

Ecological Site Description

Gravelly Exposed Backslope Woodland

F134XY010MO

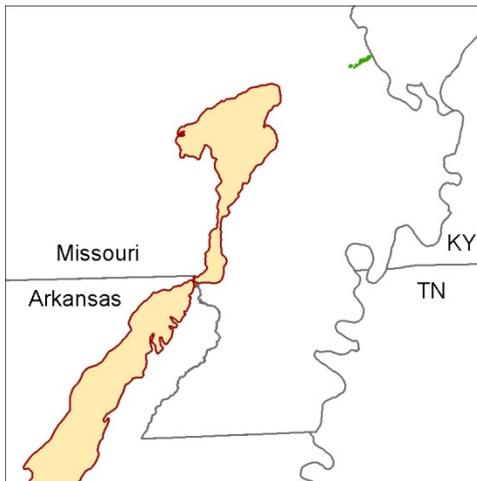
- (*Quercus alba* - *Quercus falcata*/*Rhus aromatica*/*Elymus virginicus* - *Schizachyrium scoparium*)
- (white oak – southern red oak/aromatic sumac/Virginia wild rye – little bluestem)

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.

Gravelly Exposed Backslope Woodlands are within the green area on the map (Missouri portion only; distributions farther south are currently under review). They occupy the southerly and westerly aspects of steep, dissected slopes, and are mapped in complex with the Gravelly Protected

Backslope Forest ecological site. These sites are not extensive, occurring in a few scattered upland locations in Scott County, Missouri. Soils are very deep, with an abundance of gravel.

Physiographic Features

This site is on upland backslopes, with slopes of 15 to 45 percent. It is on exposed aspects (south, southwest, and west), which receive significantly more solar radiation than the protected 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 acidic subsoils that are low in bases. The soils were formed under woodland vegetation, and have thin, light-colored surface horizons. Parent material is coastal plain sediments.

They have gravelly loam surface horizons, and skeletal subsoils with high amounts of gravel and cobbles. These soils are not affected by seasonal wetness. Soil series associated with this site include Saffell.

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.

Gravelly Exposed Backslope Woodlands occur on gravel terraces that are on upland backslopes above the surrounding lowlands. They occur below Loess Forests and Woodlands, and have inclusions of interesting acid seeps. The sloping position and coarse textured, excessively drained materials limit the growth of trees and supports a grassland community with numerous unique species.

The reference plant community is well developed woodland dominated by an overstory of white oak, along with occasional southern red oak. The canopy is moderately tall (65 to 80 feet) but less dense (55 to 75 percent closure) and structurally diverse than adjacent protected slopes. Increased light from the more open canopy causes a diversity of woodland ground flora species to flourish. Woodlands are distinguished from forest, by their relatively open understory, and the presence of sun-loving ground flora species. Characteristic plants in the ground flora can be used to gauge the restoration potential of a stand along with remnant open-grown old-age trees, and tree height growth.

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. While most upland woodlands had an estimated fire frequency of 5 to 15 years, these may have burned less frequently (estimated 10 to 20 years) and with lower intensity.

Gravelly Exposed Backslope Woodlands were also subjected to occasional disturbances from wind and ice, as well as grazing by native large 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. Grazing by large native herbivores would have effectively kept understory conditions more open, creating conditions more favorable to oak reproduction and woodland ground flora species.

Today, these ecological sites have been cleared and converted to pasture or have undergone repeated timber harvest and domestic grazing. Most existing forested ecological sites have a younger (50 to 80 years) canopy layer whose species composition and quality has been altered by timber harvesting practices. In the long term absence of fire, woody species, especially hickory and sugar maple, encroach into these woodlands. Once established, these woody plants can quickly fill the existing understory increasing shade levels with a greatly diminished ground flora. Removal of

the younger understory and the application of prescribed fire have proven to be effective restoration means.

Uncontrolled domestic grazing is also impacting these communities, further diminishing the diversity of native plants and introducing species that are tolerant of grazing, such as buckbrush, gooseberry, and Virginia creeper along with eastern redcedar. These grazed sites also have a more open understory in addition to soil compaction, soil erosion and lower productivity problems.

These ecological sites are moderately productive. Oak regeneration is typically problematic. Sugar maple, red elm, and hickories are often dominant competitors in the understory. Maintenance of the oak component will require disturbances such as thinning and prescribed fire that will encourage more sun adapted species and reduce shading effects.

Reference State Plant Community

Canopy Trees

Common Name	Botanical Name	Cover % (low-high)	Canopy Height (ft)
POST OAK	<i>Quercus stellata</i>	10-20	60
BLACK OAK	<i>Quercus velutina</i>	20-30	80
SOUTHERN RED OAK	<i>Quercus falcata</i>	20-30	80
BLACK HICKORY	<i>Carya texana</i>	10-20	50
PIGNOT HICKORY	<i>Carya glabra</i>	5-10	50
BLACKJACK OAK	<i>Quercus marilandica</i>	0-10	40
WHITE OAK	<i>Quercus alba</i>	20-30	70

Understory Trees

Common Name	Botanical Name	Cover % (low-high)	Canopy Height (ft)
SASSAFRAS	<i>Sassafras albidum</i>	5-10	30
DOWNY SERVICEBERRY	<i>Amelanchier arborea</i>	5-10	20

Shrubs

Common Name	Botanical Name	Cover % (low-high)	Canopy Height (ft)
WINGED ELM	<i>Ulmus elata</i>	5-20	6
AROMATIC SUMAC	<i>Rhus aromatica</i>	10-30	5
LOW BUSH BLUEBERRY	<i>Vaccinium angustifolium</i>	5-20	3

Forbs

Common Name	Botanical Name	Cover % (low-high)
NAKED FLOWER TICKTREFOLI	<i>Desmodium nudiflorum</i>	5-20
VIOLET BUSH CLOVER	<i>Lespedeza violacae</i>	5-20
BIRD'S FOOT VIOLET	<i>Viola pedata</i>	5-20
ELM-LEAF GOLDENROD	<i>Solidago ulmifolia</i>	5-20
LICORICE BEDSTRAW	<i>Galium circaezans</i>	5-20
DOWNY RAGGED GOLDENROD	<i>Solidago petiolares</i>	5-20
PERPLEXED TICKTREFOLI	<i>Desmodium perplexum</i>	5-20
MANYRAY ASTER	<i>Symphiotrichum anomalum</i>	5-20
TRAILING BUSH CLOVER	<i>Lespedeza procumbens</i>	5-20
ST. ANDREW'S CROSS	<i>Hypericum hypericoides</i>	5-20
HAIRY SUNFLOWER	<i>Helianthus hirsutus</i>	5-20
SKY BLUE ASTER	<i>Symphiotrichum oolentangiense</i>	5-20

Grasses and sedges

Common Name	Botanical Name	Cover % (low-high)
CYPRESS PANIC GRASS	<i>Panicum dichotomum</i>	5-10
LITTLE BLUESTEM	<i>Schizachyrium scoparium</i>	5-10
ROCK MULY	<i>Muhlenbergii sobolifera</i>	5-10
BROOMSEEDGE	<i>Andropogon virginicus</i>	5-10
INDIANGRASS	<i>Sorghasturm nutans</i>	5-10
POVERTY OAT GRASS	<i>Danthonia spicata</i>	5-10
RIBBED SEDGE	<i>Carex virescens</i>	5-10
ROSEY SEDGE	<i>Carex rosea</i>	5-10
VIRGINIA WILD RYE	<i>Elymus virginicus</i>	5-10

Site Interpretations

Wildlife

- Oaks on this site provide abundant hard mast; scattered shrubs provide soft mast; native legumes provide high-quality wildlife food;
- Sedges and native cool-season grasses provide green browse; native warm-season grasses provide cover and nesting habitat; and a diversity of forbs provides a diversity and abundance of insects.
- Post-burn areas can provide temporary bare-ground and herbaceous cover habitat is important for turkey poults and quail chicks.
- Bird species associated with early-successional stages of this ecological site include Northern Bobwhite, Painted Bunting, Prairie Warbler, Field Sparrow, Blue-winged Warbler, Yellow-breasted Chat, Brown Thrasher, and Bachman’s Sparrow; note all these species also occur in glades associated with woodlands. Birds associated with mid- to late successional woodlands include Indigo Bunting, Red-headed Woodpecker, Eastern Bluebird, Northern Bobwhite, Summer Tanager, Eastern Wood-Pewee, Whip-poor-will, Chuck-will’s widow, and Red-eyed Vireo.
- Reptiles and amphibians associated with these woodlands include ornate box turtle, northern fence lizard, five-lined skink, coal skink, broad-headed skink, six-lined racerunner, western slender glass lizard, prairie ring-necked snake, flat-headed snake, rough earth snake, red milk snake, western pygmy rattlesnake, and timber rattlesnake.

Forestry

- Management: Estimated site index values range from 50 to 55 for oak. Timber management opportunities are generally fair. 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. 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. Favor white oak, post oak, and black oak.
- Limitations: Large amounts of coarse fragments throughout profile; Surface stones and rocks are problems for efficient and safe equipment operation and will make equipment use somewhat difficult. Disturbing the surface excessively in harvesting operations and building roads increases soil losses, which leaves a greater amount of coarse fragments on the

surface. Hand planting or direct seeding may be necessary. Seedling mortality due to low available water capacity may be high. Mulching or providing shade can improve seedling survival. Mechanical tree planting will be limited. 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

Pinery – a vegetative community within the historic pine range in Missouri that has shortleaf pine as a significant tree species

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

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

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

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

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