USDA Natural Resources Conservation Service

Ecological site R109XY038MO
Wet Terrace Prairie

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General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

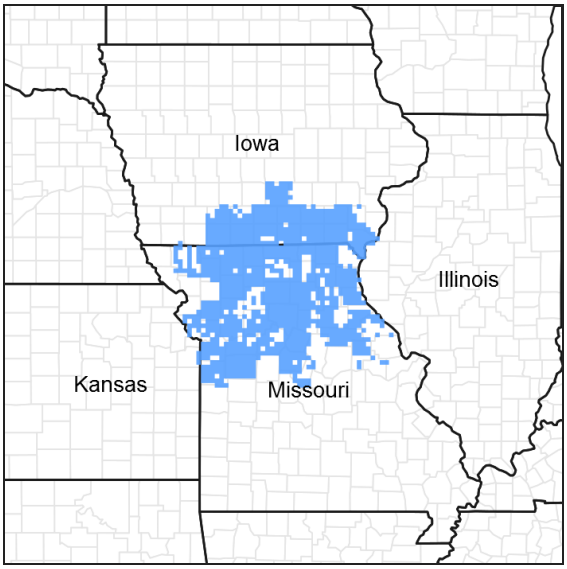


Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

MLRA notes

Major Land Resource Area (MLRA): 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-Mesic Bottomland Prairie.

National Vegetation Classification System Vegetation Association (NatureServe, 2010):
The reference state for this ecological site is most similar to Andropogon gerardii - Panicum virgatum - Helianthus grosseserratus Herbaceous Vegetation (CEGL002024).

Geographic relationship to the Missouri Ecological Classification System (Nigh & Schroeder, 2002):
This ecological site occurs throughout the 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 Terrace Prairies are widely distributed in the MLRA. Soils are very deep, with clayey subsoils and seasonal high water tables. Many areas are subject to 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

R109XY002MO	**Loess Upland Prairie** Loess Upland Prairies are upslope.
R109XY031MO	**Wet Floodplain Prairie** Wet Floodplain Prairies are downslope.

Similar sites

R109XY029MO	**Wet Upland Drainageway Prairie** Wet Upland Drainageway Prairies are similar in composition and structure and are subject to flooding but occur in narrow drainageways in the uplands.

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 high floodplains and stream terraces. Slopes are 0 to 9 percent. The site receives some runoff from adjacent stream terrace sites. Most areas are subject to flooding.

The following figure (adapted from Boeckman, 1992) shows a typical landscape position of this ecological site, and landscape relationships among the major ecological sites of the floodplains and stream terraces. This site is within the area labeled as “2” on the figure, and is typically associated with Wet Loess Terrace Prairie sites, and Floodplain ecological sites such as the Loamy Floodplain Forest and Wet Floodplain Prairie sites shown in the figure.

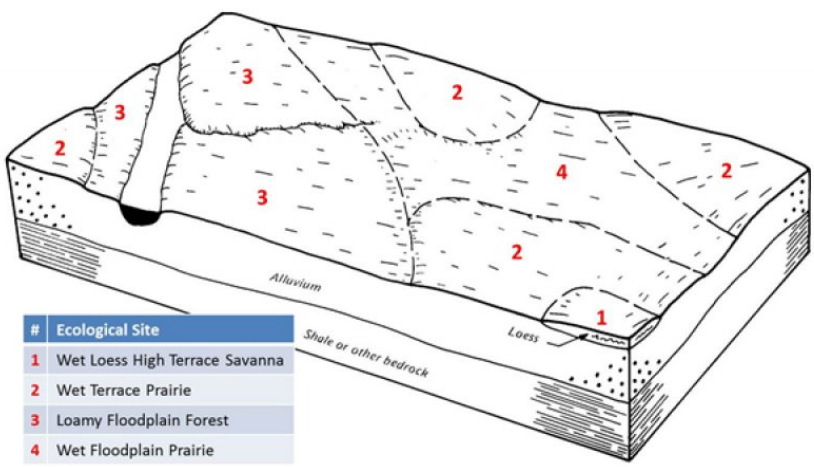


Figure 2. Landscape relationships for this ecological site

Table 2. Representative physiographic features

Landforms	(1) Stream terrace (2) Flood-plain step
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	None to occasional
Ponding frequency	None
Slope	0–9%
Water table depth	6–24 in
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)	146-154 days
Freeze-free period (characteristic range)	168-186 days
Precipitation total (characteristic range)	40-41 in
Frost-free period (actual range)	142-155 days
Freeze-free period (actual range)	167-188 days
Precipitation total (actual range)	40-42 in
Frost-free period (average)	149 days
Freeze-free period (average)	179 days
Precipitation total (average)	41 in

Climate stations used

- (1) KEARNEY 3E [USC00234382], Kearney, MO
- (2) LAMONI [USC00134585], Lamoni, IA
- (3) KEOSAUQUA [USC00134389], Keosauqua, IA
- (4) SALISBURY [USC00237514], Salisbury, MO
- (5) TRENTON [USC00238444], Trenton, 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 stream terraces and floodplain steps of perennial streams. They are not adjacent to the current stream channel. Areas on floodplain steps are subject to flooding, typically of short duration and low intensity. Constructed levees, often accompanied by stream channelization, have altered the flooding dynamics in many places.

Sites on floodplain steps are in the RIVERINE wetlands class of the Hydrogeomorphic (HGM) classification system (Brinson, 1993), whereas stream terrace areas are best considered as MINERAL SOIL FLAT wetlands. These areas are Emergent Palustrine wetlands (Cowardin et al., 1979).

Soil features

These soils have no rooting restriction. The soils were formed under prairie vegetation, and have dark, organic-rich surface horizons. Parent material is alluvium. Soil series associated with this site include Arbela, Bremer, Gifford, Humeston, Nevin, Speed, Tina, Triplett, and Tuskeego.

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
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	6–9 in
Calcium carbonate equivalent (0-40in)	0%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	4.5–7.8
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

Information contained in this section was developed using historical data, professional experience, field reviews, and scientific studies. The information presented is representative of very complex vegetation communities. Key indicator plants, animals and ecological processes are described to help inform land management decisions. Plant communities will differ across the MLRA because of the naturally occurring variability in weather, soils, and aspect. The Reference Plant Community is not necessarily the management goal. The species lists are representative and are not botanical descriptions of all species occurring, or potentially occurring, on this site. They are not intended to cover every situation or the full range of conditions, species, and responses for the site.

Wet Terrace Prairies were a common component of floodplains throughout the region. These ecological sites occurred at the base of slopes below Upland Loess or Till Prairies and above Wet Floodplain Prairies. Wet Terrace Prairie ecological sites exist because of their association with seasonal wet conditions and heavy, clayey soils and periodic flooding. These conditions along with periodic fire have a strong influence on excluding trees. Wet Terrace Prairies are dominated by a dense cover of wet tolerant grasses and forbs. On slightly higher areas within or at the edge of the prairie matrix occasional widely scattered bur oak, swamp white oak, pin oak, shellbark hickory and willow occurred amid the grass-dominated landscape.

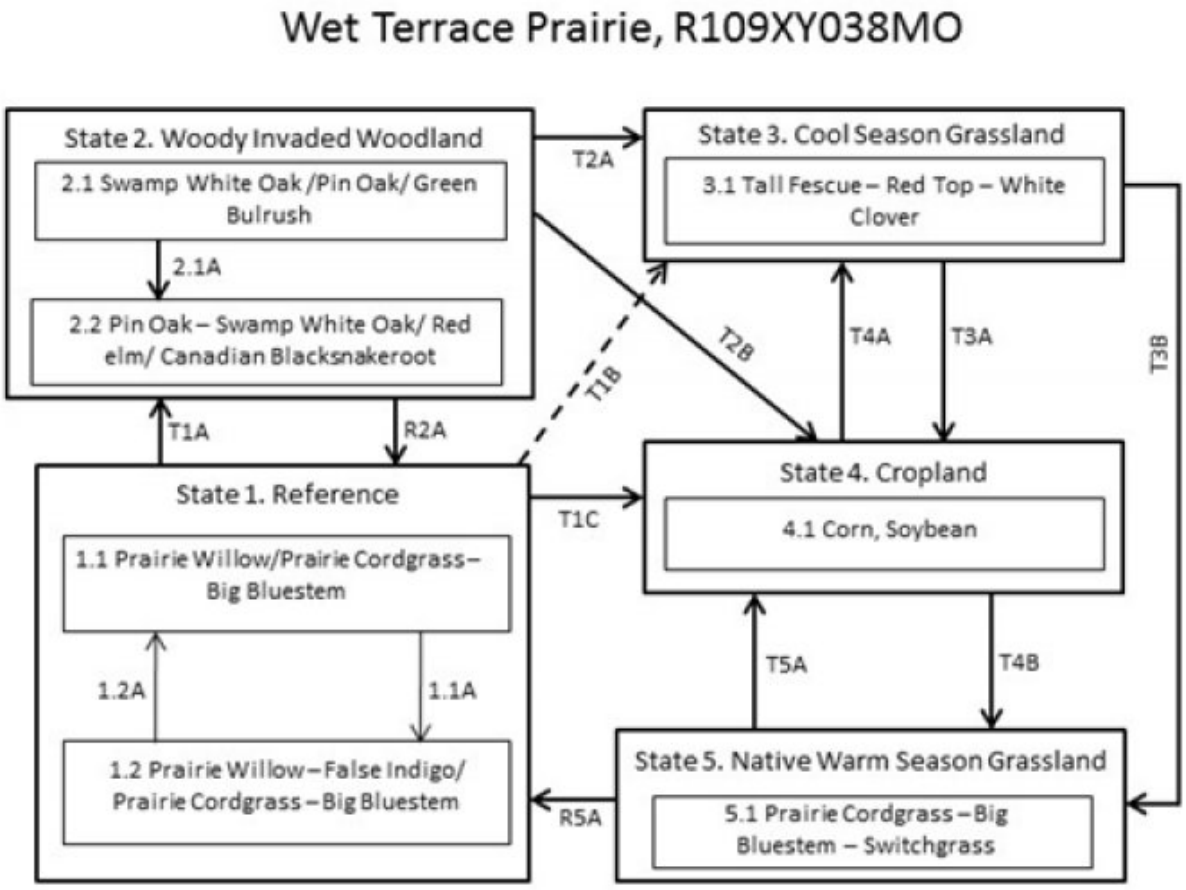
These sites were on relatively stable former floodplain positions that occasionally flooded, probably once every 10 or so years. In addition to seasonal site wetness, periodic fire also played a role in keeping woody species at bay. Fire during dry periods removed the dense mat of leaf litter creating opportunities for plants less aggressive than the grasses and sedges. Wet Terrace Prairies were furthermore 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 most 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
2.1A	Woody invasion; fire-free interval 40+ 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 wild plum occurred in small groves or as scattered individuals across the prairie landscape. Two phases can occur that will transition back and forth depending on fire frequencies. Longer fire free intervals will allow woody species to increase such as prairie willow, dogwoods and wild plum. When fire intervals shorten these woody species will decrease. This state is very rare. Nearly all former reference states have been converted to cool season grassland and intensive agriculture cropland or reverted to a woodland community.

Dominant plant species

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

Community 1.1
Prairie Willow/Prairie Cordgrass-Big Bluestem

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

Forest 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).

Dominant plant species

- prairie willow (*Salix humilis*), shrub
- prairie cordgrass (*Spartina pectinata*), other herbaceous
- big bluestem (*Andropogon gerardii*), other herbaceous

Community 1.2
Prairie Willow-False Indigo/Prairie Cordgrass-Big Bluestem

This phase is similar to community phase 1.1 but shrubs are increasing due to longer periods of fire suppression. Some displacement of grasses and forbs may be occurring due to shading and competition from the increased canopy cover.

Dominant plant species

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

Pathway 1.1A
Community 1.1 to 1.2

Fire-free interval 10+ years

Pathway 1.2A
Community 1.2 to 1.1

Fire interval 1-3 years

State 2
Woody Invaded Woodland

Degraded reference states that have experienced fire suppression and woody invasion for 20 or more years will transition to this state. With fire suppression, woody species such as bur oak and swamp white oak will begin to increase transitioning this state from a prairie to a woodland. Native herbaceous ground cover will also decrease. With further prolonged fire suppression and continued woody invasion a second phase with a more closed woodland canopy will develop. Transition from this state to cool season grasslands (State 3) or intensive cropland (State 4) was very common in the late 1800's to early 1900's.

Dominant plant species

- swamp white oak (*Quercus bicolor*), tree
- pin oak (*Quercus palustris*), tree
- elm (*Ulmus*), shrub
- Canadian blacksnakeroot (*Sanicula canadensis*), other herbaceous
- green bulrush (*Scirpus atrovirens*), other herbaceous

Community 2.1
Swamp White Oak /Pin Oak/ Green Bulrush

This phase has experienced fire suppression and woody invasion for 20 or more years. With fire suppression, woody species such as bur oak and swamp white oak begin to increase transitioning to a woodland.

Dominant plant species

- swamp white oak (*Quercus bicolor*), tree
- pin oak (*Quercus palustris*), tree
- green bulrush (*Scirpus atrovirens*), other herbaceous

Community 2.2
Pin Oak – Swamp White Oak/ Red Elm/ Canadian Blacksnakeroot

Figure 10. Chloe Lowry Marsh Natural Area, Mercer County., MO

With further prolonged fire suppression and continued woody invasion a second phase with a more closed woodland canopy will develop.

Forest overstory. Forest overstory species list is based on five reconnaissance-level plots. No cover percentages were recorded. Relative abundance can be inferred by the number of plots (5 total plots) that a species occurs in, as follows:

pin oak 4
swamp white oak 4
shagbark hickory 3

bitternut (pignut) hickory 2
bur oak 2
slippery elm 2
American basswood 1
American elm 1
black cherry 1
black walnut 1
green ash 1
northern red oak 1
red mulberry 1
shingle oak 1
silver maple 1

Forest understory. Forest understory species list is based on five reconnaissance-level plots. Not all species were recorded in all plots. Canopy heights (bottom and top) are by height class, not individual species heights.

Dominant plant species

- pin oak (*Quercus palustris*), tree
- swamp white oak (*Quercus bicolor*), tree
- elm (*Ulmus*), shrub
- Canadian blacksnakeroot (*Sanicula canadensis*), other herbaceous

Pathway 2.1A
Community 2.1 to 2.2

Woody invasion; fire-free interval 40+ years

State 3
Cool Season Grassland

Conversion of other states to non-native cool season species such as tall fescue, red top and white clover has been common in this area. Occasionally, these pastures will have scattered bur oaks 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. A return to the reference state may be impossible, requiring a very long term series of management options.

Dominant plant species

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

Community 3.1
Tall Fescue-Red Top-White Clover

Dominant plant species

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

State 4
Cropland

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

Dominant plant species

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

Community 4.1
Corn, Soybean

Dominant plant species

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

State 5
Native Warm Season Grassland

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

Dominant plant species

- prairie cordgrass (*Spartina pectinata*), other herbaceous
- big bluestem (*Andropogon gerardii*), other herbaceous
- switchgrass (*Panicum virgatum*), other herbaceous

Community 5.1
Prairie Cordgrass-Big Bluestem-Switchgrass

Dominant plant species

- prairie cordgrass (*Spartina pectinata*), other herbaceous
- big bluestem (*Andropogon gerardii*), other herbaceous
- switchgrass (*Panicum virgatum*), other herbaceous

Transition T1A
State 1 to 2

Fire suppression >20 years; woody invasion

Transition T1B
State 1 to 3

Tillage; vegetative seeding; grassland management

Transition T1C
State 1 to 4

Tillage; conservation cropping system

Restoration pathway R2A
State 2 to 1

Woody removal; prescribed fire 1-3 years

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

Transition T3B
State 3 to 5

Vegetative seeding; prescribed fire; grassland management

Restoration pathway T4A
State 4 to 3

Vegetative seeding; grassland management

Transition T4B
State 4 to 5

Vegetative seeding; prescribed fire; grassland management

Restoration pathway T5A
State 5 to 4

Tillage; conservation cropping system

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	–	–

Table 6. Community 1.1 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)
Grass/grass-like (Graminoids)					
prairie cordgrass	SPPE	*Spartina pectinata*	Native	–	20–40
big bluestem	ANGE	*Andropogon gerardii*	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

Table 7. Community 1.2 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)
Grass/grass-like (Graminoids)					
big bluestem	ANGE	*Andropogon gerardii*	Native	–	–
switchgrass	PAVI2	*Panicum virgatum*	Native	–	–
Forb/Herb					
sawtooth sunflower	HEGR4	*Helianthus grosseserratus*	Native	–	–

Table 8. Community 2.2 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)	Diameter (In)	Basal Area (Square Ft/Acre)
Tree							
American elm	ULAM	*Ulmus americana*	Native	40–60	–	–	–
slippery elm	ULRU	*Ulmus rubra*	Native	40–60	–	–	–
red mulberry	MORU2	*Morus rubra*	Native	40–60	–	–	–
black cherry	PRSE2	*Prunus serotina*	Native	40–60	–	–	–
swamp white oak	QUBI	*Quercus bicolor*	Native	40–100	–	–	–
shingle oak	QUIM	*Quercus imbricaria*	Native	70–100	–	–	–
bur oak	QUMA2	*Quercus macrocarpa*	Native	40–100	–	–	–
pin oak	QUPA2	*Quercus palustris*	Native	70–100	–	–	–
silver maple	ACSA2	*Acer saccharinum*	Native	70–100	–	–	–
bitternut hickory	CACO15	*Carya cordiformis*	Native	40–100	–	–	–
shagbark hickory	CAOV2	*Carya ovata*	Native	40–100	–	–	–
green ash	FRPE	*Fraxinus pennsylvanica*	Native	70–100	–	–	–
black walnut	JUNI	*Juglans nigra*	Native	40–60	–	–	–
northern red oak	QURU	*Quercus rubra*	Native	40–60	–	–	–
American basswood	TIAM	*Tilia americana*	Native	70–100	–	–	–

Table 9. Community 2.2 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)
Grass/grass-like (Graminoids)					
green bulrush	SCAT2	*Scirpus atrovirens*	Native	0.3–3	25–50
hop sedge	CALU4	*Carex lupulina*	Native	0.3–3	0.1–50
greater straw sedge	CANO	*Carex normalis*	Native	0.3–3	5–10
fowl mannagrass	GLST	*Glyceria striata*	Native	0.3–3	0.1–10
whitegrass	LEVI2	*Leersia virginica*	Native	0.3–3	5–10
sweet woodreed	CIAR2	*Cinna arundinacea*	Native	0.3–3	1–2
Virginia wildrye	ELVI3	*Elymus virginicus*	Native	0.3–3	1–2
reed canarygrass	PHAR3	*Phalaris arundinacea*	Native	0.3–3	0.1–1
Forb/Herb					
Canadian blacksnakeroot	SACA15	*Sanicula canadensis*	Native	0.3–3	0.1–10
calico aster	SYLA4	*Symphyotrichum lateriflorum*	Native	0.3–3	5–10
marshpepper knotweed	POHY	*Polygonum hydropiper*	Native	0.3–3	5–10
jumpseed	POVI2	*Polygonum virginianum*	Native	0.3–3	0.1–10
American hogpeanut	AMBR2	*Amphicarpaea bracteata*	Native	0.3–3	5–10
Canadian woodnettle	LACA3	*Laportea canadensis*	Native	0.3–3	1–10
sharpwing monkeyflower	MIAL2	*Mimulus alatus*	Native	0.3–3	0.1–2
white avens	GECA7	*Geum canadense*	Native	0.3–3	1–2
jewelweed	IMCA	*Impatiens capensis*	Native	0.3–3	0.1–2
beggarticks	BIDEN	*Bidens*	Native	0.3–3	1–2
Canadian honewort	CRCA9	*Cryptotaenia canadensis*	Native	0.3–3	0.1–2
Canada germander	TECA3	*Teucrium canadense*	Native	0.3–3	0.1–2

wild petunia	RUELL	*Ruellia*	Native	0.3–3	1–2
cutleaf coneflower	RULA3	*Rudbeckia laciniata*	Native	0.3–3	1–2
common selfheal	PRVU	*Prunella vulgaris*	Native	0.3–3	0.1–1
buttercup	RANUN	*Ranunculus*	Native	0.3–3	0.1–1
pointedleaf ticktrefoil	DEGL5	*Desmodium glutinosum*	Native	0.3–3	0.1–1
green dragon	ARDR3	*Arisaema dracontium*	Native	0.3–3	0.1–1
Canadian clearweed	PIPU2	*Pilea pumila*	Native	0.3–3	0.1–1
stickywilly	GAAP2	*Galium aparine*	Native	0.3–3	0.1–1
Fern/fern ally					
marginal woodfern	DRMA4	*Dryopteris marginalis*	Native	0.3–3	0.1–1
Shrub/Subshrub					
currant	RIBES	*Ribes*	Native	0.3–3	0.1–1
multiflora rose	ROMU	*Rosa multiflora*	Introduced	0.3–3	0.1–1
coralberry	SYOR	*Symphoricarpos orbiculatus*	Native	0.3–3	0.1–1
blackhaw	VIPR	*Viburnum prunifolium*	Native	0.3–20	–
common buttonbush	CEOC2	*Cephalanthus occidentalis*	Native	5–20	–
eastern poison ivy	TORA2	*Toxicodendron radicans*	Native	0.3–3	–
Tree					
pin oak	QUPA2	*Quercus palustris*	Native	0.3–20	0.1–2
shagbark hickory	CAOV2	*Carya ovata*	Native	0.3–3	1–2
common hackberry	CEOC	*Celtis occidentalis*	Native	0.3–20	1–2
silver maple	ACSA2	*Acer saccharinum*	Native	0.3–3	0.1–2
green ash	FRPE	*Fraxinus pennsylvanica*	Native	0.3–20	0.1–1
Ohio buckeye	AEGL	*Aesculus glabra*	Native	5–20	–
bitternut hickory	CACO15	*Carya cordiformis*	Native	5–20	–
shellbark hickory	CALA21	*Carya laciniosa*	Native	5–20	–
northern red oak	QURU	*Quercus rubra*	Native	5–20	–
American elm	ULAM	*Ulmus americana*	Native	0.3–30	–
slippery elm	ULRU	*Ulmus rubra*	Native	0.3–30	–
Vine/Liana					
Virginia creeper	PAQU2	*Parthenocissus quinquefolia*	Native	0.3–3	0.1–2
bristly greenbrier	SMTA2	*Smilax tamnoides*	Native	0.3–3	0.1–1

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

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

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

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

Plot HEATCA_KS01 – Gifford soil
Located in Heath CA, Clark County, MO
Latitude: 40.580416
Longitude: -91.897551

Plot PERSSP_KS04 – Tuskeego soil
Located in Pershing State Park, Linn County, MO
Latitude: 39.750358
Longitude: - 93.223895

Plot MUFOCA_KS02 – Gifford soil
Located in Mussel Fork CA, Linn County, MO
Latitude: 39.734134
Longitude: - 92.882962

Plot ATLACA_KS02 – Gifford soil
Located in Atlanta CA, Macon County, MO
Latitude: 39.875606
Longitude: - 92.49068

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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.

Contributors

Doug Wallace
Fred Young

Approval

Suzanne Mayne-Kinney, 7/01/2024

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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	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:**