Ecological Site Description

Clayey Floodplain Forest F131AY011MO

- *(Celtis occidentalis - Ulmus americana/Cephalanthus occidentalis/Leersia oryzoides)*
- (hackberry – American elm/buttonbush/ricecut grass)

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: 131A – Southern Mississippi River Alluvium

Introduction

The Southern Mississippi River Alluvium (area outlined in red on the map; northern portion only) is a vast alluvial plain, stretching from the confluence of the Mississippi and Ohio Rivers to tidewater areas of the Gulf of Mexico. The area is formed primarily in sediments deposited by the Mississippi River, with significant contributions from the St Francis and Black Rivers west of Crowley's Ridge, in the northern part of the area. A variety of alluvial landforms are present, including natural levees, sand splays, backswamps, channels, swales, stream terraces and braided terraces. Dunes have formed from wind redistribution of alluvial sands, and loess deposits overlie older terraces to the west. Elevation ranges from about 330 feet in the north to sea level in the south. Local relief is low, and much of the area appears flat, although low escarpments and other slight changes in elevation often indicate major changes in hydrology and soils.

Clayey Floodplain Forests are within the green areas on the map (Missouri portion only; distributions farther south are currently under review). These areas are scattered in the easternmost part of the area, near the current channel of the Mississippi River. They are generally associated with both Sandy Floodplain and Loamy Floodplain ecological sites. Soils are very deep and clayey with high water tables, and are subject to flooding.

Physiographic Features

These sites are on nearly level floodplains of the Mississippi River. Areas not protected by levees are subject to flooding.

Soil Features
These soils are very deep and clayey throughout, with high water tables. The soils were formed under forest vegetation. Organic matter content is variable. Parent material is alluvium. They have silty clay loam to clay surface layers, with clayey subsurface layers. These soils are affected by seasonal wetness. Soil series associated with this site include Bowdre, Cooter, Portageville, Roellen, and Tunica.

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.

Historically, the Mississippi River was a very dynamic system with frequent flooding and multiple braided channels that shifted back and forth across the floodplain. Gravelly, sandy, loamy, and clayey deposits of sediment sorted themselves out on the floodplain depending on the speed, volume and duration of the waters carrying them. Clayey deposits occurred in areas of slower moving water, such as in isolated, concave meander scars or backwater areas between the natural levees formed nearer the channel. Current management of the river has drastically altered this dynamic process although the clayey soil texture and seasonally high water table still influences the development of these floodplain forest communities. Vegetation is subject to debris deposition and scouring.

Clayey Floodplain Forests resembles the adjacent Loamy Floodplain Forests, except that it lacks species of oak, sugar maple, and walnut that do not tolerate extended periods of wetness that can occur in these units. In addition, the ground flora is often barren because of inundation and occasional ponding. Historic flooding of Clayey Floodplain Forest occurred annually in this region or at least once every 3 years. Flooding would have been a combination of headwater and backwater events, with periods of slower moving water distinguishing it from adjacent forest types.

Succession in Clayey Floodplain Forests appears to be similar to that of the Loamy Floodplain Forests, except that periods of inundation and ponding exclude later successional hardwood species. Hackberry, elm, ash, eastern cottonwood and sycamore form a tall canopy (80 to 100 feet) that is uneven and has frequent holes. Catastrophic floods will often partially or completely knock down trees; consequently, this ecological site is often made up of a mosaic of early to late successional floodplain forests.

Today most of these ecological sites have been cleared and converted to intensive agriculture. While some cleared fields have retained a narrow strip of forest along the stream, many of these ecological sites are often cleared right up to the bank. In such cases, severe flooding may cause stream bank erosion and complete loss of this ecological site. Uncontrolled grazing by domestic livestock in the remaining strips of forest can also kill trees and remove the ground cover, resulting in de-stabilization and degradation of this ecological site as well.

The remaining remnants that still exist along un-leveed areas, within levees and on islands play an important role as a source of food and shelter for migrating birds. In addition, large floodplain trees that extend above the canopy are important nesting sites for bald eagles and herons. Carefully planned timber harvests can be tolerated in this system, but high grading of the timber will eventually degrade the ecological site. Re-establishment of these riparian forests is important for stream quality and health, as well as for migratory birds. Planting of appropriate species has proven to be quite successful.

Reference State Plant Community

Canopy Trees

Common Name	Botanical Name	Cover % (low-high)	Canopy Height (ft)
SWAMP WHITE OAK	*Quercus bicolor*	10-20	90
GREEN ASH	*Fraxinus pennsylvanica*	10-20	80
HACKBERRY	*Celtis occidentalis*	10-30	80
SUGARBERRY	*Celtis laevigata*	10-30	80
SHELLBARK HICKORY	*Carya laciniosa*	10-20	70
SYCAMORE	*Platanus occidentalis*	10-20	100
SILVER MAPLE	*Acer saccharinum*	10-20	80
EASTERN COTTONWOOD	*Populus deltoides*	10-20	100
AMERICAN ELM	*Ulmus americana*	10-30	90

Understory Trees

Common Name	Botanical Name	Cover % (low-high)	Canopy Height (ft)
RED ELM	*Ulmus rubra*	10-20	50
BOX ELDER MAPLE	*Acer negundo*	10-20	40
BLACK WILLOW	*Salix nigra*	10-20	50

Shrubs

Common Name	Botanical Name	Cover % (low-high)	Canopy Height (ft)
BUTTONBUSH	*Cephlanthus occidentalis*	10-20	8
SWAMP DOGWOOD	*Cornus obliqua*	5-10	10

Vines

Common Name	Botanical Name	Cover % (low-high)
FOX GRAPE	*Vitis vulpina*	10-20
RACOON GRAPE	*Ampelopis cordata*	10-20
POISON IVY	*Toxicodendron radicans*	10-20

Forbs

Common Name	Botanical Name	Cover % (low-high)
CLEARWEED	*Pilea pumila*	10-20
WHITE WOODLAND ASTER	*Aster lateriflorus*	10-20
WOOD NETTLE	*Laportea canadensis*	10-20
GOLDENGLOW	*Rudbeckia laciniata*	10-20
WATERLEAF	*Hydrophyllum virginianum*	10-20
HISPID BUTTERCUP	*Ranunculus hispidus*	10-20
YELLOW IRONWEED	*Verbesina alternifolia*	10-20
TOUCH-ME-NOT	*Impatiens pallida*	10-20
FALSE NETTLE	*Boehmeria cylindrica*	10-20

Grasses and sedges

Common Name	Botanical Name	Cover % (low-high)
RICE CUTGRASS	*Leersia oryzoides*	10-30
FOX SEDGE	*Carex vulpina*	5-20
HOP SEDGE	*Carex lupulina*	5-20
WOOD REED GRASS	*Cinna arundinacea*	5-20
INDIAN WOODOATS	*Chasmanthium latifolium*	5-20

Site Interpretations

Wildlife

- This ecological site is a dense, muti-layered forest, with snags and cavities and down dead wood that provides habitat for many species requiring cool, rich, moist conditions.
- Bird species associated with these mature 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, Kentucky Warbler, Hooded Warbler, Acadian Flycatcher, Barred Owl, Pileated Woodpecker, Cerulean Warbler, and Yellow-throated Warbler.
- Reptiles and amphibians associated with this ecological site include small-mouthed salamander, central newt, midland brown snake, and gray treefrog.

Forestry

- Management: Site index values range from 71 for pecan, 86 for pin oak and 107 for cottonwood. Timber management opportunities are 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. Maintain adequate riparian buffer areas.

- Limitations: Wetness from flooding – short duration and high water table; Use of equipment may be restricted in spring and other excessively wet periods. Equipment use when wet may compact soil and damage tree roots. Tree planting is difficult during spring flooding periods. Seedling mortality may be high due to excess wetness. Ridging the soil and planting on the ridges may increase survival. Clayey soils have reduced traction and compact easily when wet. Unsurfaced roads and skid trails may be impassable during rainy periods. Restrict activities to dry periods or surfaced areas. The surface layer is firm when dry and sticky when wet and becomes cloddy if tilled. Seedling mortality may occur during the summer because of lack of adequate soil moisture.

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

References

Missouri Department of Conservation. 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.