Ecological Site Description

Ponded Floodplain Prairie R115BY042MO

- *(/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: 115B – Central Mississippi Valley Wooded Slopes, Western Part

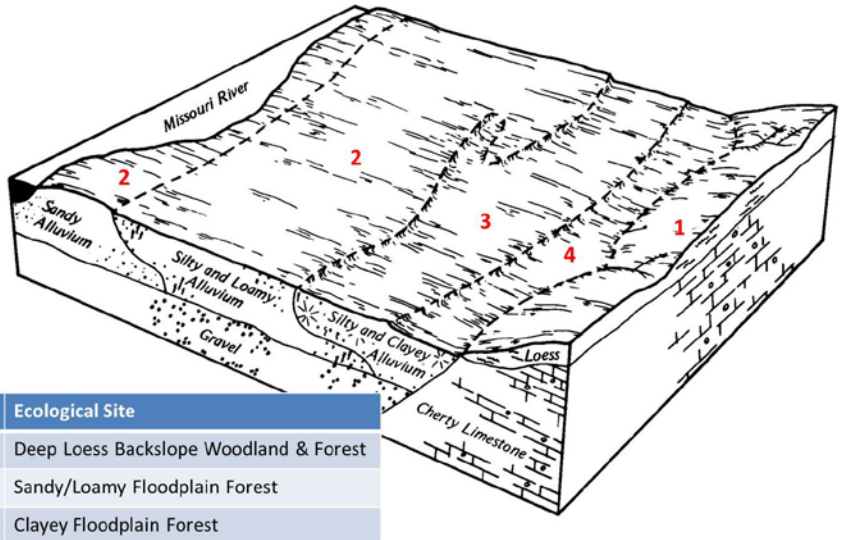
Introduction

The Central Mississippi Valley Wooded Slopes, Western Part (area outlined in red on the map) consists mainly of the deeply dissected, loess-covered hills bordering the Missouri and Mississippi Rivers as well as the floodplains and terraces of these rivers. It wraps around the northeast corner of the Ozark Uplift, and constitutes the southern border of the Pre-Illinoisan-aged till plain. Elevation ranges from about 320 feet along the Mississippi River near Cape Girardeau in the south to about 1,020 feet on the highest ridges near Hillsboro, MO in the east. Local relief varies from 10 to 20 feet in the major river floodplains, to 50 to 100 feet in the dissected uplands, with bluffs of 200 to 350 feet along the Mississippi and Missouri Rivers. Underlying bedrock is mainly Ordovician-aged dolomite and sandstone, with Mississippian-aged limestone north of the Missouri River.

Ponded Floodplain Prairies (green areas on the map) are on the Missouri and Mississippi River floodplains, and in the lower portion of the Grand River floodplain. 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. Sites are commonly adjacent to the Clayey Floodplain Forest and the Loamy Floodplain Forest ecological sites. Soils are very deep and clayey, and are subject to flooding and ponding.

Physiographic Features

This site is in depression areas of backswamps on the Missouri and Mississippi River floodplains, and in the lower portion of the Grand River floodplain. 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.



#	Ecological Site
1	Deep Loess Backslope Woodland & Forest
2	Sandy/Loamy Floodplain Forest
3	Clayey Floodplain Forest
4	Ponded Floodplain Prairie

The adjacent figure (adapted from Horn, 1992) shows the typical landscape position of this ecological site, and landscape relationships among the major ecological sites of the Missouri River floodplain. This site is within the area labeled as "4" on the figure, and is typically in swales of former backswamp positions of the Missouri and Mississippi rivers. These sites are commonly adjacent to Clayey Floodplain sites (labeled "3").

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 loam to clay surface horizons, with clayey subsurface layers. Soil series associated with this site include Beaucoup, Booker and Portage.

Ecological Dynamics

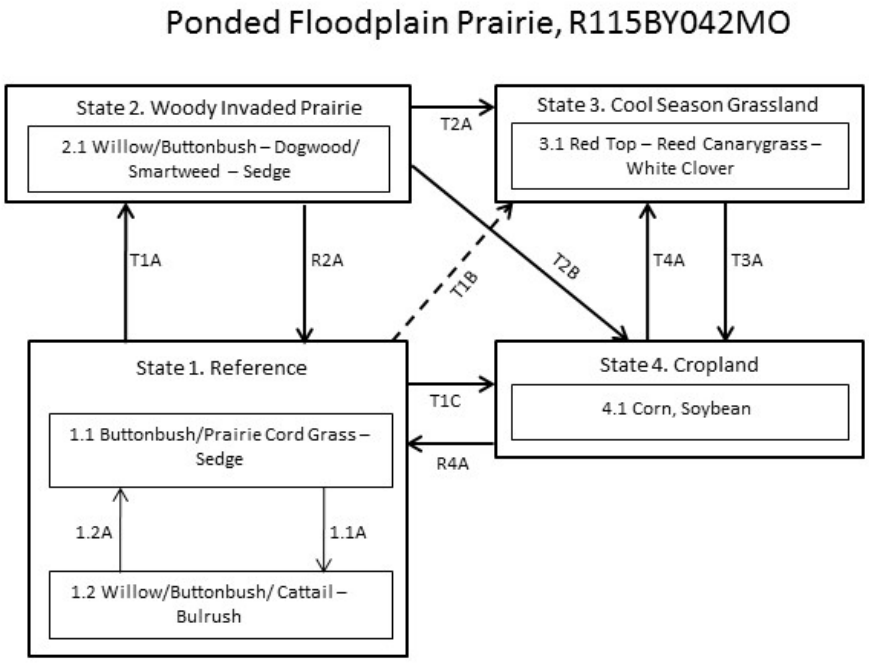
Information contained in this section was developed using historical data, professional experience, field reviews, and scientific studies. The information presented is representative of very complex vegetation communities. Key indicator plants, animals and ecological processes are described to help inform 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 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 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.



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	*Cephalanthus occidentalis*	5-20	5
SANDBAR WILLOW	*Salix exigua*	5-20	8
FALSE INDIGO	*Amorpha fruticosa*	5-20	4

Forbs

Common Name	Botanical Name	Cover % (low-high)
SWAMP MILKWEED	*Ascelpias incarnata*	5-20
SMALL WHITE ASTER	*Aster fragilis*	5-20
SAWTOOTH SUNFLOWER	*Helianthus grosseserratus*	5-20
BLUE FLAG	*Iris virginica*	5-20
WINGED LOOSESTRIFE	*Lythrum alatum*	5-20
BEGGAR TICK	*Bidens cernua*	5-20
AMERICAN BUGLEWEED	*Lycopus americanus*	5-20
TICKSEED SUNFLOWER	*Bidens aristosa*	5-20
SPOTTED TOUCH-ME-NOT	*Impatiens capensis*	5-20
SMARTWEED	*Polygonum hydropiperoises*	5-20
IRONWEED	*Vernonia fasciculate*	5-20
SWAMP AGRIMONY	*Agrimonia parviflora*	5-20
WATER SMARTWEED	*Polygonum amphibium (Marsh)*	5-20
GIANT BUR-REED	*Sparganium eurycarpum (Marsh)*	5-20
AMERICAN LOTUS	*Nelumbo lutea (Marsh)*	5-30
SPADDERDOCK	*Nuphar lutea (Marsh)*	5-20
BLADDERWORT	*Utricularia gibba (Marsh)*	5-20
ARROWHEAD	*Sagittaria latifolia (Marsh)*	5-20
DUCKWEED	*Lemns minor (Marsh)*	5-30

Grasses and sedges

Common Name	Botanical Name	Cover % (low-high)
HOP SEDGE	*Carex lupulina*	10-20
SHORELINE SEDGE	*Carex hyalinolepis*	10-20
FOX SEDGE	*Carex vulpinoidea*	10-20
FESCUE SEDGE	*Carex festucacea*	10-20
AWLFRUIT SEDGE	*Carex stipata*	5-10
RICE CUTGRASS	*Leersia oryzoides*	10-20
PRAIRIE CORD GRASS	*Spartina pectinata*	20-40
GREAT BULRUSH	*Schoenoplectus tabernaemontani (Marsh)*	10-20
BROADLEAF CATTAIL	*Typha latifolia (Marsh)*	5-40
NARROW-LEAF CATTAIL	*Typha angustifolia (Marsh)*	5-40
RIVER BULLRUSH	*Bolboschoenus fluviatilis (Marsh)*	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, Ring-necked Duck, Bufflehead, 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, Least Bittern, Mallard, Sora, Pie-billed Grebe, King Rail, Common Moorhen, 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*), 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*), 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*).

*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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