

Ecological site R109XY031MO

Wet Floodplain Prairie

Last updated: 7/02/2024
Accessed: 09/28/2026

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.

MLRA notes

Major Land Resource Area (MLRA): 109X—Iowa and Missouri Heavy Till Plain

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

Classification relationships

Terrestrial Natural Community Type in Missouri (Nelson, 2010): The reference state for this ecological site is most similar to a Wet Bottomland Prairie. National Vegetation Classification System Vegetation Association (NatureServe, 2010): The reference state for this ecological site is most similar to *Spartina pectinata* - *Carex* spp. - *Calamagrostis canadensis* - *Lythrum alatum* - (*Oxypolis rigidior*) Herbaceous Vegetation (CEGL002224). Geographic relationship to the Missouri Ecological Classification System (Nigh & Schroeder, 2002): This ecological site occurs throughout the Central Dissected Till Plains Section.

Ecological site concept

NOTE: This is a “provisional” Ecological Site Description (ESD) that is under development. It contains basic ecological information that can be used for conservation planning, application and land management. As additional information is collected, analyzed and reviewed, this ESD will be refined and published as “Approved”. Wet Floodplain Prairies are widespread in floodplains throughout the MLRA and adjacent areas. Typically, this ecological site occupies most of the floodplain between Terrace sites and the ribbon of Floodplain Forest sites along the stream channel. On larger floodplains, it occupies low areas in the floodplain associated with former meander scars, tributary stream channels and backwater lowlands between natural levees of these once dynamic rivers. Here they are often associated with Pondered Floodplain Prairies on lower areas, and Wet Floodplain Woodland sites on higher areas. Soils are very deep, seasonally wet, and subject to flooding. The reference plant community is prairie dominated by a dense cover of wetland species, including prairie cordgrass, sedges, and wetness-tolerant forbs.

Associated sites

F109XY030MO	Loamy Floodplain Forest Loamy Floodplain Forest sites are often in adjacent, natural levee positions between this site and the active stream channel.
F109XY037MO	Wet Floodplain Woodland Wet Floodplain Woodlands are often in adjacent, slightly higher positions closer to the active stream channel.

R109XY002MO	Loess Upland Prairie Loess Upland Prairies, and other upland prairie and savanna ecological sites, are upslope, on summits and shoulders.
R109XY032MO	Ponded Floodplain Prairie Ponded Floodplain Prairies are often in adjacent, depressional positions farther from the channel.

Similar sites

R109XY032MO	Ponded Floodplain Prairie Ponded Floodplain Prairies have many of the same prairie species and along with similar flooding frequencies but are in slightly lower positions and subject to ponding. The lowest and wettest areas may have marshes and marsh species.
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Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Cephalanthus occidentalis</i> (2) <i>Amorpha fruticosa</i>
Herbaceous	(1) <i>Carex</i> (2) <i>Spartina pectinata</i>

Physiographic features

This site is on floodplains, with slopes of less than 5 percent. Typically these sites are in backswamp positions, not adjacent to the stream channel. Sites not protected by levees are subject to flooding.

The following figure (adapted from Abney, 1997) shows the typical landscape position of this ecological site, and landscape relationships among the major ecological sites of the floodplains and adjacent uplands. This site is within the area labeled as “2” on the figure, and is typically adjacent to the Loamy Floodplain Forest site that contains the active stream channel. In many places a band of Wet Floodplain Woodland occurs between this site and Loamy Floodplain Forest sites. Several sites occur in adjacent upland positions, such as the Loess Upland Prairie shown in the figure.

Figure 1. Landscape relationships for this ecological site

Table 2. Representative physiographic features

Landforms	(1) Flood plain
Flooding duration	Brief (2 to 7 days) to long (7 to 30 days)
Flooding frequency	Rare to occasional
Ponding duration	Very brief (4 to 48 hours)

Ponding frequency	None to rare
Slope	0 – 10 %
Water table depth	0 – 60 cm
Aspect	Aspect is not a significant factor

Climatic features

The Iowa and Missouri Heavy Till Plain MLRA has a continental type of climate marked by strong seasonality. In winter, dry-cold air masses, unchallenged by any topographic barriers, periodically swing south from the northern plains and Canada. If they invade reasonably humid air, snowfall and rainfall result. In summer, moist, warm air masses, equally unchallenged by topographic barriers, swing north from the Gulf of Mexico and can produce abundant amounts of rain, either by fronts or by convectional processes. In some summers, high pressure stagnates over the region, creating extended droughty periods. Spring and fall are transitional seasons when abrupt changes in temperature and precipitation may occur due to successive, fast-moving fronts separating contrasting air masses.

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

Mean annual precipitation varies along the same gradient as temperature – lower annual precipitation in the north, higher in the south. Seasonality in precipitation is very pronounced due to strong continental influences. June precipitation, for example, averages four to five times greater than January precipitation. During years when precipitation comes in a fairly normal manner, moisture is stored in the top layers of the soil during the winter and early spring, when evaporation and transpiration are low. During the summer months the loss of water by evaporation and transpiration is high, and if rainfall fails to occur at frequent intervals, drought will result. Drought directly influences ecological communities by limiting water supplies, especially at times of high temperatures and high evaporation rates. Drought indirectly affects ecological communities by increasing plant and animal susceptibility to the probability and severity of fire. Frequent fires encourage the development of grass/forb dominated communities and understories.

Superimposed upon the basic MLRA climatic patterns are local topographic influences that create topoclimatic, or microclimatic variations. For example, air drainage at nighttime may produce temperatures several degrees lower in valley bottoms than on side slopes. At critical times during the year, this phenomenon may produce later spring or earlier fall freezes in valley bottoms. Slope orientation is an important topographic influence on climate. Summits and south-and-west-facing slopes are regularly warmer and drier, supporting more grass dominated communities than adjacent north- and-east-facing slopes that are cooler and moister that support more woody dominated communities. Finally, the cooler microclimate within a canopied forest is measurably different from the climate of a more open and warmer grassland or savanna area.

Source: University of Missouri Climate Center - <http://climate.missouri.edu/climate.php>; Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin, United States Department of Agriculture Handbook 296 - <http://soils.usda.gov/survey/geography/mlra/>

Table 3 Representative climatic features

Frost-free period (characteristic range)	150-160 days
Freeze-free period (characteristic range)	170-190 days
Precipitation total (characteristic range)	970-1,040 mm
Frost-free period (actual range)	130-170 days

Freeze-free period (actual range)	160-200 days
Precipitation total (actual range)	940-1,070 mm
Frost-free period (average)	150 days
Freeze-free period (average)	180 days
Precipitation total (average)	1,020 mm

- (1) CONCEPTION [USC00231822], Conception, MO
- (2) SALISBURY [USC00237514], Salisbury, MO
- (3) CHARITON 1 E [USC00131394], Chariton, IA
- (4) KEARNEY 3E [USC00234382], Kearney, MO
- (5) TRENTON [USC00238444], Trenton, MO
- (6) KEOKUK LOCK DAM 19 [USC00134381], Keokuk, IA

Influencing water features

This ecological site is in floodplains of perennial streams, primarily in backswamp positions, and are not typically adjacent to the current stream channel. They are influenced by a seasonal high water table, due to high groundwater levels in these topographically low positions. Most soils also have 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.

Stream levels typically respond quickly to storm events, especially in watersheds where surface runoff is dominant. Medium- to long-duration flooding is common in many areas, particularly during spring and early summer storm events. Constructed levees, often accompanied by stream channelization, have altered the hydrology and flooding dynamics in many places.

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).

Soil features

These soils were formed under prairie vegetation, and have dark, organic-rich surface horizons. Parent material is alluvium. They have silt loam or silty clay loam surface horizons, and loamy or clayey substrata lacking argillic horizons. These soils are affected by a seasonal water table in the spring months. Soil series associated with this site include Ackmore, Amana, Carlow, Chequest, Colo, Excello, Otter, Vesser, Wabash, and Zook.

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	Very poorly drained to somewhat poorly drained

Permeability class	Very slow to moderately slow
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	12.7 – 20.32 cm
Calcium carbonate equivalent (0-101.6cm)	Not specified
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	Not specified
Soil reaction (1:1 water) (0-101.6cm)	5.2 – 7.8
Subsurface fragment volume <=3" (Depth not specified)	Not specified
Subsurface fragment volume >3" (Depth not specified)	Not specified

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 Floodplain Prairie ecological sites exist because of their association with low, persistent wet areas with very poorly drained, heavy, frequently flooded soils. These conditions along with periodic fire have a strong influence on excluding trees and shrubs. Wet Floodplain Prairies are dominated by a dense cover of wetland species, including prairie cordgrass, sedges and wet tolerant forbs.

Prior to levee development and channeling, these areas were regularly flooded by typically slow-moving backwater floods. Unaltered sites usually were flooded at least three months of the year. Seasonal high water table created further inundation and ponding.

Fire during dry periods removed the dense mat of leaf litter creating opportunities for plants less aggressive than the grasses and sedges. Peak water levels were usually high and persistent enough to preclude tree establishment under normal hydrologic regimes. In the long term, siltation slowly filled these depressions, altering flood duration and causing a shift toward floodplain woodland communities.

Today most of these ecological sites have been drained and farmed. Only a very few quality remnants exist. While their flood regime usually has been altered, because of their site conditions, during wet years, they still act as ephemeral farmed wetlands in the agricultural landscape. Their position and soil properties also still make them good candidates for wet prairie development management. Left unfarmed, these sites can quickly develop into naturally wet communities.

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.

State and transition model

Figure 8. State and transition diagram for this ecological s

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 6. Community 1.1 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (m)	Canopy Cover (%)
Grass/grass-like (Graminoids)					
prairie cordgrass	SPPE	<i>Spartina pectinata</i>	Native	–	20-40
shoreline sedge	CAHY3	<i>Carex hyalinolepis</i>	Native	–	10-20
hop sedge	CALU4	<i>Carex lupulina</i>	Native	–	10-20
fox sedge	CAVU2	<i>Carex vulpinoidea</i>	Native	–	10-20
fescue sedge	CAFE3	<i>Carex festucacea</i>	Native	–	10-20
Canada wildrye	ELCA4	<i>Elymus canadensis</i>	Native	–	10-20
rice cutgrass	LEOR	<i>Leersia oryzoides</i>	Native	–	10-20
fowl mannagrass	GLST	<i>Glyceria striata</i>	Native	–	5-10
Torrey's rush	JUTO	<i>Juncus torreyi</i>	Native	–	5-10
Forb/Herb					
water knotweed	POAM8	<i>Polygonum amphibium</i>	Native	–	5-20
swamp milkweed	ASIN	<i>Asclepias incarnata</i>	Native	–	5-20
winged lythrum	LYAL4	<i>Lythrum alatum</i>	Native	–	5-20
white doll's daisy	BOAS	<i>Boltonia asteroides</i>	Native	–	5-20
bearded beggarticks	BIAR	<i>Bidens aristosa</i>	Native	–	5-20
prairie ironweed	VEFA2	<i>Vernonia fasciculata</i>	Native	–	5-20
sawtooth sunflower	HEGR4	<i>Helianthus grosseserratus</i>	Native	–	5-20
smooth white oldfield aster	SYRA5	<i>Symphyotrichum racemosum</i>	Native	–	5-20
Virginia iris	IRVI	<i>Iris virginica</i>	Native	–	5-20
American water horehound	LYAM	<i>Lycopus americanus</i>	Native	–	5-20
swamp smartweed	POHY2	<i>Polygonum hydropiperoides</i>	Native	–	5-20
harvestlice	AGPA6	<i>Agrimonia parviflora</i>	Native	–	5-20
Shrub/Subshrub					
common buttonbush	CEOC2	<i>Cephalanthus occidentalis</i>	Native	–	5-20
false indigo bush	AMFR	<i>Amorpha fruticosa</i>	Native	–	5-20

Table 7. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 8. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 9. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 10. Community 4.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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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: Breeding birds: Sedge Wren, Red-Winged Blackbird, American Bittern, Marsh Wren, and Common Yellowthroat. 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: Western Chorus Frog (*Pseudacris triseriata triseriata*), Plains Leopard Frog (*Rana blairi*), Graham's Crayfish Snake (*Regina grahamii*), Midland Brown Snake (*Storeria dekayi wrightourm*), prairies with crawfish burrows may have Northern Crawfish Frog (*Rana areolata circulosa*); Western Fox Snake (*Elaphe vulpina vulpina*), and Western Massasauga rattlesnake (*Sistrurus catenatus tergeminus*). Small mammals associated with this ecological site's reference state condition: 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: 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 states may be suitable for non-traditional forestry uses such as windbreaks, environmental plantings, alley cropping (a method of planting, in which rows of trees or shrubs are interspersed with rows of crops) or woody bio-fuels.

Inventory data references

Potential Reference Sites: Wet Floodplain Prairie Plot PERSSP_KS02 – Wabash soil Located in Pershing State Park, Linn County, MO Latitude: 39.773165 Longitude: - 93.218119 Plot PERSP_KS12 – Carlow soil Located in Pershing State Park, Linn County, MO Latitude: 39.738824 Longitude: -93.228899 Plot YECRA_KS01 – Chequest soil Located in Yellow Creek CA, Chariton County, MO Latitude: 39.582209 Longitude: - 93.227056

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Contributors

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Approval

Suzanne Mayne-Kinney, 7/02/2024

Acknowledgments

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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	09/28/2026

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:

17. Perennial plant reproductive capability:
