USDA Natural Resources Conservation Service

Ecological site R109XY032MO
Ponded Floodplain Prairie

Last updated: 7/01/2024
Accessed: 05/21/2025

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): 109X–Iowa and Missouri Heavy Till Plain

The Iowa and Missouri Heavy Till Plain is an area of rolling hills interspersed with interfluve divides and alluvial valleys. Elevation ranges from about 660 feet along the lower

reaches of rivers, to about 980 feet on stable interfluve summits in southern Iowa. Relief is about 80 to 160 feet between major streams and adjacent interfluve 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-Illinoisan aged till on interfluves, 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, or Marsh.

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 primarily within the Grand River Alluvial Plains Land Type Association of the Grand River Hills Subsection.

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”.

Ponded Floodplain Prairies are not extensive and are primarily in floodplains of the Grand River watershed in the southern part of the MLRA. They occur in depressional areas of the floodplain associated with former meander scars, tributary stream channels and backswamps between natural levees of these once dynamic rivers. They are often associated with Wet Floodplain Prairie ecological sites, which are on slightly higher positions. Soils are very deep, wet, and clayey, and are subject to ponding and flooding. The reference plant community is prairie dominated by a dense cover of wetland species, including buttonbush, willow, prairie cordgrass, sedges, and wet-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.
R109XY031MO	**Wet Floodplain Prairie** Wet Floodplain Prairies are often in adjacent, slightly higher backswamp positions.
R109XY046MO	**Till Upland Savanna** Till Upland Savannas, and other upland prairie and savanna ecological sites, are upslope, on gently sloping backslopes.

Similar sites

R109XY031MO	**Wet Floodplain Prairie** Wet Floodplain Prairies have many of the same prairie species along with a similar flooding frequency but are higher on the floodplain and not subjected to long ponding periods.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Cephalanthus occidentalis*
Herbaceous	(1) *Spartina pectinata* (2) *Carex*

Physiographic features

This site is in depressional areas of backswamps in floodplains within the Grand River watershed. Slopes are less than 2 percent. The site receives runoff from adjacent floodplain sites. Areas not protected by levees are frequently flooded. The site is subject to intermittent ponding.

The following figure (adapted from Benham, 1990) shows a 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 “3” on the figure, and is in backswamp positions that are not adjacent to the stream channel. These sites are typically adjacent to Wet Floodplain Prairie sites. Several sites occur in adjacent upland positions, particularly the Till Upland Savanna shown in the figure.

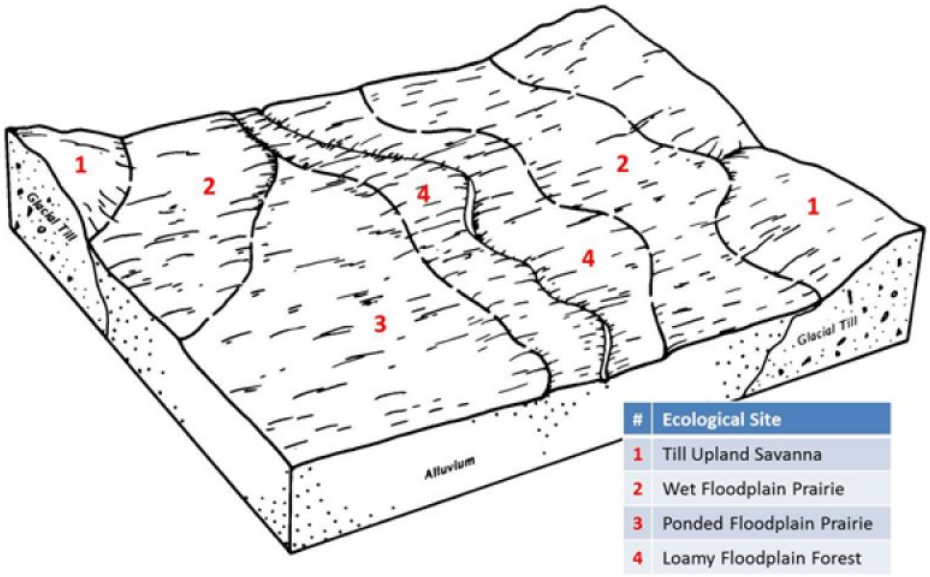


Figure 2. Landscape relationships for this ecological site

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	Brief (2 to 7 days) to long (7 to 30 days)
Ponding frequency	Occasional to frequent
Slope	0–2%
Water table depth	0–15 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)	156-161 days
Freeze-free period (characteristic range)	187-189 days
Precipitation total (characteristic range)	1,041-1,067 mm
Frost-free period (actual range)	155-162 days
Freeze-free period (actual range)	187-189 days
Precipitation total (actual range)	1,041-1,067 mm

Frost-free period (average)	159 days
Freeze-free period (average)	188 days
Precipitation total (average)	1,067 mm

Climate stations used

- (1) CHILLICOTHE 2S [USC00231580], Chillicothe, MO
- (2) BROOKFIELD [USC00230980], Brookfield, MO

Influencing water features

This ecological site is in floodplains of perennial streams, in backswamp positions, and are not 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, as well as slow hydraulic conductivity, which impedes throughflow from precipitation and flood events. The water table is typically near or at the surface in late fall through spring, receding in the summer. Ephemeral ponding may occur as a result of entrapment of floodwaters in these depressional positions, from seasonal high groundwater tables above the soil surface, as a result of runoff from higher positions in the floodplain and adjacent uplands, or a combination of these factors.

Stream levels typically respond quickly to storm events, especially in watersheds where surface runoff is dominant. 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 DEPRESSIONAL wetlands class of the Hydrogeomorphic (HGM) classification system (Brinson, 1993).

Cowardin (Cowardin et al., 1979) wetland types include: Palustrine Emergent Seasonally Flooded, Palustrine Emergent Temporarily Flooded, and Palustrine Emergent Semipermanently Flooded.

Soil features

These soils are very deep, with seasonal high water tables. They were formed under herbaceous wetland vegetation, and have dark, organic-rich surface horizons. Parent material is alluvium. They have silty clay to clay surface horizons, with clayey subsurface layers. Soil series associated with this site include Portage.

Table 4. Representative soil features

Parent material	(1) Alluvium

Surface texture	(1) Silty clay
Family particle size	(1) Clayey
Drainage class	Very poorly drained
Permeability class	Very slow
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	10.16 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)	4.5–6.2
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.

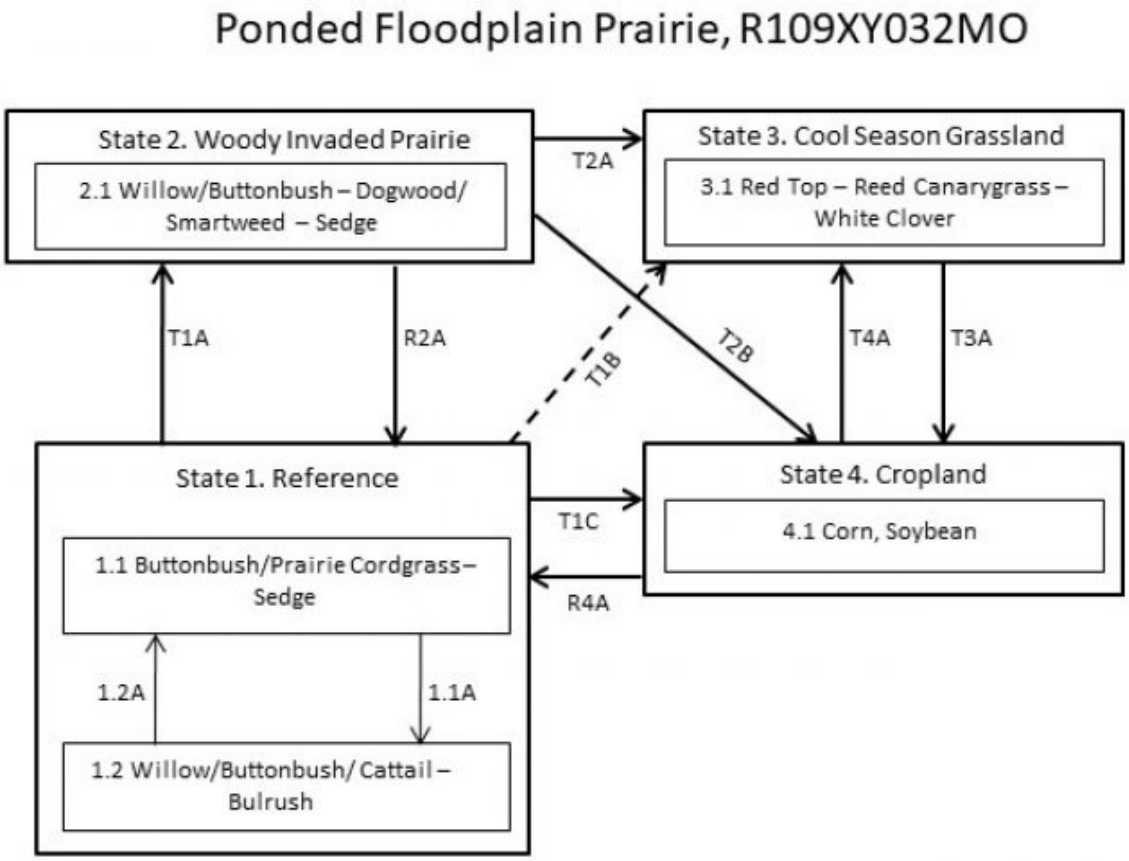
Ponded Floodplain Prairie ecological sites exist because of their association with low, wet areas with very poorly drained, heavy soils. These conditions along with periodic fire have a strong influence on excluding trees. Ponded Floodplain Prairies are dominated by a dense cover of wetland species, including prairie cordgrass, sedges and wet tolerant forbs. Shrubs, such as buttonbush and willow, are scattered throughout. The lowest and wettest areas may have marshes with cattails, river bulrush and other emergent wetland species, and minor areas of open water.

Prior to levee development and channeling, these areas were regularly flooded by typically slow-moving backwater floods. Some further inundation and ponding occurred through groundwater movement. Unaltered sites usually were flooded at least six months of the year. In addition to flooding, periodic fire also played a limited role in controlling woody species. Fire during dry periods removed the dense mat of leaf litter creating opportunities for plants less aggressive than the grasses and sedges. Over the long term, siltation slowly fills these depressions, altering flood duration and causing a shift toward floodplain forest or woodland communities.

Today most of these ecological sites have been drained and farmed. Only a very few quality remnants exist. However, because of their site conditions, 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 marsh development management. Left unfarmed, these wet depressions 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



Code	Event/Activity/Process
T1A	Woody invasion; reduced flooding and ponding
T1B	Tillage; vegetative seeding; grassland management; drainage water management
T1C	Tillage; conservation cropping system; drainage water management
T3A	Tillage; conservation cropping system
T2A	Woody removal; tillage; vegetative seeding; grassland management
T2B	Woody removal; tillage; conservation cropping system
T4A	Vegetative seeding ; grassland management
1.1A	Increased flooding and ponding
1.2A	Decreased flooding and ponding
R2A	Woody removal; restore natural hydrology
R3A, R4A	Vegetative seeding; restore natural hydrology

Figure 9. State and transition diagram for this ecological site

State 1
Reference

This state is typical of wet depressional prairies and marshes that experience full horizon saturation (endosaturation) for extended periods during the growing season. Long duration flooding regimes are common during some years. Two phases can occur that will transition back and forth depending on ponding and flooding frequencies. Longer ponding and flooding intervals with periods of open water will reduce woody species such prairie willow, dogwoods and false indigo. When ponding and flooding intervals shorten these woody species will increase or re-establish. This state is very rare. Nearly all sites have been converted to intensive agriculture cropland along with some cool season grassland.

Dominant plant species

- buttonbush (*Cephalanthus*), shrub
- willow (*Salix*), shrub
- prairie cordgrass (*Spartina pectinata*), other herbaceous
- sedge (*Abildgaardia*), other herbaceous
- cattail (*Typha*), other herbaceous
- bulrush (*Blysmus*), other herbaceous

Community 1.1
Buttonbush/Prairie Cord Grass – Sedge

Figure 10. Ponded Floodplain Prairie at Pershing State Park, Linn County, Missouri

This phase is dominated by a dense cover of wetland species, including prairie cord grass, sedges and wet tolerant forbs. Shrubs, such as buttonbush and willow, are scattered throughout. The lowest and wettest areas may have marshes with cattails, river bulrush and other emergent wetland species, and minor areas of open water

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

Dominant plant species

- buttonbush (*Cephalanthus*), shrub
- prairie cordgrass (*Spartina pectinata*), other herbaceous
- sedge (*Abildgaardia*), other herbaceous

Community 1.2
Willow/Buttonbush/ Cattail – Bulrush

This phase has longer ponding and flooding and will reduce woody species such prairie willow, dogwoods and false indigo. Marsh species such as cattails and bulrushes will increase.

Dominant plant species

- buttonbush (*Cephalanthus*), shrub
- willow (*Salix*), shrub
- cattail (*Typha*), other herbaceous
- bulrush (*Blysmus*), other herbaceous

Pathway 1.1A
Community 1.1 to 1.2

Increased flooding and ponding

Pathway 1.1A
Community 1.2 to 1.1

Increased flooding and ponding

State 2
Woody Invaded Prairie

Degraded reference states that have experienced reduced ponding and flooding reduction for 20 or more years will transition to this state. With reduced ponding and flooding, woody species such as willow, silver maple and dogwood will begin to increase transitioning this state from a prairie to a Woody Invaded Prairie. Native ground cover will also decrease. Transition from this state to cool season grasslands (State 3) or intensive cropland (State 4) was very common.

Dominant plant species

- willow (*Salix*), shrub

- buttonbush (*Cephalanthus*), shrub
- dogwood (*Cornus*), shrub
- smartweed (*Polygonum kawagoeanum*), other herbaceous
- sedge (*Abildgaardia*), other herbaceous

Community 2.1
Willow/Buttonbush – Dogwood/ Smartweed – Sedge

Dominant plant species

- willow (*Salix*), shrub
- buttonbush (*Cephalanthus*), shrub
- dogwood (*Cornus*), shrub
- smartweed (*Polygonum kawagoeanum*), other herbaceous
- sedge (*Abildgaardia*), other herbaceous

State 3
Cool Season Grassland

Conversion of other states to non-native cool season species such as Reed canarygrass, white clover, and red top occurs infrequently. Occasionally, these pastures will have scattered bur oaks or pecan. Transitioning to a Cropland State to help eliminate non-native grassland species and then restoring to a reference state is usually the easiest and most useful method of restoration from this state.

Dominant plant species

- redtop (*Agrostis gigantea*), other herbaceous
- reed canarygrass (*Phalaris arundinacea*), other herbaceous
- white clover (*Trifolium repens*), other herbaceous

Community 3.1
Red Top – Reed Canarygrass – White Clover

Dominant plant species

- redtop (*Agrostis gigantea*), other herbaceous
- reed canarygrass (*Phalaris arundinacea*), other herbaceous
- white clover (*Trifolium repens*), other herbaceous

State 4
Cropland

With extensive drainage, this is the dominant state that exists currently with intensive cropping of corn and soybeans occurring. Farmed wetlands are common. A return to the reference state may be difficult and costly, requiring a very long term series of

management options.

Dominant plant species

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

Community 4.1
Cropland

Dominant plant species

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

Transition T1A
State 1 to 2

Woody invasion; reduced flooding and ponding

Transition T1B
State 1 to 3

Tillage; vegetative seeding; grassland management; drainage water management

Transition T1C
State 1 to 4

Tillage; conservation cropping system; drainage water management

Restoration pathway R2A
State 2 to 1

Woody removal; restore natural hydrology

Transition T2A
State 2 to 3

Woody removal; tillage; vegetative seeding; grassland management

Transition T2B
State 2 to 4

Woody removal; tillage; conservation cropping system

Transition T3A
State 3 to 4

Tillage; conservation cropping system

Restoration pathway R4A
State 4 to 1

Vegetative seeding; restore natural hydrology

Restoration pathway T4A
State 4 to 3

Vegetative seeding; grassland management

Additional community tables

Table 5. Community 1.1 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (M)	Canopy Cover (%)
Grass/grass-like (Graminoids)					
broadleaf cattail	TYLA	*Typha latifolia*	Native	–	5–40
narrowleaf cattail	TYAN	*Typha angustifolia*	Native	–	5–40
prairie cordgrass	SPPE	*Spartina pectinata*	Native	–	20–40
shoreline sedge	CAHY3	*Carex hyalinolepis*	Native	–	10–20
softstem bulrush	SCTA2	*Schoenoplectus tabernaemontani*	Native	–	10–20
rice cutgrass	LEOR	*Leersia oryzoides*	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
Forb/Herb					
common duckweed	LEMI3	*Lemna minor*	Native	–	5–30
American lotus	NELU	*Nelumbo lutea*	Native	–	5–20
yellow pond-lily	NULU	*Nuphar lutea*	Native	–	5–20
broadleaf arrowhead	SALA2	*Sagittaria latifolia*	Native	–	5–20
harvestlice	AGPA6	*Agrimonia parviflora*	Native	–	5–20
sawtooth sunflower	HEGR4	*Helianthus grosseserratus*	Native	–	5–20
swamp milkweed	ASIN	*Asclepias incarnata*	Native	–	5–20

broadfruit bur-reed	SPEU	*Sparganium eurycarpum*	Native	–	5–20
humped bladderwort	UTGI	*Utricularia gibba*	Native	–	5–20
nodding beggartick	BICE	*Bidens cernua*	Native	–	5–20
jewelweed	IMCA	*Impatiens capensis*	Native	–	5–20
water knotweed	POAM8	*Polygonum amphibium*	Native	–	5–20
smooth white oldfield aster	SYRA5	*Symphyotrichum racemosum*	Native	–	5–20
Virginia iris	IRVI	*Iris virginica*	Native	–	5–20
American water horehound	LYAM	*Lycopus americanus*	Native	–	5–20
swamp smartweed	POHY2	*Polygonum hydropiperoides*	Native	–	5–20
winged lythrum	LYAL4	*Lythrum alatum*	Native	–	5–20
bearded beggarticks	BIAR	*Bidens aristosa*	Native	–	5–20
prairie ironweed	VEFA2	*Vernonia fasciculata*	Native	–	5–20
Shrub/Subshrub					
common buttonbush	CEOC2	*Cephalanthus occidentalis*	Native	–	5–20
narrowleaf willow	SAEX	*Salix exigua*	Native	–	5–20
false indigo bush	AMFR	*Amorpha fruticosa*	Native	–	5–20

Animal community

Wildlife
Game species that likely utilize this ecological site include:
Waterfowl: Mallard, Blue-Winged Teal, Green-Winged Teal, American Black Duck, Northern Pintail, Gadwall, American Widgeon, and Northern Shoveler. Other waterbirds: Sora, Virginia Rail, Common Snipe

Furbearers: Muskrat, Beaver, and Mink.

Bird species associated with this ecological site's reference state condition:
Breeding birds likely associated with herbaceous perennial plant dominated (Spartina pectinata, Typha species, Polygonum amphibium, Schoenoplectus fluviatilis, Carex species, Sparganium eurycarpum) areas of this ecological site (Palustrine Emergent Semipermanently Flooded): Sedge Wren, Red-Winged Blackbird, American Bittern, Least Bittern, Mallard, Sora, Common Moorhen, Marsh Wren, and Common Yellowthroat.

A number of migratory bird species are likely associated with annual plant (Eleocharis species, Bidens species, Cyperus species, Polygonum lapathifolium, Polygonum hydropiper) dominated areas and mudflats of this ecological site (Palustrine Emergent Seasonally Flooded, Palustrine Emergent Temporarily Flooded): Great Egret, Common

Snipe, Pectoral Sandpiper, Greater Yellowlegs, Semipalmated Plover, and dabbling ducks (e.g., Mallard, Blue-Winged Teal, Gadwall, and Northern Pintail).

Breeding birds associated with woody vegetation dominated areas of this ecological site: Common Yellowthroat, Yellow Warbler, and Song Sparrow.

Amphibian and reptile species that may be associated with this ecological site's reference state: Western Chorus Frog (Pseudacris triseriata triseriata), Plains Leopard Frog (Rana blairi), Bullfrog (Rana catesbeiana), Southern Leopard Frog (Rana sphenocephala), Western Painted Turtle (Chrysemys picta bellii), Diamond-backed Water Snake (Nerodia rhombifer rhombifer), Graham's Crayfish Snake (Regina grahamii), Midland Brown Snake (Storeria dekayi wrightourm), Northern Leopard Frog (Rana pipiens) and Western Ribbon Snake (Thamnophis proximus proximus).

Small mammals likely 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 dragonflies and damselflies, beetles, and ants. 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), Sedge Grasshopper (Stethophyma celatum), the Lance-tipped Darner dragonfly (Aeshna constricta) and the Ruby Meadowhawk dragonfly (Sympetrum rubicundulum).

Other invertebrates: Grassland Crayfish (Procambarus gracilis), Northern Crayfish (Orconectes virilis), Papershell Crayfish (O. immunis).

(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, sedges and forbs. Some scattered open grown trees and shrubs may have also been present. Altered states 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: Ponded Floodplain Prairie

Plot PERSP01 – Portage soil
Located in Pershing State Park, Linn County, MO
Latitude: 39.750615
Longitude: -93.224637

Plot PERSP_KS06 – Portage soil
Located in Pershing State Park, Linn County, MO
Latitude: 39.766259
Longitude: -93.219871

Plot PERSP_KS10 – Portage soil
Located in Pershing State Park, Linn County, MO
Latitude: 39.736914
Longitude: -93.233456

Plot PERSP_KS11 – Portage soil
Located in Pershing State Park, Linn County, MO
Latitude: 39.73886
Longitude: -93.233252

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Contributors

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Approval

Suzanne Mayne-Kinney, 7/01/2024

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.

This site was originally approved on 07/28/2015 for publication.

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	05/21/2025
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):**

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

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

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

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

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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:**