

## *Ecological Site Description*

### **Ponded Floodplain Prairie**

**R109XY032MO**

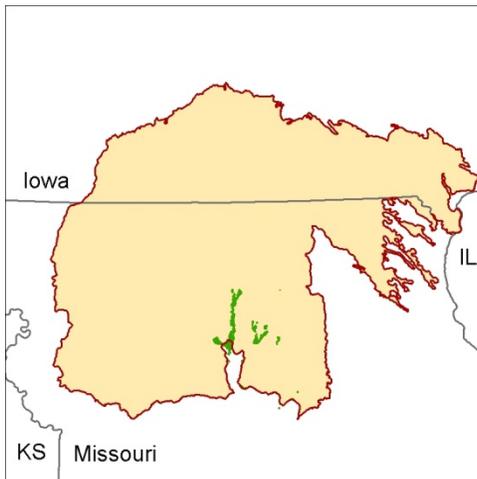
- (/Cephalanthus occidentalis/Spartina pectinata - Carex)
- (/buttonbush/prairie cord grass – sedge)

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



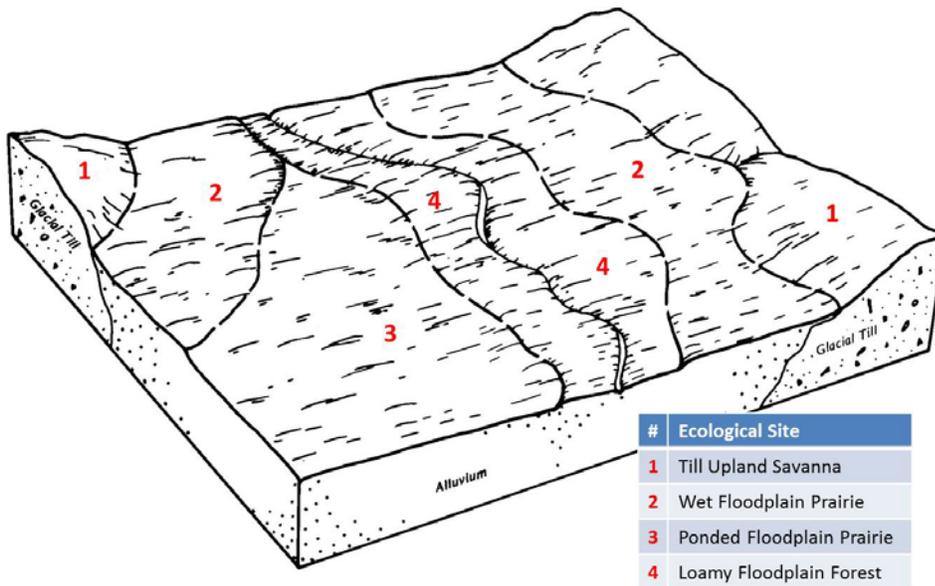
is about 80 to 160 feet between major streams and adjacent interfluvial summits. Most of the till plain drains south to the Missouri River via the Grand and Chariton River systems, but the northeastern portion drains southeast to the Mississippi River. Loess caps the pre-Illinoian aged till on interfluvial 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.

Pondered Floodplain Prairies are within the green areas on the map. These sites are not extensive, and are primarily in floodplains of the Grand River watershed in the southern part of the MLRA. They occur in depression 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.

### **Physiographic Features**

This site is in depression 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 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 “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.

**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.

**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 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.

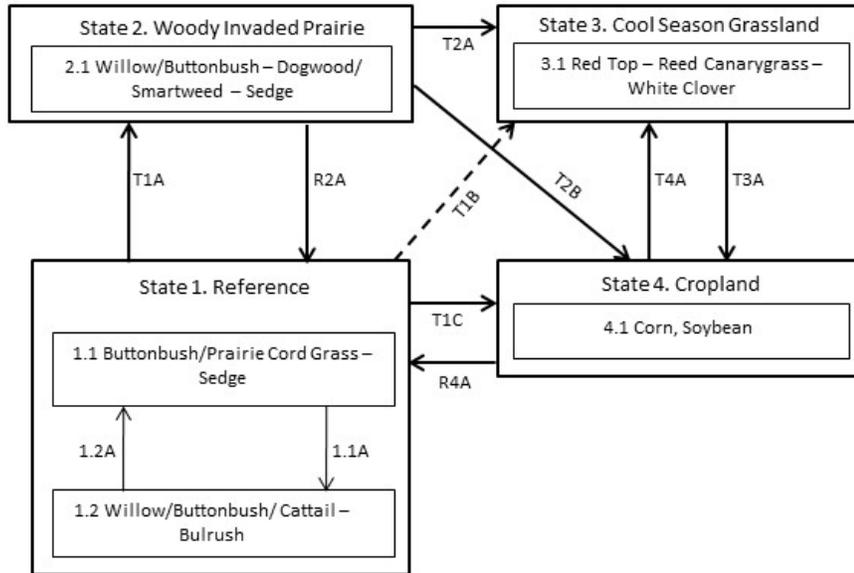
Prior to levee development and channeling, these areas were regularly flooded by typically slow-moving backwater floods. Some further inundation and ponding occurred through groundwater movement. Unaltered sites usually were flooded at least six months of the year. In addition to flooding, periodic fire 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

### Ponded Floodplain Prairie, R109XY032MO



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

**Ecological States**

**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.

**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.

**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.

**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.

**Reference State Plant Community**

Shrubs

Common Name	Botanical Name	Cover % (low-high)	Canopy Height (ft)
BUTTONBUSH	<i>Cephalanthus occidentalis</i>	5-20	5
SANDBAR WILLOW	<i>Salix exigua</i>	5-20	8
HEART-LEAVED WILLOW	<i>Salix rigida</i>	5-20	5
FALSE INDIGO	<i>Amorpha fruticosa</i>	5-20	4
SILKY DOGWOOD	<i>Cornus obliqua</i>	5-20	5

## 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
BLUE FLAG	<i>Iris virginica</i>	5-20
WINGED LOOSESTRIFE	<i>Lythrum alatum</i>	5-20
BEGGAR TICK	<i>Bidens cernua</i>	5-20
AMERICAN BUGLEWEED	<i>Lycopus americanus</i>	5-20
TICKSEED SUNFLOWER	<i>Bidens aristosa</i>	5-20
SPOTTED TOUCH-ME-NOT	<i>Impatiens capensis</i>	5-20
SMARTWEED	<i>Polygonum hydropiperoides</i>	5-20
IRONWEED	<i>Vernonia fasciculata</i>	5-20
SWAMP AGRIMONY	<i>Agrimonia parviflora</i>	5-20
WATER SMARTWEED	<i>Polygonum amphibium (Marsh)</i>	5-20
GIANT BUR-REED	<i>Sparganium eurycarpum (Marsh)</i>	5-20
AMERICAN LOTUS	<i>Nelumbo lutea (Marsh)</i>	5-20
SPADDERDOCK	<i>Nuphar lutea (Marsh)</i>	5-20
BLADDERWORT	<i>Utricularia gibba (Marsh)</i>	5-20
ARROWHEAD	<i>Sagittaria latifolia (Marsh)</i>	5-20
DUCKWEED	<i>Lemna minor (Marsh)</i>	5-30

## Grasses and sedges

Common Name	Botanical Name	Cover % (low-high)
HOP SEDGE	<i>Carex lupulina</i>	10-20
SHORELINE SEDGE	<i>Carex hyalinolepis</i>	10-20
FOX SEDGE	<i>Carex vulpinoidea</i>	10-20
FESCUE SEDGE	<i>Carex festucacea</i>	10-20
RICE CUTGRASS	<i>Leersia oryzoides</i>	10-20
PRAIRIE CORD GRASS	<i>Spartina pectinata</i>	20-40
GREAT BULRUSH	<i>Schoenoplectus tabernaemontani (Marsh)</i>	10-20
BROADLEAF CATTAIL	<i>Typha latifolia (Marsh)</i>	5-40
NARROW-LEAF CATTAIL	<i>Typha angustifolia (Marsh)</i>	5-40
RIVER BULLRUSH	<i>Bolboschoenus fluviatilis (Marsh)</i>	10-20

## Site Interpretations

## Influencing Water Features

- Cowardin wetland types include: Palustrine Emergent Seasonally Flooded, Palustrine Emergent Temporarily Flooded, and Palustrine Emergent Semipermanently Flooded.

## 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 sphenoccephala*), 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

### 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. 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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