

Ecological Site Description

Deep Loess Protected Backslope Forest

F134XY002MO

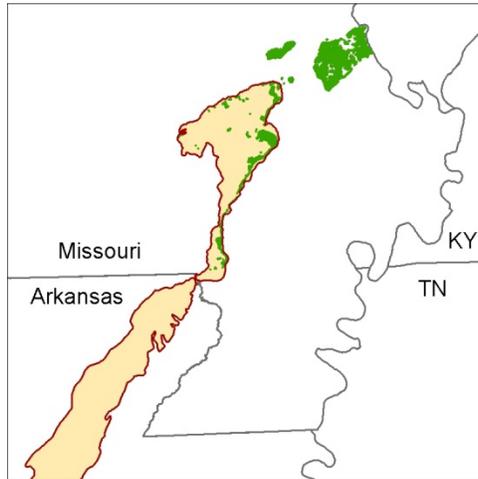
- (*Quercus rubra* - *Liriodendron tulipifera*/*Asimina triloba* /*Polystichum acrostichoides* - *Erigenia bulbosa*)
- (northern red oak – tulip tree/pawpaw/Christmas fern – harbinger of spring)

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: 134 – Southern Mississippi Valley Loess

Introduction

The Southern Mississippi Valley Loess (area outlined in red on the map; northern portion only) is a relatively narrow strip of the coastal plain bordering the Mississippi River valley that is blanketed with loess. The northern part of this MLRA, discussed here, is locally referred to as Crowley’s Ridge. Elevation ranges from about 300 feet on the footslopes to nearly 600 feet on the highest ridges. Loess caps the summits and upper slopes, and Pliocene-aged sand and gravel deposits of the coastal plain influence soils on lower, steeper slopes.



Deep Loess Protected Backslope Forests are within the green areas on the map (Missouri portion only; distributions farther south are currently under review). They occupy the northerly and easterly aspects of steep, dissected slopes, and are mapped in complex with the Deep Loess Exposed Backslope Woodland ecological site. These sites are common in Scott County, Missouri, and on the easternmost

uplands of Crowley’s Ridge in Stoddard County, Missouri. Soils are very deep, with no rooting restrictions.

Physiographic Features

This site is on upland backslopes, with slopes of 15 to 35 percent. It is on protected aspects (north, northeast, and east), which receive significantly less solar radiation than the exposed aspects. The site receives runoff from upslope summit and shoulder sites, and generates runoff to adjacent, downslope ecological sites. This site does not flood.

Soil Features

These soils have no major rooting restriction. The soils were formed under woodland vegetation, and have thin, light-colored surface horizons. Parent material is loess. The soils have silt loam surface horizons. Subsoils are silt loam to silty clay loam. These soils are not affected by seasonal wetness. Soil series associated with this site include Memphis.

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 reference community is a forest dominated by an overstory of northern red oak, white oak, tulip tree and occasional sugar maple. The canopy is tall (80 to 120 feet) and well developed (90 to 100 percent canopy closure) and the understory well developed and with great structural diversity. In the most mesic landscape positions, shade tolerant and moisture loving species, such as beech, basswood, coffee tree, and bitternut hickory are in greater abundance.

In this region of wet lowland forests, it is unlikely that fire played a major role in the ecological dynamics of the forests and woodlands. In addition, Loess Protected Backslope Forests occur in the most cool, moist and protected landscape positions. While the upland woodlands had an estimated fire frequency of 5 to 15 years, Loess Protected Backslope Forests burned less frequently (estimated 15 to 25 years) and with much lower intensity.

Deep Loess Protected Backslope Forests would have also been subjected to occasional disturbances from wind and ice, as well as grazing by large native herbivores, such as bison, elk, and deer. Wind and ice would have periodically opened the canopy up by knocking over trees or breaking substantial branches off canopy trees. Such canopy disturbances allowed more light to reach the ground and favored reproduction of the oak species.

Today, these communities have been cleared and converted to pasture, or have undergone repeated timber harvest and domestic livestock grazing. Most existing occurrences have a younger (50 to 80 years) canopy layer whose composition has been altered by timber harvesting practices. In addition, in the absence of fire, the canopy, sub-canopy and woody understory layers are better developed. The absence of periodic fire has allowed more shade-tolerant tree species, such as sugar maple, tulip poplar white ash, or American beech to increase in abundance. Uncontrolled domestic grazing has diminished the diversity and cover of woodland ground flora species, and has introduced weedy species such as gooseberry, buckbrush, poison ivy and Virginia creeper created a more open understory and increased soil compaction and soil erosion.

Deep Loess Protected Backslope Forests are some of the richest and most productive forest sites in the region. Carefully planned single tree selection or the creation of small group openings can help regenerate more desirable oak species and increase vigor on the residual trees. Clear-cutting does occur and can result (if oak regeneration is present) in dense, even-aged stands of primarily oak.

This may be most beneficial for existing stands whose composition has been highly altered by past management practices.

Oak regeneration is problematic. Sugar maple, tulip poplar, red elm, ironwood, hickories, grapes, pawpaw and spicebush are often dominant competitors in the understory. Maintenance of the oak component will require disturbances that will impair the cool, moist, shaded conditions, so trade-offs will have to be made carefully. The high productivity of these sites makes it more challenging than on other forest sites in the region.

Reference State Plant Community

Canopy Trees

Common Name	Botanical Name	Cover % (low-high)	Canopy Height (ft)
WHITE OAK	<i>Quercus alba</i>	10-20	90
AMERICAN BEECH	<i>Fagus grandifolia</i>	10-20	90
TULIP POPLAR	<i>Liriodendron tulipifera</i>	20-30	120
NORTHERN RED OAK	<i>Quercus rubra</i>	30-50	110
WHITE ASH	<i>Fraxinus americana</i>	5-10	80
SUGAR MAPLE	<i>Acer saccharum</i>	5-20	80
RED ELM	<i>Ulmus rubra</i>	5-10	60
BASSWOOD	<i>Tilia americana</i>	5-10	90
KENTUCKY COFFEETREE	<i>Gymnocladus dioicus</i>	5-10	80
BLACK WALNUT	<i>Juglans nigra</i>	5-10	90
BITTERNUT HICKORY	<i>Carya cordiformis</i>	10-20	90

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
BLADDERNUT	<i>Staphylea trifolia</i>	10-20	20
FLOWERING DOGWOOD	<i>Cornus florida</i>	10-20	30

Shrubs

Common Name	Botanical Name	Cover % (low-high)	Canopy Height (ft)
BLUE BEECH	<i>Carpinus caroliniana</i>	5-20	15
RED BUCKEYE	<i>Aesculus pavia</i>	5-20	12
SPICEBUSH	<i>Lindera benzoin</i>	10-20	8

Vines

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

Ferns

Common Name	Botanical Name	Cover % (low-high)
CHRISTMAS FERN	<i>Polystichum acrostichoides</i>	5-30
MAIDENHAIR FERN	<i>Adiantum pedatum</i>	5-20

Forbs

Common Name	Botanical Name	Cover % (low-high)
VIRGINIA-SNAKEROOT	<i>Aristolochia serpentaria</i>	10-20
VIRGINIA SPRINGBEAUTY	<i>Claytonia virginica</i>	10-20
LESSER YELLOW LADY'S SLIPPER	<i>Cypripedium parviflorum v. parviflorum</i>	0-5
WHITE DOG'S TOOTH VIOLET	<i>Erythronium albidum</i>	10-20
HEPATICCA	<i>Hepatica nobilis</i>	10-20
GOLDEN SEAL	<i>Hydrastis canadensis</i>	10-20
FEATHERY FALSE SOLOMON'S-SEAL	<i>Maianthemum racemosum</i>	10-20
WILD BLUE PHLOX	<i>Phlox divaricata</i>	20-30
MAYAPPLE	<i>Podophyllum peltatum</i>	20-30
TOAD SHADE	<i>Trillium sessile</i>	20-30
BELLWORT	<i>Uvularia grandiflora</i>	10-20
WOODNETTLE	<i>Laportea canadensis</i>	10-20
GREEN DRAGON	<i>Arisaema dracontium</i>	5-10
HARBINGER OF SPRING	<i>Eriogenia bulbosa</i>	20-30

Grasses and sedges

Common Name	Botanical Name	Cover % (low-high)
Typically <5% cover	na	na

Site Interpretations

Wildlife

- Wild turkey, white-tailed deer, and eastern gray squirrel depend on hard and soft mast food sources and are typical upland game species of this type.
- Birds associated with this ecological site include Worm-eating warbler, Whip-poor-will, Great Crested Flycatcher, Ovenbird, Pileated Woodpecker, Wood Thrush, Red-eyed Vireo, Northern Parula, Louisiana Waterthrush (near streams), and Broad-winged Hawk.
- Reptile and amphibian species associated with mature forests include: ringed salamander, spotted salamander, marbled salamander, central newt, long-tailed salamander, dark-sided salamander, southern red-backed salamander, three-toed box turtle, western worm snake, western earth snake, and American toad.

Forestry

- **Management:** Estimated Site index values range from 70 to 90 for oak. Timber management opportunities are excellent. 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. Uneven-aged management will slowly cause an increase in more shade tolerant species such as sugar maple. Using prescribed fire as a management tool could have a negative impact on timber quality, may not be fitting, or should be used with caution on a particular site if timber management is the primary objective. Where possible, favor white oak, black walnut, black cherry, and northern red oak.

- Limitations: No major equipment restrictions or limitations exist. Erosion is a hazard when slopes exceed 15 percent. On steep slopes greater than 35 percent, traction problems increase and equipment use is not recommended.

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.