

Ecological Site Description

Sandy/Gravelly Floodplain Forest

F116AY042MO

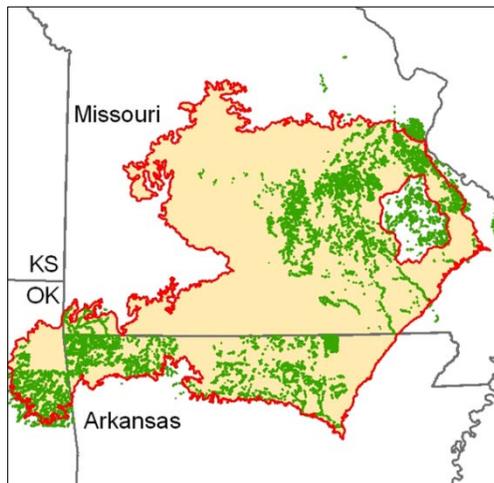
- (*Platanus occidentalis* - *Populus deltoides*/*Salix interior*/*Laportea canadensis*)
- (sycamore – eastern cottonwood/sandbar willow/Canadian woodnettle)

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: 116A – Ozark Highland

Introduction

The Ozark Highland (yellow area on the map) constitutes the Salem Plateau of the Ozark Uplift. Elevation ranges from about 300 feet on the southeast edge of the Ozark escarpment, to about 1,600 feet in the west, adjacent to the Burlington Escarpment of the Springfield Plateau. The underlying bedrock is mainly horizontally bedded Ordovician-aged dolomites and sandstones that dip gently away from the uplift apex in southeast Missouri. Cambrian dolomites are exposed on deeply dissected hillslopes. In some places, Pennsylvanian and Mississippian sediments overlie the plateau. Relief varies from the gently rolling central plateau areas to deeply dissected hillslopes associated with drainageways such as the Current and Eleven Point Rivers.



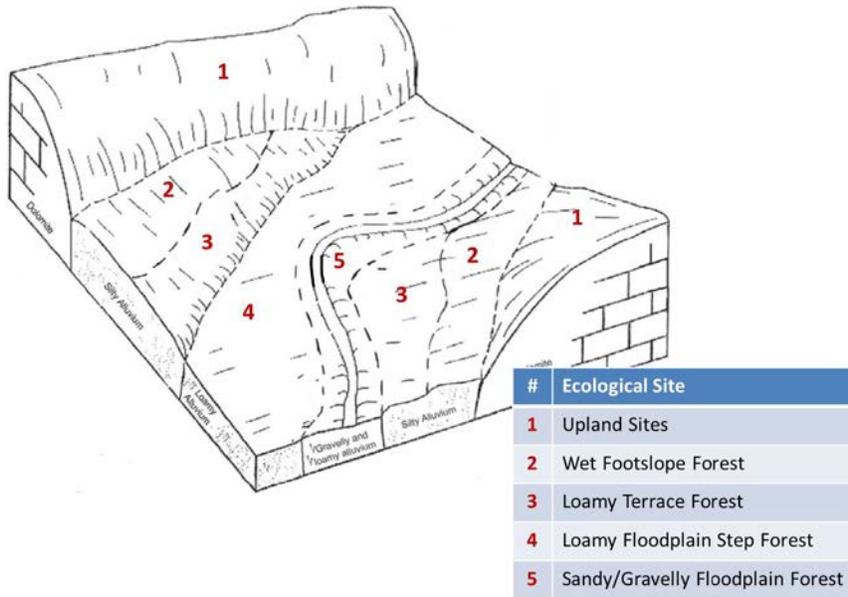
Sandy/Gravelly Floodplain Forests (green areas on the map) occur throughout the Ozark Highland along most streams. Soils are very gravelly, and subject to flooding.

Physiographic Features

This site is on low floodplains with slopes of 0 to 3 percent. This ecological site is generally on the lowest floodplain directly adjacent to the stream channel, but also occurs along abandoned channels farther from the active stream channel. The site receives some runoff from higher floodplains, stream terraces and uplands. This site is subject to frequent flooding.

The following figure (adapted from Simmons et al, 2006) shows the typical landscape position of this ecological site, and landscape relationships with other ecological sites. It is within the area labeled “5” on the figure, directly adjacent to the stream channel. Sandy/Gravelly Floodplain Forest

sites are typically associated with Floodplain Step sites, labeled “4”, and with Terrace sites, labeled “3”.



Soil Features

These soils have low plant-available water capacity, due to an abundance of coarse fragments. They were formed under forest vegetation, with periodic depositional flood events. Organic matter content is variable. Parent material is alluvium. They have sandy loam, loam or silt loam surface horizons that are gravelly to very gravelly in places and sandy or loamy subsoils that are generally skeletal. They are not affected by seasonal wetness. Soil series associated with this site include Batcave,

Bloomsdale, Cedargap, Elsah, Midco, Pinerun, Relfe, Tilk, and Wideman.

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.

Interior Ozark streams are generally high-gradient, with frequent, flashy floods after significant rainfall events. Flooding of Sandy/Gravelly Floodplain Forests typically occurs annually or at least once every three years. Cherty gravel and sandy sediments, originating from the predominance of cherty dolomites and sandstone strata in the surrounding uplands, make up a significant portion of the alluvium in most Interior Ozark floodplains. These materials are normally deposited near the stream where fast-moving waters can carry and release them. Gravel bar succession to forest is dominated by flood tolerant, pioneer tree species such as sycamore, eastern cottonwood and willow. Young stands of these species stabilize the floodplain gravel bars, and continue to trap coarse-textured floodwater sediments.

Consequently, many Sandy/Gravelly 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, finer sediments accumulate on the forest floor, and a dense ground flora of grasses and nettles develops. Over time, the local stream may down-cut into the floodplain or meander away from the site, thereby altering the flooding regime. The lower frequency of floods and slower

floodwaters results in deposition of loamy sediments. Ultimately, shade tolerant elm, ash, and hackberry will accumulate in the understory and the forest may succeed to a Loamy Floodplain Forest ecological site dominated by these species. However, catastrophic floods will often partially or completely knock down the early successional species and regenerate the ecological site. Consequently, this site is typically a mosaic of early to late successional floodplain forest.

Today many Sandy/Gravelly Floodplain Forests in Missouri have been cleared and converted to agriculture and 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. Grazing by domestic livestock in the remaining strips of forest, can also kill trees and remove the ground cover, resulting in destabilization and potential loss of this ecological site as well.

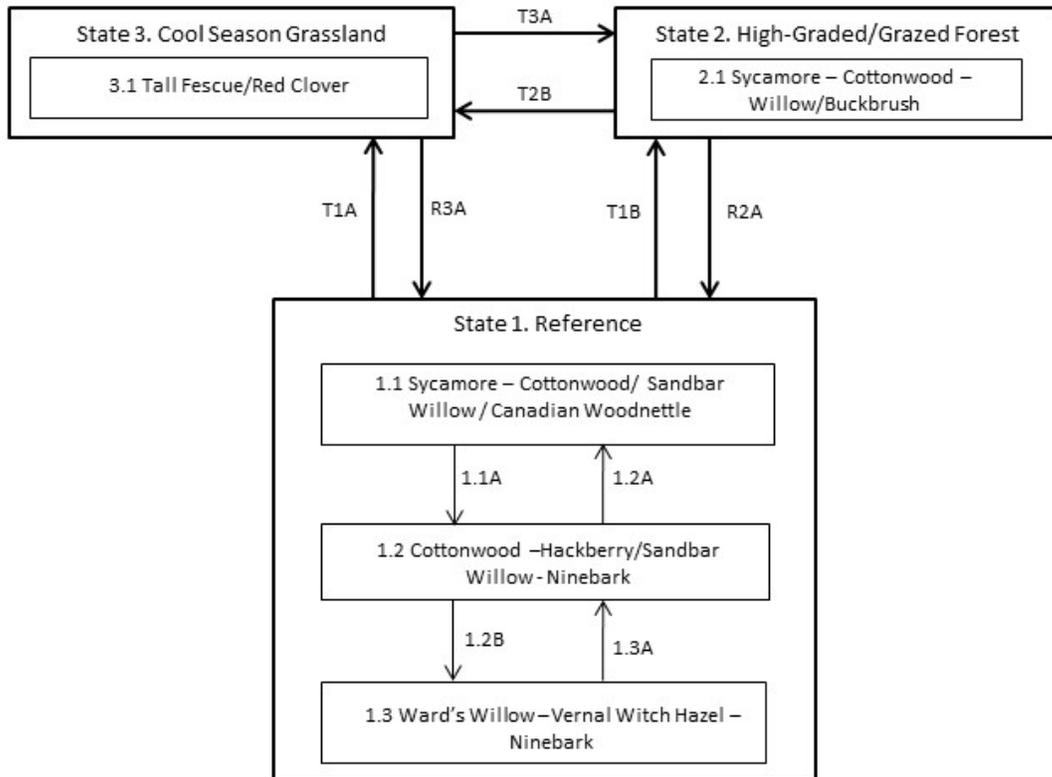
Remaining remnants still exist along un-leveed areas and within levees. They often occur as a rather narrow band of trees and shrubs traversing the stream edge. These bands of forest play an important role as a source of food and shelter for migrating birds. In addition, isolated large sycamore and cottonwood 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/Gravelly Floodplain Forest, F116AY042MO



Code	Event/Activity
T1A, T2B	Clearing; pasture planting; prescribed grazing; hayland management
T1B	Poorly planned harvest (high grading); uncontrolled grazing
T3A	Uncontrolled grazing; woody invasion (+20-40 years)
R2A	Grazing exclusion; access control; tree planting; forest stand improvement
R3A	Tree planting; long term succession (+50-70 years)
1.1A	Flooding disturbance
1.2A	No flooding disturbance
1.2B	Severe streambank and channel instability and erosion
1.3A	Long-term stability; reduction in flood regime intensity

Ecological States

State 1: Reference

Sandy/Gravelly Floodplain Forests are dominated by mature sycamore and/or eastern cottonwood. While these species can occur together, sycamores tend to dominate the smaller, higher energy streams with more gravel, while cottonwoods are more dominant on larger rivers with less gravel. Maximum tree age, historically, was probably about 100 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 sands and gravels, and have a sparse understory. These gravel bars and intermittent stream channels are in the early stages of ecological succession, and are typically on point bar deposits. They are characterized by a sparse to abundant ground cover of grasses and forbs. Shrubs such as Ward’s willow, vernal witch hazel and ninebark can create a 100 percent cover in places, and tree seedlings of cottonwood are common. Frequent, high-velocity flood events deposit fresh sand and gravel 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 develop into the early seral Sandy/Gravelly Floodplain Forest 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: High-Graded/Grazed Forest

Sandy/Gravelly Floodplain Forests subjected to repeated, high-graded timber harvests and domestic grazing transition to this State. This state exhibits an over-abundance of less desirable tree species, and weedy understory species such as buckbrush. The vegetation offers little nutritional value for cattle, and excessive stocking damages tree boles, degrades understory species composition, destabilizes stream banks and results in soil compaction and accelerated erosion and runoff during flood events. Restoration of the riverfront forest can be facilitated by exclusion of cattle coupled with tree planting.

State 3: Cool Season Grassland

Conversion of Sandy/Gravelly Floodplain Forests to planted, non-native pasture species such as tall fescue has been common in the Ozark highlands. Frequent flooding and low available water capacity make non-native pastures difficult to maintain in a healthy, productive state on this ecological site. Restoration of the Sandy/Gravelly Floodplain Forests can be achieved over time by discontinuing grazing and active pasture management and allowing natural woody succession to occur. Tree planting, especially to bring in desired species, may be necessary.

Reference State Plant Community

Canopy Trees

Common Name	Botanical Name	Cover % (low-high)	Canopy Height (ft)
BLACK WILLOW	<i>Salix nigra</i>	10-20	60
EASTERN COTTONWOOD	<i>Populus deltoides</i>	10-30	90
HACKBERRY	<i>Celtis occidentalis</i>	5-20	70
RIVER BIRCH	<i>Betula nigra</i>	5-20	80
SYCAMORE	<i>Platanus occidentalis</i>	10-30	100
SILVER MAPLE	<i>Acer saccharinum</i>	5-10	80
AMERICAN ELM	<i>Ulmus americana</i>	5-20	70

Understory Trees

Common Name	Botanical Name	Cover % (low-high)	Canopy Height (ft)
BOX ELDER	<i>Acer negundo</i>	10-20	50
OHIO BUCKEYE	<i>Aesculus glabra</i>	10-20	40

Shrubs

Common Name	Botanical Name	Cover % (low-high)	Canopy Height (ft)
GRAY DOGWOOD	<i>Cornus foemina</i>	5-20	12
SANDBAR WILLOW	<i>Salix interior</i>	5-20	20
PEACH-LEAVED WILLOW	<i>Salix amygdaloides</i>	5-20	20
CAROLINA WILLOW	<i>Salix caroliniana</i>	5-20	20
NINEBARK	<i>Physocarpus opulifolius</i>	5-20	8
OZARK WITCHHAZEL	<i>Hamamelis vernalis</i>	5-20	9

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
GIANT CANE	<i>Arundinaria gigantea</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 Riverfront 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 Riverfront Forests include: American Redstart, Northern Parula, and Willow Flycatcher.
- Birds associated with late-successional Riverfront 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 Riverfront Forest include: small-mouthed salamander, central newt, midland brown snake, gray treefrog, and southern leopard frog.

Forestry

- **Management:** Site index values range from 47 to 66 for oak and 57 to 90 for non-oak species. 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 short duration flooding; coarse fragments in profile. The use of equipment may be restricted in spring and other excessively wet periods. Disturbing the surface excessively in harvesting operations and building roads increases soil losses, which may leave a greater amount of coarse fragments on the surface. Tree planting is difficult during spring flooding periods. Mechanical tree planting may be limited due to coarse fragments on surface.

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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