wetland species, including prairie cordgrass, sedges, and wet-tolerant forbs.

Associated sites

R115XB037MO	**Loamy Terrace Prairie** Loamy Terrace Prairies are commonly adjacent to these sites and are on higher positions.
F115XB041MO	**Clayey Floodplain Forest** Clayey Floodplain Forests are found adjacent to these sites but nearer the main channel and are wooded.

Similar sites

R115XB038MO	**Wet Terrace Prairie** There are no similar ecological sites in this MLRA.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Salix humilis*
Herbaceous	(1) *Spartina pectinata* (2) *Andropogon gerardii*

Physiographic features

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

The accompanying 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 “2” on the figure, and is typically on high stream terrace positions of the Missouri and Mississippi rivers. These sites are commonly adjacent to Loamy Terrace Prairie sites (labeled “1”), and are on higher positions adjacent to Floodplain Forest sites as shown in the figure.

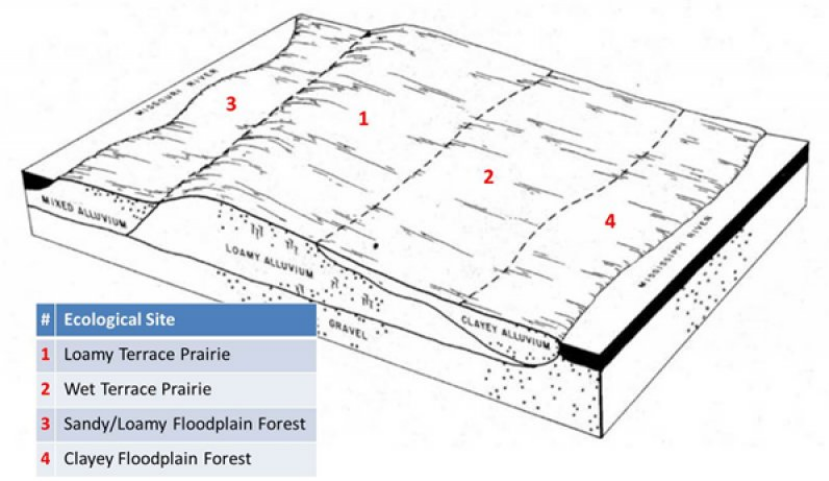


Figure 2. Landscape relationships for this ecological site.

Table 2. Representative physiographic features

Landforms	(1) Stream terrace
Runoff class	Very low to medium
Flooding duration	Brief (2 to 7 days)
Flooding frequency	Rare
Ponding frequency	None
Elevation	350–1,350 ft

Slope	0–2%
Water table depth	8–20 in
Aspect	Aspect is not a significant factor

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 (characteristic range)	160-181 days
Freeze-free period (characteristic range)	195-204 days
Precipitation total (characteristic range)	42-44 in

Frost-free period (actual range)	157-188 days
Freeze-free period (actual range)	191-205 days
Precipitation total (actual range)	41-45 in
Frost-free period (average)	171 days
Freeze-free period (average)	199 days
Precipitation total (average)	43 in

Climate stations used

- (1) ALTON MELVIN PRICE L&D [USC00110137], West Alton, IL
- (2) KASKASKIA RVR NAV LOCK [USC00114629], Ellis Grove, IL
- (3) BOONVILLE [USC00230817], Boonville, 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 and 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 no rooting restriction. They were formed under prairie vegetation. Parent material is alluvium. They have silt loam or silty clay loam surface horizons and loamy or clayey subsoils. They are affected by a seasonal high water table during the spring months. Soil series associated with this site include Blase, Nevin, Newhaven, Ridgeville, Shaffton, Speed, and Tanglenook.

Table 4. Representative soil features

Parent material	(1) Alluvium
Surface texture	(1) Silt loam (2) Silty clay loam
Family particle size	(1) Clayey
Drainage class	Poorly drained to somewhat poorly drained
Permeability class	Very slow to moderately slow
Soil depth	72 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	6–8 in
Calcium carbonate equivalent (0-40in)	0–6%

Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	4.5–8.2
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, poorly drained conditions. These conditions along with periodic fire had a strong influence on excluding trees. Wet Terrace Prairies are dominated by a dense cover of native wet tolerant grasses and forbs. On slightly higher areas within or at the edge of the prairie matrix scattered elm, bur oak, pin oak, shellbark hickory and willow occurred amid the grass-dominated landscape.

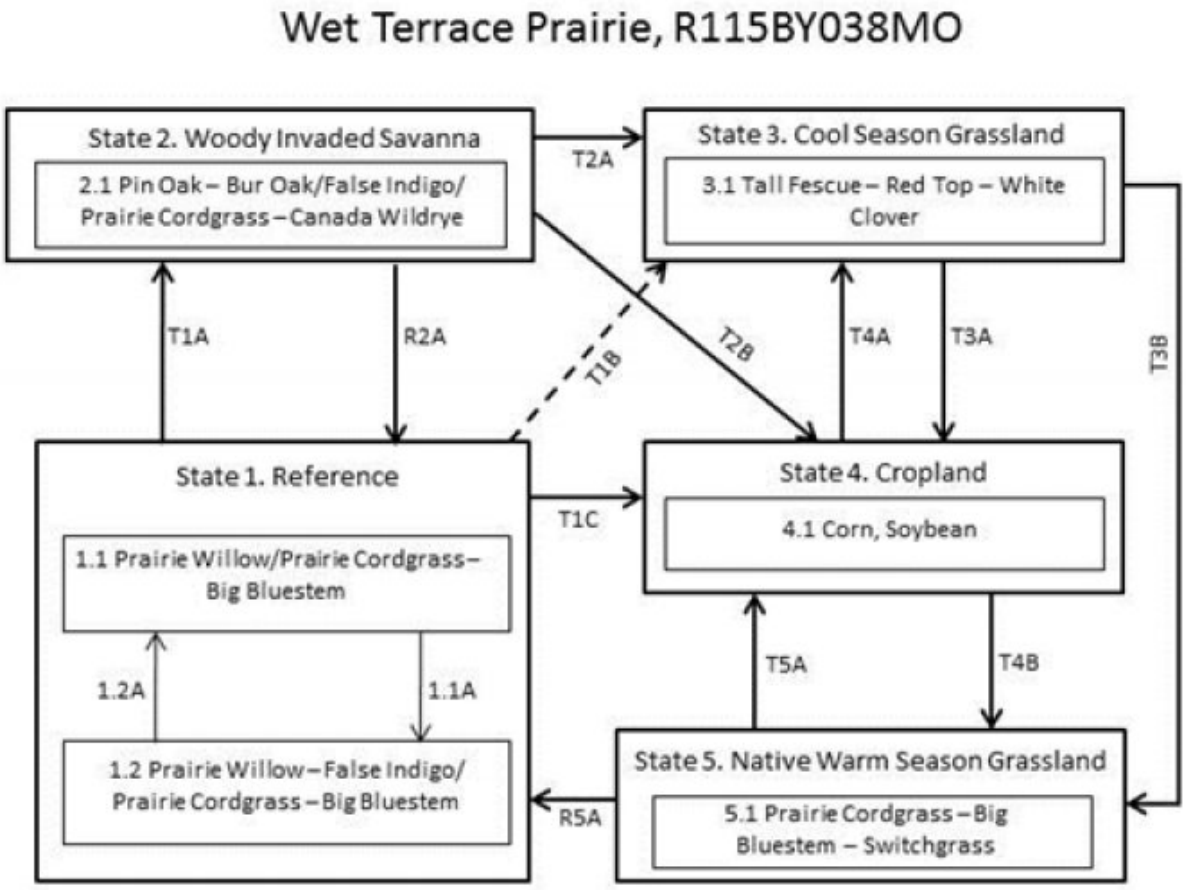
These sites are on relatively stable former floodplain positions that rarely flooded, probably once every 25 or so years. In addition to site wetness, periodic fire also played a role in keeping woody species at bay. Fire during dry periods removed the dense mat of leaf litter creating opportunities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

Wet Terrace Prairies were also subjected to grazing by native large herbivores, such as bison, elk and white-tailed 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 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



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 9. State and transition diagram for this ecological s

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, post oak, elm, American hazelnut, prairie willow and American plum occurred in small groves or as scattered individuals across the prairie landscape.

Dominant plant species

- prairie willow (*Salix humilis*), shrub
- false indigo bush (*Amorpha fruticosa*), shrub
- prairie cordgrass (*Spartina pectinata*), grass
- big bluestem (*Andropogon gerardii*), grass

Community 1.1
Prairie Willow - False Indigo Bush/Prairie Cordgrass-Big Bluestem

This phase is a native tall grass prairie dominated by prairie cordgrass, big bluestem and a wide variety of prairie forbs. Occasional shrubs are also usually present. The plant species list is based on field surveys and commonly occurring species listed in Nelson (2010).

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
Prairie Willow – False Indigo Bush/ Prairie Cordgrass – Big Bluestem

This phase is similar to community phase 1.1 but woody 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.

Pathway P1.1A
Community 1.1 to 1.2

This community pathway is the result of fire-free interval of more than 10 years.

Pathway P1.2A
Community 1.2 to 1.1

This community pathway is the result of return to fire intervals of 1 to 3 years.

State 2
Woody Invaded Savanna

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 oak and/or swamp white oak. Long term uncontrolled grazing and a lack of grassland management can cause significant soil erosion and compaction and increases in less productive species such as Kentucky bluegrass and weedy forbs such as ironweed.

Dominant plant species

- bur oak (*Quercus macrocarpa*), tree
- pin oak (*Quercus palustris*), tree
- false indigo bush (*Amorpha fruticosa*), shrub
- prairie cordgrass (*Spartina pectinata*), grass
- Canada wildrye (*Elymus canadensis*), grass

Community 2.1
Pin Oak – Bur Oak/False Indigo Bush/ Prairie Cordgrass – Canada Wildrye

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

State 3
Cool Season Grassland

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.

Dominant plant species

- tall fescue (*Schedonorus arundinaceus*), grass
- redtop (*Agrostis gigantea*), grass
- white clover (*Trifolium repens*), other herbaceous

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 occurs for a limited period of time before transitioning back to cropland.

Dominant plant species

- corn (*Zea mays*), grass
- soybean (*Glycine*), other herbaceous

Community 4.1
Corn, Soybean

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

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.

Community 5.1
Prairie Cordgrass – Big Bluestem – Switchgrass

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

Transition T1A
State 1 to 2

This transition is the result of fire suppression for at least 20 years and woody invasion.

Transition T1B
State 1 to 3

This transition is the result of fire suppression, tillage, vegetative seeding and grassland management.

Transition T1C
State 1 to 4

This transition is the result of tillage, conservation cropping system and water management.

Restoration pathway R2A
State 2 to 1

This restoration pathway is the result of woody removal and prescribed fire.

Transition T2B
State 2 to 4

This transition is the result of woody removal, tillage, conservation cropping system and water management.

Transition T3A
State 3 to 4

This transition is the result of tillage, conservation cropping system and water management.

Transition T3B
State 3 to 5

This transition is the result of vegetative seeding, prescribed fire, and grassland management.

Transition T4A
State 4 to 3

This transition is the result of vegetative seeding and grassland management.

Transition T4B
State 4 to 5

This transition is the result of vegetative seeding, prescribed fire, and grassland management.

Restoration pathway R5A
State 5 to 1

This restoration pathway is the result of vegetative seeding and prescribed fire.

Transition T5A
State 5 to 4

This transition is the result of tillage, conservation cropping system and water management.

Additional community tables

Table 5. Community 1.1 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)	Diameter (In)	Basal Area (Square Ft/Acre)
Tree							
shellbark hickory	CALA21	*Carya laciniosa*	Native	–	0–5	–	–
bur oak	QUMA2	*Quercus macrocarpa*	Native	–	0–5	–	–
pin oak	QUPA2	*Quercus palustris*	Native	–	0–5	–	–
slippery elm	ULRU	*Ulmus rubra*	Native	–	–	–	–

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	*Andropogon gerardii*	Native	–	20–40
prairie cordgrass	SPPE	*Spartina pectinata*	Native	–	20–40
switchgrass	PAVI2	*Panicum virgatum*	Native	–	20–30
bluejoint	CACA4	*Calamagrostis canadensis*	Native	–	10–20
hop sedge	CALU4	*Carex lupulina*	Native	–	10–20
fox sedge	CAVU2	*Carex vulpinoidea*	Native	–	10–20
fescue sedge	CAFE3	*Carex festucacea*	Native	–	10–20
Canada wildrye	ELCA4	*Elymus canadensis*	Native	–	10–20
Forb/Herb					
Shreve's iris	IRVIS	*Iris virginica var. shrevei*	Native	–	5–20
smooth white oldfield aster	SYRA5	*Symphyotrichum racemosum*	Native	–	5–20
sawtooth sunflower	HEGR4	*Helianthus grosseserratus*	Native	–	5–20
swamp milkweed	ASIN	*Asclepias incarnata*	Native	–	5–20
winged lythrum	LYAL4	*Lythrum alatum*	Native	–	5–20
white doll's daisy	BOAS	*Boltonia asteroides*	Native	–	5–20
sweet coneflower	RUSU	*Rudbeckia subtomentosa*	Native	–	5–20
bearded beggarticks	BIAR	*Bidens aristosa*	Native	–	5–20
seedbox	LUAL2	*Ludwigia alternifolia*	Native	–	5–20
water knotweed	POAM8	*Polygonum amphibium*	Native	–	5–20
harvestlice	AGPA6	*Agrimonia parviflora*	Native	–	5–20
hemlock waterparsnip	SISU2	*Sium suave*	Native	–	5–20
prairie ironweed	VEFA2	*Vernonia fasciculata*	Native	–	5–20
Virginia bunchflower	VEVI5	*Veratrum virginicum*	Native	–	5–20
Culver's root	VEVI4	*Veronicastrum virginicum*	Native	–	5–20
Shrub/Subshrub					
false indigo bush	AMFR	*Amorpha fruticosa*	Native	–	5–20
prairie willow	SAHU2	*Salix humilis*	Native	–	5–20

Animal community

Wildlife

Game species that utilize this ecological site include:

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: Sora, Common Snipe and Virginia Rail
Furbearers: Muskrat, Beaver, and Mink.

Bird species associated with this ecological site's reference state condition include:
Breeding birds: Sedge Wren, Red-Winged Blackbird, Least Bittern, and Common Yellowthroat.

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

Amphibian and reptile species associated with this ecological site's reference state condition include: Western Chorus Frog (Pseudacris triseriata triseriata), Southern Leopard Frog (Rana sphenocephala), Graham's Crayfish Snake (Regina grahamii), and Midland Brown Snake (Storeria dekayi wrightourm).

Small mammals associated with this ecological site's reference state condition include: Muskrat (Ondatra zibethicus), Southern Bog Lemming (Synaptomys cooperi), and Mink (Mustela vison).

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: Swamp Milkweed Leaf Beetle (Labidomera clivicollis), Cordgrass Planthopper (Prokelisia crocea), Dion Skipper butterfly (Euphyes dion), Duke's Skipper butterfly (Euphyes dukesi), native bees (Lasioglossum hartii, Hesperapis carinata, Svastra atripes and Cemolobus ipomoeae), Bullate Meadow katydid (Orchelimum bullatum) and Sedge Grasshopper (Stethophyma celatum).

Other invertebrates: Grassland Crayfish (Procambarus gracilis)

(This section prepared by Mike Leahy, Natural Areas Coordinator, Missouri Department of Conservation, 2013. References for this section: Fitzgerald and Pashley 2000b; Heitzman and Heitzman 1996; Jacobs 2001; Johnson 2000; Pitts and McGuire 2000; Schwartz and others 2001)

Other information

Forestry

Management: This ecological site is not recommended for traditional timber management activity. Historically this site was dominated by a ground cover of native prairie grasses and forbs. Some scattered open grown trees may have also been present. Altered sites may be suitable for non-traditional forestry uses such as windbreaks, environmental plantings, alley cropping (a method of planting, in which rows of trees or shrubs are interspersed with rows of crops) or woody bio-fuels.

Inventory data references

Potential Reference Sites: Wet Terrace Prairie

No quality reference sites are known to exist

Other references

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

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

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

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

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

Frost, C., 1996. Pre-settlement Fire Frequency Regimes of the United States: A First Approximation. Pages 70-81, Proceedings of the 20nd Tall Timbers Fire Ecology Conference: Fire in Ecosystem Management: Shifting the Paradigm from Suppression to Prescription. Tall Timbers Research Station, Tallahassee, FL.

Harlan, J.D., T.A. Nigh and W.A. Schroeder. 2001. The Missouri original General Land Office survey notes project. University of Missouri, Columbia.

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

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

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

Ladd, D. 1991. Reexamination of the role of fire in Missouri oak woodlands. Pp. 67-80 in G.V. Brown, James K.; Smith, Jane Kapler, eds. 2000. Wildland fire in ecosystems: effects of fire on flora. Gen. Tech. Rep. RMRS-GTR-42-vol. 2. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 257 p.

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

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

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

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

Tummons, Richard L. 1982. Soil Survey of St. Charles County, Missouri. U.S. Dept. of Agric. Soil Conservation Service.

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

United States Department of Agriculture, Natural Resources Conservation Service. 2022. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture, Agriculture Handbook 296.

University of Missouri Climate Center - http://climate.missouri.edu/climate.php; accessed June 2012

Contributors

Fred Young
Doug Wallace

Approval

Suzanne Mayne-Kinney, 12/30/2024

Acknowledgments

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

Rangeland health reference sheet

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

Author(s)/participant(s)	
Contact for lead author	
Date	05/12/2025
Approved by	Suzanne Mayne-Kinney
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:**
