

Ecological Site Description

Loamy Terrace Forest

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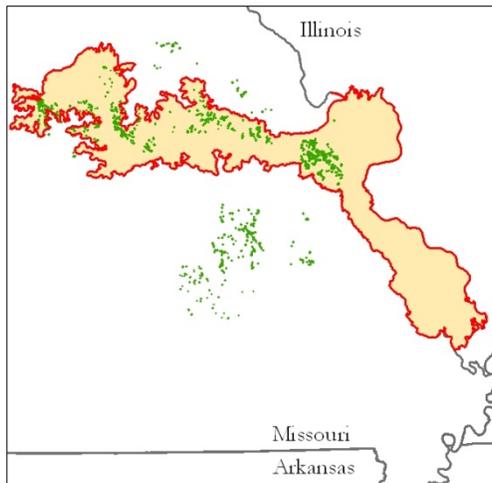
- (*Acer saccharum* - *Quercus rubra* /*Asimina triloba*/*Asarum canadense*)
- (sugar maple – northern red oak /pawpaw/wild ginger)

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.

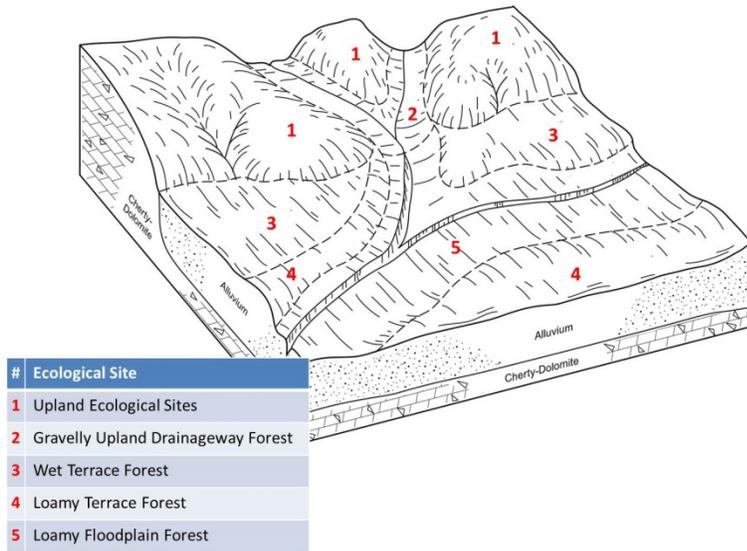
Loamy Terrace Forests (green areas on the map) are scattered throughout the Missouri River watershed portion of the MLRA, and in adjacent areas. Soils are very deep and loamy, and are subject to flooding.

Physiographic Features

This site is on low stream terraces and high floodplains (floodplain steps) with slopes of 0 to 5 percent. The site generates some runoff to adjacent lower floodplain sites, and receives some runoff from higher stream terraces and uplands. This site is subject to rare to occasional flooding. Scour is uncommon in these flood events, and deposition is minimal, so ecological processes more closely resemble those of stream terrace systems.

The following figure (adapted from Skaer, 2004) shows the typical landscape position of this ecological site, and landscape relationships among the major ecological sites in the floodplain and

stream terrace systems of major tributaries of the Missouri and Mississippi rivers. This site is within the area labeled as “4” on the figure, and is typically adjacent to but on higher positions than floodplain ecological sites such as the Loamy Floodplain Forest (labeled “5” on the figure).



Soil Features

These soils have no rooting restriction. They were formed under forest vegetation, and have thin, light-colored surface horizons. Parent material is alluvium. They have silt loam, sandy loam or loam surface horizons, and loamy subsoils with argillic horizons that may be skeletal

with depth. They are not affected by seasonal wetness. Soil series associated with this site include Cedargap, Horsecreek, Jemerson, Razort, and Wiota.

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.

Loamy Terrace Forests are on relatively stable former floodplain positions. These rarely flooded terraces occur above occasionally flooded high floodplains on well drained, loamy soils and riverfront forests on lower, more frequently flooded areas. The reference plant community is dominated by a wide variety of deciduous hardwood tree species including sugar maple, northern red oak, bitternut hickory, bur oak, American elm, black walnut and Kentucky coffee tree. Trees are generally large and tall forming a dense, closed canopy.

Both historically and today, these forests are structurally and compositionally diverse, with occasional tree-fall gaps and natural mortality providing opportunities for regeneration of overstory species. The understory is also complex, with multiple layers of shade tolerant species such as pawpaw, spicebush, Ohio buckeye and leatherwood. Grape vines, greenbrier, and Virginia creeper are also present along with a diverse array of ground flora species that carpets the forest floor.

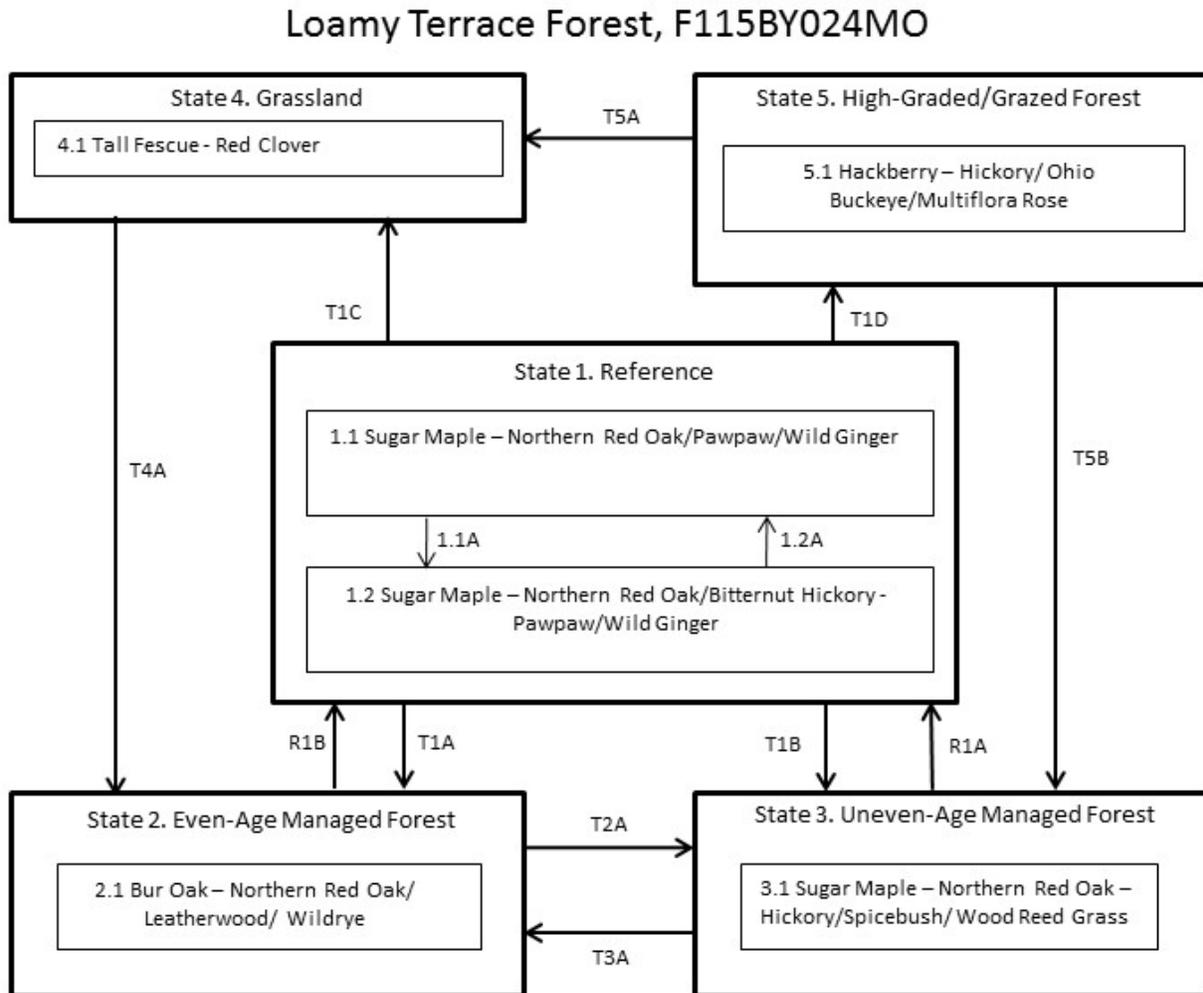
Today, the rich, loamy Loamy Terrace Forests are largely converted to pasture and hayland. Where they do still occur, they often occur as a rather narrow band of forest traversing the riverfront forest or stream edge. These bands of forest play an important role as a source of food and shelter for

migrating birds. In addition, they are very important in stream bank stabilization. Most sites have suffered from extensive hydrological alterations (ditches, levees, etc.).

Uncontrolled grazing by domestic livestock in these remaining strips of forest damages and kills smaller trees and removes the ground cover. Carefully planned timber harvests can be tolerated on these sites, but high grading of the timber will ultimately degrade the sites. Re-establishment of these productive forests is important for stream quality and stream health, and as critical habitat for migratory birds. Planting of later successional species on the appropriate landscape position and soils has proven to be an effective means for restoration.

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



Code	Activity/Event/Process
T1A	Harvesting; even-aged management
T1B	Harvesting; uneven-age management
T1C, T5A	Clearing; pasture planting
T1D	High-grade harvesting; uncontrolled grazing
T2A	Uneven-age management
T3A	Even-age management; thinning
T4A, T5A	Tree planting; long-term succession; no grazing
T5B	Uneven-age management; tree planting; no grazing

Code	Activity/Event/Process
1.1A	No disturbance (10+ years)
1.2A	Disturbance (fire, wind, ice) 3-5 years

Code	Activity/Event/Process
R1A	Extended rotations; forest stand improvement
R1B	Uneven-age mgt, extended rotations; forest stand improvement

Ecological States

State 1: Reference

The reference state was dominated by northern red oak and sugar maple including a wide variety of other deciduous hardwood tree species. Maximum tree age was likely 150 to 300 years. Periodic disturbances from fire, wind or occurred along with infrequent flooding. Long disturbance-free periods allowed an increase in more shade tolerant species such as bitternut hickory and sugar maple. Two community phases are recognized in this state, with shifts between phases based on disturbance frequency.

The reference state is rare today. Some sites have been converted to grassland (State 4). Others have been subject to repeated, high-graded timber harvest coupled with uncontrolled domestic livestock grazing (State 5). Many reference sites have been managed for timber harvest, resulting in either even-age (State 2) or uneven-age (State 3) forests.

State 2: Even-Age Managed Forest

These former forests are now rather dense, with an under developed understory and ground flora. Thinning can increase overall tree vigor and improve understory diversity. Continual timber management, depending on the practices used, will either maintain this state, or convert the site to uneven-age (State 3) forests.

State 3: Uneven-Age Managed Forest

Uneven-Age Managed forests can resemble the reference state but are denser. The biggest differences are tree age, most being only 50 to 90 years old, and canopy closure. Composition is also likely altered from the reference state depending on tree selection during harvest. In addition, without a regular 15 to 20 year harvest re-entry into these stands, they will slowly increase in more shade tolerant species such as bitternut hickory and sugar maple and northern red oak will become less dominant.

State 4: Grassland

Conversion of forests to planted, non-native pasture species such as tall fescue has been common in this region. If grazing and active pasture management is discontinued, the site will eventually transition, over time, to State 2 (Even-Age).

State 5: High-Graded/Grazed Woodland

Forested sites subjected to repeated, high-graded timber harvests and uncontrolled domestic grazing transition to this state. This state exhibits an over-abundance of hickory and other less desirable tree species, and weedy understory species such as buckbrush, gooseberry, poison ivy and Virginia creeper. The vegetation offers little nutritional value for cattle, and excessive stocking damages tree boles, degrades understory species composition and results in soil compaction and accelerated erosion and runoff. Exclusion of livestock from sites in this state coupled with uneven-age management techniques will cause a transition to State 3 (Uneven-Age).

Reference State Plant Community**Canopy Trees**

Common Name	Botanical Name	Cover % (low-high)	Canopy Height (ft)
WHITE OAK	<i>Quercus alba</i>	5-20	80
WHITE ASH	<i>Fraxinus americana</i>	5-20	70
KENTUCKY COFFEE TREE	<i>Gymnocladus dioica</i>	5-20	70
HACKBERRY	<i>Celtis occidentalis</i>	5-20	70
BITTERNUT HICKORY	<i>Carya cordiformis</i>	5-20	80
AMERICAN ELM	<i>Ulmus americana</i>	5-20	70
BLACK WALNUT	<i>Juglans nigra</i>	10-20	70
NORTHERN RED OAK	<i>Quercus rubra</i>	20-40	90
SUGAR MAPLE	<i>Acer saccharum</i>	20-40	80

Understory Trees

Common Name	Botanical Name	Cover % (low-high)	Canopy Height (ft)
OHIO BUCKEYE	<i>Aesculus glabra</i>	10-20	40
PAWPAW	<i>Asimina triloba</i>	10-20	20

Shrubs

Common Name	Botanical Name	Cover % (low-high)	Canopy Height (ft)
WAHOO	<i>Euonymus atropurpureus</i>	10-20	8
SPICEBUSH	<i>Lindera benzoin</i>	10-20	6

Vines

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

Forbs

Common Name	Botanical Name	Cover % (low-high)
PALE TOUCH-ME-NOT	<i>Impatiens pallida</i>	5-20
WILD GINGER	<i>Asarum canadense</i>	10-20
CLEARWEED	<i>Pilea pumila</i>	5-20
WHITE WOODLAND ASTER	<i>Aster lateriflorus</i>	5-20
WOOD NETTLE	<i>Laportea canadensis</i>	10-20
WATERLEAF	<i>Hydrophyllum virginianum</i>	5-20
BLUE BELLS	<i>Mertensia virginica</i>	5-20
WHITE TROUT LILY	<i>Erythronium albidum</i>	5-20

Grasses and sedges

Common Name	Botanical Name	Cover % (low-high)
EASTERN STAR SEDGE	<i>Carex radiata</i>	5-10
WOOD REED GRASS	<i>Cinna arundinacea</i>	5-10
VIRGINIA WILDRYE	<i>Elymus virginicus</i>	5-10

Site Interpretations**Wildlife**

- Moist conditions with abundant coarse woody debris make this type of ecological site important for many herptiles.

- Ephemeral pools provide important amphibian breeding habitat.
- Periodic inundation and acorns provide important habitat and food for migrating ducks (especially mallards) and breeding ducks including wood ducks and hooded mergansers.
- Tall emergent trees along with an uneven canopy structure and canopy gaps are important for heron colonies, eagle nesting, Mississippi kites, cerulean warblers and other bird species.
- Birds associated with late-successional to mature forests are Wood Duck, Hooded Merganser, Barred Owl, Cerulean Warbler, Yellow-throated Warbler, Prothonotary Warbler, Pileated Woodpecker, Yellow-throated Vireo, Brown Creeper, and Yellow-crowned Night Heron.
- Reptiles and amphibians associated with ecological site include: small-mouthed salamander, central newt, midland brown snake, gray treefrog, northern spring peeper, Blanchard's cricket frog, southern leopard frog, western painted turtle, and red-eared slider.

Forestry

- Management: Estimated site index values range from 60 to 70 for 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. Where possible, favor white oak, black walnut, northern red oak, and bitternut hickory. Maintain adequate riparian buffer areas.
- Limitations: No major limitations or restrictions. Occasional periods of seasonal wetness; 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 may be difficult during spring flooding 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

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

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