

## *Ecological Site Description*

### **Wet Terrace Prairie**

**R109XY038MO**

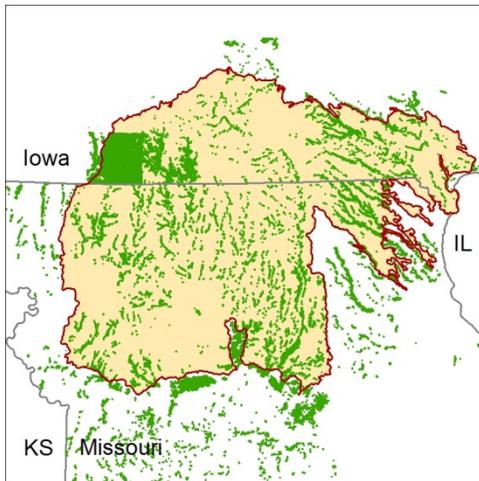
- (/Salix humilis/Spartina pectinata - Andropogon gerardii)
- (/prairie willow/prairie cordgrass – big bluestem)

An Ecological Site Description (ESD) is a reference document of ecological knowledge regarding a particular land area (ecological site). An ESD describes ecological potential and ecosystem dynamics of land areas and their potential management. Ecological sites are linked to soil survey map unit components, which allows for mapping of ecological sites. *(NOTE: This is a “provisional” ESD, and is subject to change. It contains basic ecological information sufficient for conservation planning and land management in Missouri. After additional information is developed and reviewed, a “Correlated” ESD will be published and will be available via the Web Soil Survey <http://websoilsurvey.nrcs.usda.gov>.)*

**Major Land Resource Area:** 109 – Iowa and Missouri Heavy Till Plain

### **Introduction**

The Iowa and Missouri Heavy Till Plain (area outlined in red on the map) 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 summits, 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.

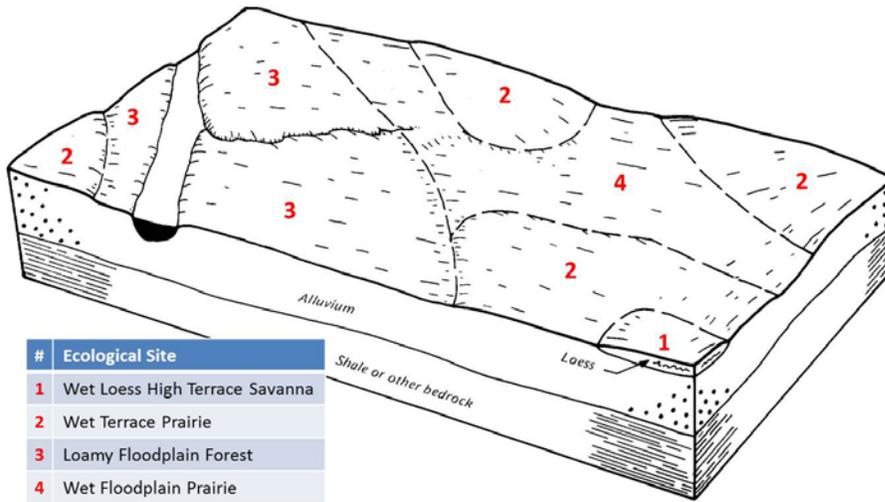
Wet Terrace Prairies are within the green areas on the map.

These sites are widely distributed in the MLRA. Soils are very deep, with clayey subsoils and seasonal high water tables. Many areas are subject to flooding.

### **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 the 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.



**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 clayey subsoils. They are affected by a seasonal high water table during the spring months. Soil series associated with

this site include Arbela, Bremer, Carlow, Coppock, Gifford, Humeston, Nevin, Speed, Tina, Triplett, and Tuskego.

**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.*

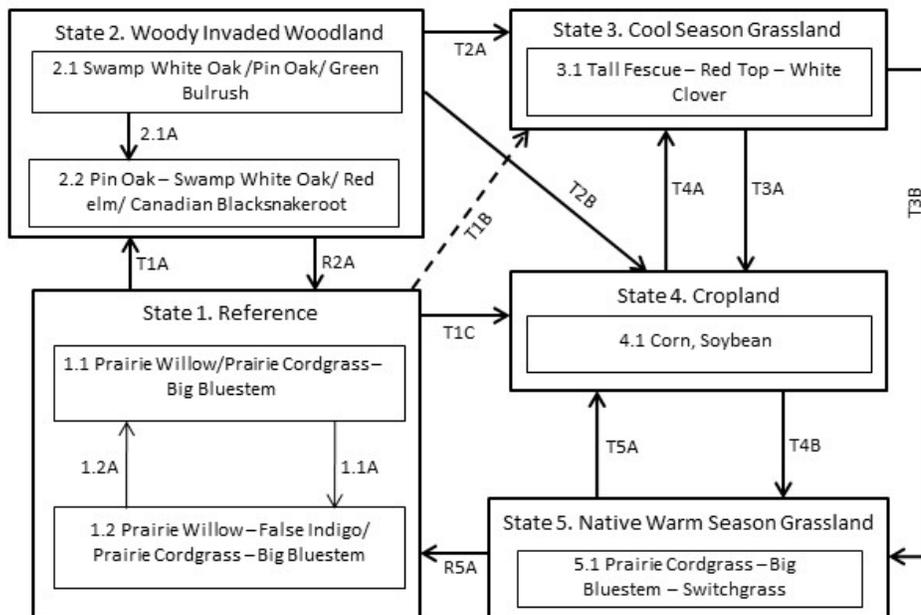
Wet Terrace Prairies were a common component of floodplains throughout the region. These ecological sites occurred at the base of slopes below Upland Loess or Till Prairies and above Wet Floodplain Prairies. Wet Terrace Prairie ecological sites exist because of their association with seasonal wet conditions 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 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.

### Wet Terrace Prairie, R109XY038MO



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

## Ecological States

### 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.

### 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.

### 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.

### 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.

### 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.

**Reference State Plant Community**

## Canopy Trees

Common Name	Botanical Name	Cover % (low-high)	Canopy Height (ft)
PIN OAK	<i>Quercus palustris</i>	0-5	70
BUR OAK	<i>Quercus macrocarpa</i>	0-5	70
SHELLBARK HICKORY	<i>Carya laciniosa</i>	0-5	60
SWAMP WHITE OAK	<i>Quercus bicolor</i>	0-5	80

## Shrubs

Common Name	Botanical Name	Cover % (low-high)	Canopy Height (ft)
PRAIRIE WILLOW	<i>Salix humiis</i>	5-20	5
FALSE INDIGO	<i>Amorpha fruticosa</i>	5-20	4

## Forbs

Common Name	Botanical Name	Cover % (low-high)
SWAMP MILKWEED	<i>Asclepias incarnata</i>	5-20
SMALL WHITE ASTER	<i>Aster fragilis</i>	5-20
SAWTOOTH SUNFLOWER	<i>Helianthus grosseserratus</i>	5-20
WINGED LOOSESTRIFE	<i>Lythrum alatum</i>	5-20
FALSE ASTER	<i>Boltonia asteroides</i>	5-20
SWEET CONEFLOWER	<i>Rudebeckia subtomentosa</i>	5-20
TICKSEED SUNFLOWER	<i>Bidens aristosa</i>	5-20
IRONWEED	<i>Vernonia fasciculata</i>	5-20
BUNCH FLOWER	<i>Melanthium virginicum</i>	5-20
CULVER'S ROOT	<i>Veronicastrum virginicum</i>	5-20
BUSHY SEEDBOX	<i>Ludwigia alternifolia</i>	5-20
WATER KNOTWEED	<i>Polygonum amphibium</i>	5-20
SWAMP AGRIMONY	<i>Agrimonia parviflora</i>	5-20
WATER PARSLEY	<i>Sium suave</i>	5-20
SOUTHERN BLUE FLAG	<i>Iris virginica v. shrevei</i>	5-20

## Grasses and sedges

Common Name	Botanical Name	Cover % (low-high)
HOP SEDGE	<i>Carex lupulina</i>	10-20
FOX SEDGE	<i>Carex vulpinoidea</i>	10-20
FESCUE SEDGE	<i>Carex festucacea</i>	10-20
SWITCH GRASS	<i>Panicum virgatum</i>	20-30
PRAIRIE CORD GRASS	<i>Spartina pectinata</i>	20-40
CANADA WILDRYE	<i>Elymus canadensis</i>	10-20
BIG BLUESTEM	<i>Andropogon gerardii</i>	20-40
BLUEJOINT GRASS	<i>Calamagrostis canadensis</i>	10-20

**Site Interpretations***Influencing Water Features*

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

*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

*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.

## **Glossary**

*Backslope* – a hillslope profile position that forms the steepest and generally linear, middle portion of the slope.

*Backswamp* – marshy or swampy, depressed areas of flood plains between natural levees and valley sides or terraces

*Calcareous* – the presence of calcium carbonate in the soil parent material within the rooting zone; relatively alkaline

*Claypan* – a dense, compact, slowly permeable layer in the subsoil having much higher clay content than the overlying material

*Chert* – hard, extremely dense or compact crystalline sedimentary rock, consisting dominantly of interlocking crystals of quartz

*Cliff* – a significant vertical, or near vertical, rock exposure

*Dolomite* – a type of sedimentary rock that is a carbonate mineral composed of calcium magnesium carbonate

*Drainageway* – the upper most reach of a stream channel system characterized by little meandering

*Dry* – a site where soil moisture is limiting during the growing season; low available water capacity

*Dune* – a low mound, ridge, bank or hill of loose, wind-blown sand

*Exposed* – steep, south and west-facing slopes, which are warmer and drier than other slope aspects

*Flatwoods* – a type of woodland that occurs on soils with a root restricting subsoil layer within 20 to 30 inches, resulting in very slow runoff and ponding that remains saturated for most of the winter and early spring months but dries out and becomes very dry in the summer months; plants that grow there must be adapted to both conditions

*Floodplain* – the nearly level plain that borders a stream and is subject to inundation under flood-stage conditions

*Footslope* – a hillslope position at the base of a slope where hillslope sediment (colluvium) accumulates

*Forest* – a vegetative community dominated by trees forming a closed canopy and interspersed with shade-tolerant understory species

*Fragipan* – a dense, brittle subsoil horizon that is extremely hard and compact when dry

*Glade* – open, rocky, barren vegetative community dominated by drought-adapted forbs and grasses, typically with scattered, stunted woody plants

*Igneous* –bedrock formed by cooling and solidification of magma. Granite and rhyolite are typical igneous bedrocks in Missouri

*Limestone* – a type of sedimentary rock composed largely of calcium carbonate

*Loess* – material transported and deposited by wind and consisting predominantly of silt-size particles

*Loamy* – soil material containing a relatively equal mixture of sand and silt and a somewhat smaller proportion of clay

*Marsh* – a type of wetland that is dominated by herbaceous rather than woody plant species

*Moist* – a site that is moderately well to well drained and has high available water capacity, resulting in a well-balanced supply of moisture (neither too dry nor too wet).

*Mudstone* – blocky or massive, fine-grained sedimentary rock in which the proportions of clay and silt are approximately equal

*Natric* – a soil horizon that displays a blocky, columnar, or prismatic structure and has a subhorizon with an exchangeable-sodium saturation of over 15%

*Outwash* – stratified sediments of sand and gravel removed or “washed out” from a glacier by melt-water streams

*Prairie* – a vegetative community dominated by perennial grasses and forbs with scattered shrubs and very few trees

*Protected* – steep, north- and east-facing slopes, which are cooler and moister than other slope aspects

*Residuum* - unconsolidated, weathered, or partly weathered mineral material that accumulates by disintegration of bedrock in place

*Riser* – a component of terraces and flood-plain steps consisting of the steep side slope; the escarpment

*Riverfront* – a vegetative community in the floodplain immediately adjacent and generally parallel to a river or stream channel

*River hills* – a geographic area characterized by thick, dissected loess deposits, formed immediately adjacent to the edges of the Missouri and Mississippi River floodplains

*Sandy* – a coarse-sized soil containing a large mixture of sand and gravels and a somewhat smaller proportion of silts and clays with excessive drainage

*Sandstone* – a sedimentary rock containing dominantly sand-size particles

*Savanna* – grasslands interspersed with open-grown scattered trees, groupings of trees, and shrubs

*Shale* – a sedimentary rock formed from clay, silty clay, or silty clay loam deposits and having the tendency to split into thin layers

*Shallow* – a site with bedrock within 20 inches of the surface

*Shoulder* – the slope profile position that forms the convex surface near the top of a hill slope; it comprises the transition zone from summit to backslope

*Sinkhole* – a closed, circular or elliptical depression, commonly funnel-shaped, characterized by subsurface drainage and formed either by dissolution of the surface of underlying bedrock or by collapse of underlying caves within bedrock

*Summit* – the top or highest area of a hillslope

*Swale* – shallow, closed depressions irregularly spaced across a floodplain or terrace with an irregularly undulating surface.

*Swamp* – an area of low, saturated ground, intermittently or permanently covered with water, and predominantly vegetated by shrubs and trees.

*Talus* – rock fragments of any size or shape (usually coarse and angular) derived from and lying at the base of a cliff or very steep rock slope.

*Terrace* – a step-like surface, bordering a valley floor that represents the former position of a flood plain

*Till* – dominantly unsorted and unstratified soil material deposited directly by a glacier

*Upland* – a general term for the higher ground of a region, in contrast with a low-lying, adjacent land such as a valley or floodplain

*Wet* – a somewhat poorly, poorly or very poorly drained site that has an oversupply of moisture during the growing season

*Woodland* – a highly variable vegetative community with a canopy of trees ranging from 30 to 100 percent closure with a sparse midstory and a dense ground flora of grasses, sedges and forbs

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