

Ecological Site Description

Sandy/Loamy Floodplain Forest

F115BY015MO

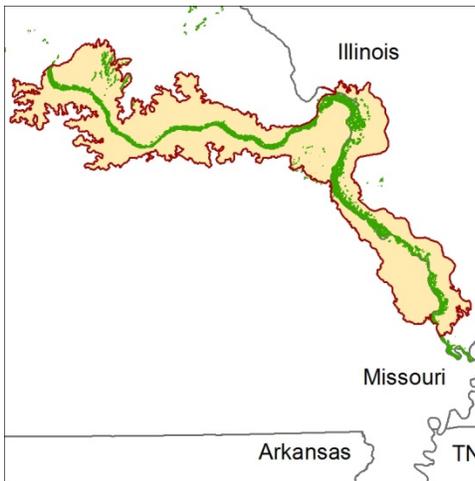
- *Populus deltoides* – *Celtis occidentalis*/*Salix*/*Elymus*)
- (eastern cottonwood - hackberry/willow/wildrye)

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)



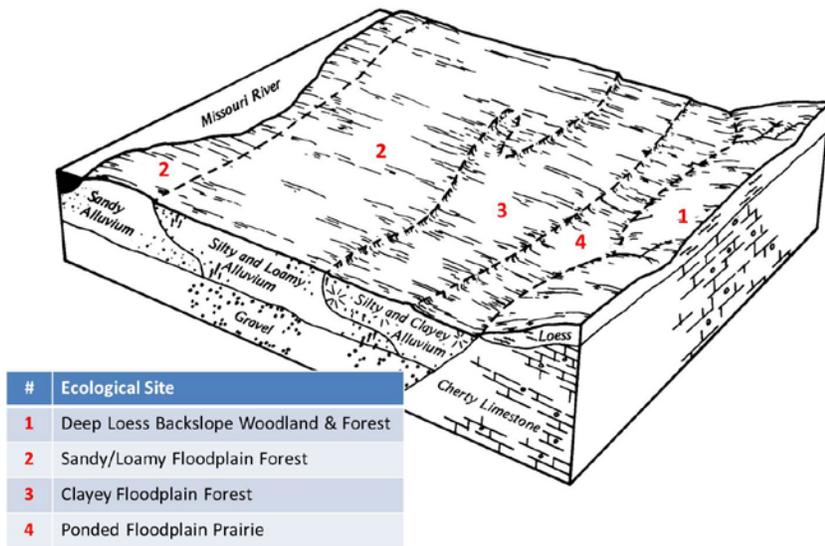
consists mainly of the deeply dissected, loess-covered hills bordering the Missouri and Mississippi Rivers as well as the floodplains and terraces of these rivers. It wraps around the northeast corner of the Ozark Uplift, and constitutes the southern border of the Pre-Illinoian-aged till plain. Elevation 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.

Sandy/Loamy Floodplain Forests (green areas on the map) are on the Missouri River and Mississippi River floodplains, primarily adjacent to the current river channel. Sites are commonly adjacent to the Clayey Floodplain Forest ecological sites. Soils are very deep, and are sandy to very fine sandy loam throughout. The reference plant community is forest dominated by black willow, eastern cottonwood, hackberry, river birch, sycamore, silver maple, and American elm.

Physiographic Features

This site is on the Missouri and Mississippi River floodplains, with slopes of less than 2 percent. Most areas are adjacent or close to the current river channel. Areas not protected by levees are subject to frequent flooding.

The following 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 “2” on the figure, and is typically adjacent to the current channel 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 moderate to good plant-available water capacity and highly variable in surface

textures. The soils were formed under woodland vegetation, and have thin, light-colored or dark surface horizons. Parent material is alluvium. Some have formed in calcareous stratified alluvium. They have loamy, very fine sandy loam and fine sand surface layers, with subsurface layers that range from silty clay loam to loamy, to very fine sandy loam and sand. These soils are subject to potential flooding. Soil series associated with this site include Blake, Buckney, Carr, Dozaville, Eudora, Grable, Haynie, Hodge, Kenmoor, Landes, Lowmo, Peers, Rocher, Sarpy, Treloar, and Ware.

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.

The Missouri and Mississippi rivers are a very dynamic system with frequent flooding and multiple braided channels shifting back and forth across the floodplain. Loamy, coarse loamy and sandy deposits of sediment were common, occurring along the floodplains with the sandy materials the youngest and most recently deposited substrate in this matrix. This ecological site is located on former streamside areas where frequent swift currents dumped the sediment load next to the river. It is normally surrounded by Clayey Floodplain Forests on slightly lower areas.

Flooding of Sandy/Loamy Floodplain Forest occurred annually or at least once every 3 years. Sand bar succession to forest is dominated by flood tolerant, pioneer tree species such as willow and cottonwood. Young stands of these species tend to stabilize the riverfront floodplain and continue to accumulate coarse materials. Consequently, many Sandy/Loamy Floodplain Forests tend to be even

aged. Young stands are often dense with a sparse understory and ground flora. As the forest matures, canopy gaps provide more light while more fine sediments accumulate on the forest floor, resulting in a dense ground flora of grasses and nettles.

Over the long term, these sites become elevated and isolated and begin to accumulate even more fine sediments. Ultimately, shade tolerant elm, ash, and hackberry will accumulate in the understory. However, catastrophic floods will often partially or completely knock down the early successional species and regenerate this ecological system. Consequently, this ecological site is often made up of a mosaic of early to late successional floodplain sandy and loamy forests.

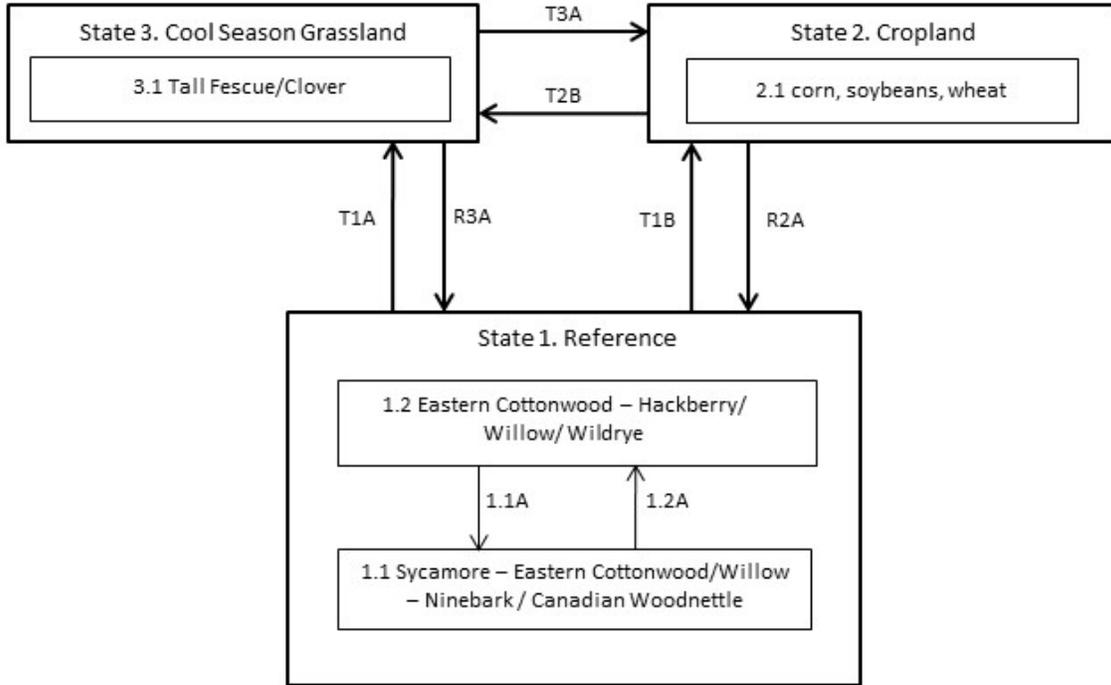
Today many floodplains of these forests have been cleared and converted to agriculture, often right up to the bank. In such cases, severe flooding may cause stream bank erosion and complete loss of this ecological site.

Remaining remnants still exist along un-leveed areas, within levees and on islands. They often occur as a rather narrow band of trees and shrubs traversing the stream edge. These bands of forest play an important role as a source of food and shelter for migrating birds. In addition, isolated large sycamore and cottonwood trees that rise above the canopy are important nesting sites for bald eagles and herons. Re-establishment of these riparian forests is important for stream quality and health, as well as for migratory birds. Planting of early successional pioneer species on these sites has proven to be quite successful.

A State and Transition Diagram is depicted in Figure 1. 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.

Figure 1: State and transition diagram

Sandy/Loamy Floodplain Forest, F115BY015MO



Code	Event/Activity
T1A	Clearing; pasture planting; prescribed grazing; hayland management
T1B	Clearing; tillage; cropping system
T3A	Tillage; cropping system
T2B	Tillage; pasture planting; prescribed grazing; hayland management
R2A, R3A	Tree planting; long term succession (+50-70 years)
1.1A	Flooding disturbance;
1.2A	No flooding disturbance; sedimentation

Ecological States

State 1: Reference

Maximum tree age, historically, was probably about 100 to 150 years. A tall, uneven canopy of 80 to 100 feet tall, with occasional gaps and a closure of 80 to 100 percent is the dominant feature of this ecological site. However, patches of younger, early successional trees and shrubs occur mainly along the flood-prone edges or interior high-water channels of the mature forest. Willows are common in the younger patches and persist along the edges of the mature forest where there is more light. Younger patches tend to occur on recently deposited coarser materials, and have a sparse understory. They are characterized by a sparse to abundant ground cover of grasses and forbs. Shrubs can create a 100 percent cover in places, and tree seedlings of cottonwood are common.

Frequent, high-velocity flood events deposit fresh alluvium in places, often derived from stream bank erosion of upstream sites in States 2 or 3. Other places are scoured by these flood events. As the stream meanders farther away from these sites, flooding events decrease in frequency and intensity, and the state will gradually change back into 1.1 phase community. Mature forest phases have a more stable surface with a dense ground flora of wild rye, spike grass and nettles. Dense tangles of vines can also occur, especially associated with canopy gaps. Red elm, green ash and hackberry also succeed into the canopy gaps.

State 2: Cropland

Conversion of reference states to cropland that is planted to corn, soybeans, or wheat has been common, especially on the more loamy areas. Frequent flooding and scouring can make this cropland state difficult to maintain in a healthy, productive state.

State 3: Cool Season Grassland

Conversion of reference states to planted, non-native pasture species such as tall fescue has been common. Frequent flooding and areas with lower available water capacity make non-native pastures difficult to maintain in a healthy, productive state on this ecological site.

Reference State Plant Community

Canopy Trees

Common Name	Botanical Name	Cover % (low-high)	Canopy Height (ft)
BLACK WILLOW	<i>Salix nigra</i>	5-20	60
EASTERN COTTONWOOD	<i>Populus deltoides</i>	5-20	90
HACKBERRY	<i>Celtis occidentalis</i>	5-20	70
RIVER BIRCH	<i>Betula nigra</i>	5-20	80
SYCAMORE	<i>Platanus occidentalis</i>	5-20	90
SILVER MAPLE	<i>Acer saccharinum</i>	5-10	80
AMERICAN ELM	<i>Ulmus americana</i>	5-20	70
GREEN ASH	<i>Fraxinus pennsylvanica</i>	5-20	80
SUGARBERRY	<i>Celtis laevigata</i>	5-20	70

Understory Trees

Common Name	Botanical Name	Cover % (low-high)	Canopy Height (ft)
RED ELM	<i>Ulmus rubra</i>	10-20	50
SANDBAR WILLOW	<i>Salix exigua</i>	10-20	20
PEACH-LEAVED WILLOW	<i>Salix amygdaloides</i>	10-20	20

Shrubs

Common Name	Botanical Name	Cover % (low-high)	Canopy Height (ft)
GRAY DOGWOOD	<i>Cornus foemina</i>	5-10	12
COMMON NINEBARK	<i>Physocarpus opulifolius</i>	5-10	5

Vines

Common Name	Botanical Name	Cover % (low-high)
VIRGINIA CREEPER	<i>Parthenocissus quinquefolia</i>	10-20
RACON GRAPE	<i>Ampelopsis cordata</i>	10-20
POISON IVY	<i>Toxicodendron radicans</i>	10-20

Forbs

Common Name	Botanical Name	Cover % (low-high)
WHITE WOODLAND ASTER	<i>Aster lateriflorus</i>	10-20
TALL NETTLE	<i>Urtica dioica</i>	10-20
WOOD NETTLE	<i>Laportea canadensis</i>	10-20
GOLDENGLOW	<i>Rudbeckia laciniata</i>	10-20
LATE GOLDENROD	<i>Solidago gigantea</i>	10-20
BROWN-EYED SUSAN	<i>Rudbeckia triloba</i>	10-20
TOUCH-ME-NOT	<i>Impatiens pallida</i>	10-20

Grasses and sedges

Common Name	Botanical Name	Cover % (low-high)
HAIRY WILD RYE	<i>Elymus villosus</i>	5-20
SCOURING RUSH	<i>Equisetum hyemale</i>	5-20
INDIAN WOODOATS	<i>Chasmanthium latifolium</i>	5-20
VIRGINIA WILD RYE	<i>Elymus virginicus</i>	5-20

Site Interpretations

Wildlife

- Tall emergent sycamores and cottonwoods along with an uneven canopy structure and canopy gaps are important for heron colonies, eagle nesting, Mississippi kites, cerulean warblers and other bird species and are important migratory songbird stopover sites.
- Bird species associated with early-successional Floodplain Forests include: White-eyed Vireo, Yellow-breasted Chat, Common Yellowthroat, Indigo Bunting, Gray Catbird, Willow Flycatcher, Orchard Oriole, and Brown Thrasher.
- Birds associated with mid-successional Floodplain Forests include: American Redstart, Northern Parula, and Willow Flycatcher.
- Birds associated with late-successional Floodplain Forests include: Great Blue Heron (colonies especially in large sycamores and cottonwoods), Bald Eagle, Belted Kingfisher, Red-shouldered Hawk, Northern Parula, Louisiana Waterthrush, Wood Duck, Hooded Merganser, and Swainson’s Warbler (sites with giant cane or dense sapling/brambles in the understory).
- Amphibian and reptile species associated with Floodplain Forest include: small-mouthed salamander, central newt, midland brown snake, gray tree frog, and southern leopard frog.

Forestry

- Management: Field collected site index values average 107 for eastern cottonwood. Timber management opportunities are fair to good. Create group openings of at least 2 acres. Large clearcuts should be minimized if possible to reduce impacts on wildlife and aesthetics. Uneven-aged management using single tree selection or small group selection cuttings of ½ to 1 acre are other options that can be used if clear cutting is not desired or warranted. Harvest methods that leave some mature trees to provide shade and soil protection may be desirable. Maintain adequate riparian buffer areas.
- Limitations: Seasonal wetness from flooding; Seedling mortality may occur because of lack of adequate soil moisture during dry periods.

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

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

References

Horn, Frederick E. 1992. Soil Survey of Callaway County, Missouri. U.S. Dept. of Agric. Soil Conservation Service.

MDC, 2006. Missouri Forest and Woodland Community Profiles. Missouri Department of Conservation, Jefferson City, Missouri.

Natural Resources Conservation Service. 2002. Woodland Suitability Groups. Missouri FOTG, Section II, Soil Interpretations and Reports. 30 pgs.

Natural Resources Conservation Service. Site Index Reports. Accessed May 2014.
https://esi.sc.egov.usda.gov/ESI_Forestland/pgFSWelcome.aspx

NatureServe, 2010. Vegetation Associations of Missouri (revised). NatureServe, St. Paul, Minnesota.

Nelson, Paul W. 2010. The Terrestrial Natural Communities of Missouri. Missouri Department of Conservation, Jefferson City, Missouri.

Nigh, Timothy A., & Walter A. Schroeder. 2002. Atlas of Missouri Ecoregions. Missouri Department of Conservation, Jefferson City, Missouri.