

Ecological Site Description

Shallow Sandstone Upland Glade/Woodland (formerly R107BY025MO)

R106XY031KS

- (*Quercus marilandica/Rhus copallina/Schizachyrium scoparium - Crotonopsis elliptica*)
- (blackjack oak/winged sumac/little bluestem – rushfoil)

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: 107B – Iowa and Missouri Deep Loess Hills

Introduction

The Iowa and Missouri Deep Loess Hills (area outlined in red on the map) encompass the Missouri River floodplain and associated loess-covered uplands, from about Sioux City Iowa in the north to central Missouri. Elevation is about 1,565 feet on the highest ridges, to about 600 feet along the Missouri River near Glasgow in central Missouri. Local relief varies from 10 to 20 feet in the major river floodplains, to 50 to 100 feet in the dissected uplands, with loess bluffs of 200 to 300 feet along the Missouri River. The loess thins with distance from the Missouri river, and local relief decreases. The loess caps pre-Illinoian till, which crops out on lower hillslopes near the edges of the MLRA. The underlying bedrock is mainly Pennsylvanian and Cretaceous-aged shale, mudstone and sandstone.



Shallow Sandstone Upland Glade/Woodlands are within the green areas on the map (Missouri portion only; Iowa distributions are currently under review). These sites are not extensive, occurring only on sandstone exposures in southern Platte County, Missouri. Soils are loamy, and shallow to sandstone bedrock.

Physiographic Features

This site is on upland crests, shoulders and backslopes with slopes of 5 to 14 percent. The site generates runoff to adjacent, downslope ecological sites. This site does not flood.

Soil Features

These soils are underlain by sandstone bedrock at less than 20 inches. The soils were formed under prairie vegetation, and have dark, organic-rich surface horizons. Parent material is sandstone residuum. They have loam surface layers, with loamy subsoils that may contain some sandstone

gravel. They are not affected by seasonal wetness. Soil series associated with this site include Basehor.

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.

Shallow Sandstone Upland Glade/Woodlands harbor a wide diversity of lichens, plants and animals. The dominant grasses include little bluestem, broomsedge and Indian grass. The glade/woodland complexes range from wide open grassy areas with very shallow soils and bare bedrock, to areas with widely scattered blackjack oaks on slightly deeper soils. They occur on lower side slopes surrounded by shale and loess prairie ecological sites. While most have suffered from grazing and fire suppression, a few good examples can still be found.

The shallow soils of this ecological site limit the growth and abundance of trees and support the native grasses and forbs that dominate these systems. Trees found on and near glades are often stunted and express poor development because of shallow droughty soils and poor growing conditions. Like the adjacent prairies, fire also played an important role in the maintenance of these systems. These systems typically burned at least once every three years.

These periodic fires removed the litter and stimulated the growth and flowering of the grasses and forbs. They also further limited the growth and dominance of trees. Fire tolerant blackjack oak occupied islands and edges of deeper soils, creating a complex mosaic of open glade and low-density woodland.

During fire-free intervals, woody species increased, especially on protected slopes. Once established, blackjack oak, Eastern redcedar and sumac can quickly fill in a glade/woodland system, especially if grazing has diminished the vigor of the diverse flora. Many glades have been heavily grazed and suffer substantial woody invasion. Removal of the woodies and the application of prescribed fire have proven to be effective management tools.

Reference State Plant Community

Canopy Trees

Common Name	Botanical Name	Cover % (low-high)	Canopy Height (ft)
BLACKJACK OAK	<i>Quercus marilandica</i>	5-20	20
POST OAK	<i>Quercus stellata</i>	0-10	30
EASTERN REDCEDAR	<i>Juniperus virginiana</i>	0-10	10

Shrubs

Common Name	Botanical Name	Cover % (low-high)	Canopy Height (ft)
WINGED ELM	<i>Ulmus alata</i>	0-10	5
WINGED SUMAC	<i>Rhus copallina</i>	0-10	5
FARCKLEBERRY	<i>Vaccinium arboreum</i>	0-10	3
AROMATIC SUMAC	<i>Rhus aromatica</i>	0-10	3

Lichens

Common Name	Botanical Name	Cover % (low-high)
REINDEER LICHEN	<i>Cladonia raugiffrina</i>	5-20
CUP LICHEN	<i>Cladonia mateocyatha</i>	5-20
COBBLESTONE LICHEN	<i>Acarospora contigua</i>	5-20

Forbs

Common Name	Botanical Name	Cover % (low-high)
RUSHFOIL	<i>Crotonopsis elliptica</i>	0-10
GOAT'S RUE	<i>Tephrosia virginiana</i>	0-10
BLAZING STAR	<i>Liatris squarrosa</i>	0-10
ROUGH FALSE FOX GLOVE	<i>Agalinis gattereri</i>	0-10
WILD PETUNIA	<i>Ruellia humilis</i>	0-10
SMALL PLANTAIN	<i>Plantago pusilla</i>	0-10
ROUGH BUTTONWEED	<i>Diodia teres</i>	0-10
DWARF DANDELION	<i>Krigia virginica</i>	0-10
SOUTHERN BLUETS	<i>Houstonia micrantha</i>	0-10
HAIRY LIP FERN	<i>Cheilanthes lanosa</i>	0-10
ROCK SPIKEMOSS	<i>Selaginella rupestris</i>	0-10
MEALY CORYDALIS	<i>Corydalis crystallina</i>	0-10
HAIRY PINWEED	<i>Lechea villosa</i>	0-10

Grasses and sedges

Common Name	Botanical Name	Cover % (low-high)
LOPSIDED RUSH	<i>Juncus secundus</i>	5-10
BROOMSEDGE	<i>Andropogon virginicus</i>	5-10
TAPERED ROSETTE GRASS	<i>Dichantherium acuminatum</i>	5-10
POVERTY OAT GRASS	<i>Danthonia spicata</i>	5-10
LITTLE BLUESTEM	<i>Schizachyrium scoparium</i>	10-20
INDIAN GRASS	<i>Sorghastrum nutans</i>	5-10
UMBRELLA SEDGE	<i>Cyperus lupulinus</i>	5-10
PURPLE LOVEGRASS	<i>Eragrostis spectabilis</i>	5-10
SIXWEEKS FESCUE	<i>Vulpia octoflora</i>	5-10

Site Interpretations

Wildlife*

- Oaks provide hard mast; scattered shrubs provide soft mast; frequent bedrock outcrops provide reptile habitat and a patchier groundflora;
- Sedges and native cool-season grasses provide green browse; native warm-season grasses on dry sites 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 – herbaceous cover habitat important for turkey poults and quail chicks.
- Game species that utilize this ecological site include:
Northern Bobwhite will utilize this ecological site for food (seeds, insects), cover needs (escape, nesting and roosting cover) and brood-rearing habitat.

Cottontail rabbits will utilize this ecological site for food (seeds, soft mast) and cover needs.

Turkey will utilize this ecological site for food (seeds, green browse, soft mast, insects) and nesting and brood-rearing cover. Turkey poults feed heavily on insects provided by this site type.

White-tailed Deer will utilize this ecological site for browse (plant leaves in the growing season, seeds and soft mast in the fall/winter). This site type also can provide escape cover.

- Bird species associated with this ecological site's reference state condition:
Breeding Birds: Field Sparrow, Yellow-breasted Chat, Brown Thrasher, Indigo Bunting, Red-headed Woodpecker, Eastern Bluebird, Northern Bobwhite, and Eastern Wood-Pewee.
- Amphibian and reptile species that may be associated with this ecological site's reference state: Five-lined Skink (*Eumeces fasciatus*), Six-lined Racerunner (*Cnemidophorus sexlineatus*), and Prairie Ring-necked Snake (*Diadophis punctatus arnyi*).
- Invertebrates – Many native insect species are likely associated with this phase of this ecological site's reference state condition, especially native bees, ants, beetles, butterflies and moths, and crickets, grasshoppers and katydids. However we don't have enough information on these groups to assign them to this phase of this ecological site's reference state condition at this time.

*This section prepared by Mike Leahy, Natural Areas Coordinator, Missouri Department of Conservation, 2013

Forestry

- Management: Site index values are less than 30 for eastern redcedar and generally less than 40 for oak. Productivity is very low. Very limited timber management opportunities exist. These sites are valuable for wildlife purposes and watershed protection. Severely reduced rooting depth restricts tree growth and increases windthrow hazards. These sites respond well to prescribed fire as a management tool.
- Limitations: Surface stones and surface rock; very shallow soil depth. Surface stones and rocks are problems for efficient and safe equipment operation. Severe seedling mortality due to high soil surface temperatures and low available water holding capacity is possible. Machine planting and mechanical site preparation is not recommended. Hard bedrock at shallow depths may interfere with equipment operation. Rock outcrops may cause breakage of timber when harvesting. Surface stones and rocks will make equipment use extremely

difficult. 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

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