Ecological Site Description

Deep Loess Exposed Backslope Woodland F134XY003MO

- *(Quercus alba - Quercus velutina/Rhus aromatica/Elymus virginicus - Carex pensylvanica*)
- (white oak – black oak/aromatic sumac/Virginia wild rye – Pennsylvania sedge)

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, which 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.

Loess 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 Deep Loess Protected Backslope Forest 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 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 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 well developed woodland dominated by an overstory of white oak and black oak. The canopy is relatively tall (70 to 90 feet) but less dense (60 to 80 percent canopy closure) and less structurally diverse than the adjacent protected slopes. Increased light from a 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 15 years) and with lower intensity. These periodic fires however did keep woodlands open, removed the litter, and stimulated the growth and flowering of the grasses and forbs. During fire free intervals, woody understory species increased and the herbaceous understory diminished. The return of fire would open the woodlands up again and stimulate the abundant ground flora.

Deep Loess 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 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 has also impacted these communities, further diminishing the diversity of native plants and introducing species that are tolerant of grazing, such as buckbrush,

gooseberry, and Virginia creeper. Grazed sites also have a more open understory. In addition, soil compaction and soil erosion from grazing can be a problem and lower site productivity.

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

Single tree selection timber harvests are common in this region and often results in removal of the most productive trees (high grading) in the stand leading to poorer quality timber and a shift in species composition away from more valuable oak species. Better planned single tree selection or the creation of group openings can help regenerate and maintain more desirable oak species and increase vigor on the residual trees.

Clearcutting also occurs and results in dense, even-aged stands dominated by oak. This may be most beneficial for existing stands whose composition has been highly altered by past management practices. However, without some thinning of the dense stands and the application of prescribed fire, the ground flora diversity may be shaded out and diversity of the stand will suffer.

Reference State Plant Species

Canopy Trees

Common Name	Botanical Name	Cover % (low-high)	Canopy Height (ft)
WHITE OAK	*Quercus alba*	40-60	80
MOCKERNUT HICKORY	*Carya alba*	10-20	70
SHAGBARK HICKORY	*Carya ovata*	10-20	70
BLACK OAK	*Quercus velutina*	20-30	90
SOUTHERN RED OAK	*Quercus flacata*	10-20	80
NORTHERN RED OAK	*Quercus rubra*	10-20	90

Shrubs

Common Name	Botanical Name	Cover % (low-high)	Canopy Height (ft)
FRAGRANT SUMAC	*Rhus aromatica*	10-20	3

Forbs

Common Name	Botanical Name	Cover % (low-high)
PRAIRIE BUSH CLOVER	*Lespedeza violacea*	5-10
BRISTLY SUNFLOWER	*Helianthus hirsutus*	5-10
SMOOTH BLUE ASTER	*Aster laevis*	5-10
ELM-LEAVED GOLDENROD	*Solidago ulmifolia*	5-10
NAKED FLOWER TICK TREFOIL	*Desmodium nudiflorum*	5-10
WILD QUININE	*Parthenium integrifolium*	5-10
WHORLED MILKWEED	*Asclepias quadrifolia*	5-10
PURPLE CONE FLOWER	*Echinacea purpurea*	5-10
SLENDER LESPEDEZA	*Lespedeza virginiCA*	5-10
CANADIAN BLACKSNAKEROOT	*Sanicula canadensis*	5-10

Grasses and sedges

Common Name	Botanical Name	Cover % (low-high)
WOODLAND BROME	*Bromus pubescens*	5-20
BOTTLEBRUSH GRASS	*Elymus hystrix*	5-20
PENNSYLVANIA SEDGE	*Carex pensylvanica.*	10-20
PANIC GRASS	*Panicum latifolium*	5-20
EASTERN STAR SEDGE	*Carex radiata*	5-20
ROCK MUHLY	*Muhlenbergia sobolifera*	5-20
LITTLE BLUESTEM	*Schizachyrium scoparious*	5-20
BIG BLUESTEM	*Andropogon gerardii*	5-10
VIRGINIA WILDRYE	*Elymus virginicus*	10-30
PARASOL SEDGE	*Carex umbellata*	5-20

Site Interpretations

Wildlife

- Hard mast from the oaks, soft mast from shrubs, high nutrition seeds and forage is abundant in this ecological site. These food values and the two-tiered structure are attractive to abundant 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.
- Bird species associated with this ecological site include Red-headed Woodpecker, Eastern Wood-Pewee, Broad-winged Hawk, Great-Crested Flycatcher, Summer Tanager, Red-eyed Vireo, and Yellow-billed Cuckoo.
- Amphibians and reptiles associated with ecological site include tiger salamander, small-mouthed salamander, ornate box turtle, northern fence lizard, five-lined skink, broad-headed skink, flat-headed snake, and rough earth snake.

Forestry

- Management: Field collected site index values average 69 for white oak and 81 for northern red oak/black 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.

- 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

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