

Ecological Site Description

Shallow Limestone Upland Glade/Prairie

R112XY029MO

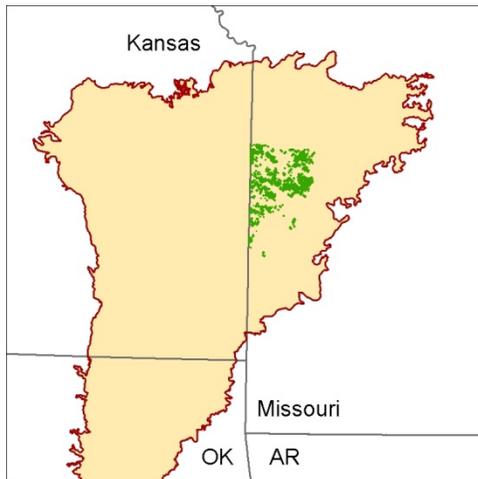
- (*Quercus muehlenbergii/Bumelia lanuginosa/Schizachyrium scoparium - Rudbeckia missouriensis*)
- (chinkapin oak/gum bumelia/little bluestem – Missouri coneflower)

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: 112 – Cherokee Prairies

Introduction

The Cherokee Prairies MLRA (area outlined in red on the map) is a nearly level to rolling, weakly dissected plain. Elevation ranges from about 330 feet along the Verdigris River in the south to over 1,300 feet along the northwest border with the Flint Hills. Local relief is three to ten feet, with major valley floodplains typically less than eight feet below the adjacent uplands. The northern and eastern part of the area is primarily in the Osage River watershed, and the southern part is mainly in the Neosho and Verdigris River watersheds. Loess blankets the northern part of the area but thins to the south. Nearly all of the upland plain is underlain with Pennsylvanian aged sandstones and shales, and most upland soils are formed in residuum from these materials.



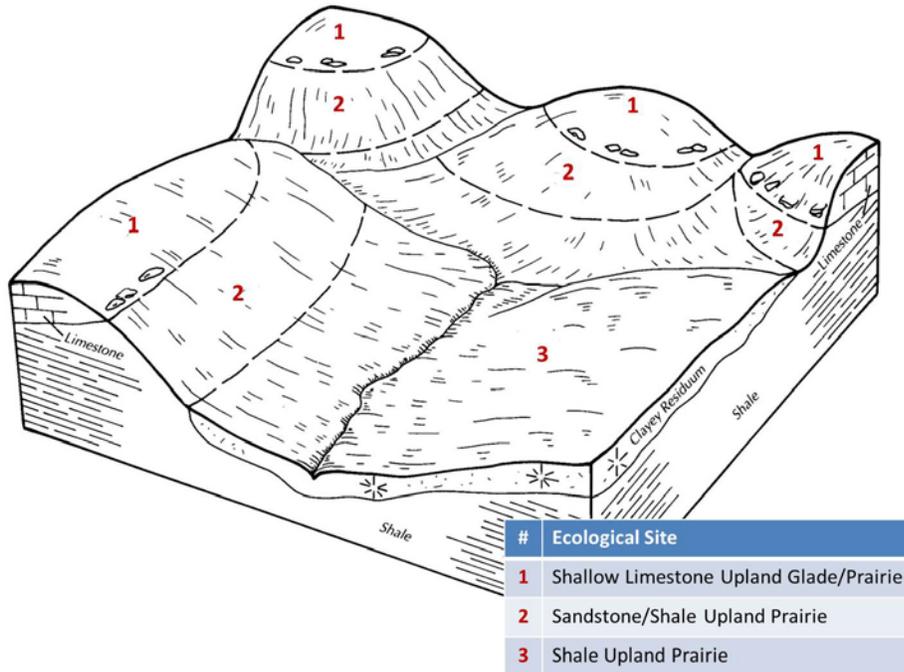
Shallow Limestone Upland Glade/Prairies are within the green areas on the map (Missouri portion only; relationships to Kansas and Oklahoma Ecological Sites are currently under review). These sites are locally extensive in Bates and northern Vernon counties, Missouri. They are closely associated with Sandstone/Shale ecological sites. Soils are shallow to limestone bedrock.

Physiographic Features

This site is on upland crests, shoulders and backslopes with slopes of 5 to 20 percent. The site generates runoff to adjacent, downslope ecological sites, and in places receives runoff from upslope summit and shoulder sites. This site does not flood.

The following figure (adapted from Kichler & Howard, 1995) shows the typical landscape position of this ecological site, and landscape relationships with other ecological sites. It is within the area

labeled “1” on the figure. A variety of upland ecological sites may be downslope, such as the Sandstone/Shale Upland Prairie and Shale Upland Prairie sites shown here.



Soil Features

These soils are underlain with limestone bedrock at less than 20 inches. The soils were formed under prairie vegetation, and have dark, organic-rich surface horizons. Parent material is limestone residuum. These soils are loamy and are skeletal, with high amounts of limestone gravel, channers and flagstones. They are not affected by seasonal wetness. Soil series associated with this site include Balltown.

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 Limestone Upland Glade/Prairies are associated with limestone scarps. They occur as thin soiled rocky areas within a complex of limestone and shale prairies. 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. Fire played an important role in the maintenance of these systems, as well. It is likely that these sites burned at least once every five 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, especially eastern redcedar. Fire tolerant chinkapin oak and post oak occupied islands and edges of deeper soils, creating a complex mosaic of open glade, prairie and low-density woodland. During fire-free intervals, woody species increased, but not to densities on over-grazed glades.

In the absence of fire, woody species, especially eastern redcedar, quickly occupy the site. This is especially true after grazing has reduced grass cover and exposed more surface to the dispersal of cedar seeds by birds. Once established, cedars can quickly fill in a glade/prairie system, especially if grazing has diminished the vigor of the diverse flora. Many glades have been heavily grazed and

suffer substantial redcedar invasion. Removal of the redcedar by chainsaw and the application of prescribed fire have proven to be an effective way to manage these systems.

Glade/prairie complexes harbor a wide diversity of plants and animals. Grasses such as little bluestem, Indian grass, and sideoats grama, are also found on prairies. But other species, such as Missouri coneflower, calamint, and the federally listed Missouri bladder-pod (*Lesquerella filiformis*), are only found on limestone/dolomite glades. The glade/prairie complexes range from wide open grassy areas with shallow soils and bare bedrock, to areas with widely scattered chinquapin and post oaks on soils 12 to 20 inches deep.

Reference State Plant Community

Canopy Trees

Common Name	Botanical Name	Cover % (low-high)	Canopy Height (ft)
CHINQUAPIN OAK	<i>Quercus muehlenbergii</i>	0-10	30
BLACKJACK OAK	<i>Quercus marilandica</i>	0-10	30
POST OAK	<i>Quercus stellata</i>	0-10	40
EASTERN RED CEDAR	<i>Juniperus virginiana</i>	0-10	20

Shrubs

Common Name	Botanical Name	Cover % (low-high)	Canopy Height (ft)
CHITTIM WOOD	<i>Bumelia lanuginosa</i>	5-20	8
FRAGRANT SUMAC	<i>Rhus aromatica</i>	5-20	3
DWARF HACKBERRY	<i>Celtis tenuifolia</i>	0-10	10
CAROLINA ROSE	<i>Rosa carolina</i>	0-10	4

Forbs

Common Name	Botanical Name	Cover % (low-high)
ORANGE PUCCON	<i>Lithospermum canescens</i>	5-20
YELLOW STAR GRASS	<i>Hypoxis hirsuta</i>	5-20
WILD QUININE	<i>Parthenium integrifolium</i>	5-20
BUTTERFLY WEED	<i>Asclepias tuberosa</i>	5-20
BLAZING STAR	<i>Liatris cylindracea</i>	5-20
NARROW LEAF BLUEETS	<i>Houstonia nigricans</i>	5-20
WILD PETUNIA	<i>Ruellia humilis</i>	5-20
BIRD'S FOOT VIOLET	<i>Viola pedata</i>	5-20
PURPLE PRAIRIE CLOVER	<i>Dalea purpurea</i>	5-20
PRAIRIE DOCK	<i>Silphium terebinthinaceum</i>	5-20
MISSOURI CONE FLOWER	<i>Rudbeckia missouriensis</i>	5-20
CALAMINT	<i>Calamintha arkansana</i>	5-20
PRICKLEY PEAR	<i>Opuntia humifusa</i>	5-20

Lichens

Common Name	Botanical Name	Cover % (low-high)
FISHSCALE LICHEN	<i>Psora decipiens</i>	10-20
SARCOGYNE LICHEN	<i>Sarcogyne regularis</i>	10-20
RUSSELL'S LICHEN	<i>Psora russellii</i>	10-20
JELLY STRAP	<i>Thyrea confusa</i>	10-20

Grasses and sedges

Common Name	Botanical Name	Cover % (low-high)
LITTLE BLUESTEM	<i>Schizachyrium scoparium</i>	10-20
MEAD’S SEDGE	<i>Carex meadii</i>	10-20
SIDEOATS GRAMA	<i>Bouteloua curtipendula</i>	10-20
BIG BLUESTEM	<i>Andropogon gerardii</i>	5-20
INDIAN GRASS	<i>Sorghastrum nutans</i>	5-20
POVERTY GRASS	<i>Sporobolus neglectus</i>	5-20

Site Interpretations

*Wildlife**

- Game species that utilize this ecological site include:
Northern Bobwhite will utilize this ecological site for food (seeds, insects) and cover needs (escape, nesting and roosting cover).

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 reference state condition:
Breeding birds as related to vegetation structure (related to time since fire, grazing, haying, and mowing):

Vegetation Height Short (< 0.5 meter, low litter levels, bare ground visible):

Grasshopper Sparrow, Horned Lark, Upland Sandpiper, Greater Prairie Chicken, Northern Bobwhite

Vegetation Height Moderate (0.5 – 1 meter, moderate litter levels, some bare ground visible):

Eastern Meadowlark, Dickcissel, Field Sparrow, Upland Sandpiper, Greater Prairie Chicken, Northern Bobwhite, Blue Grosbeak, Scissor-Tailed Flycatcher, Eastern Kingbird, Lark Sparrow

Tall Vegetation Height (> 1 meter, moderate-high litter levels, little bare ground visible):

Henslow’s Sparrow, Dickcissel, Greater Prairie Chicken, Field Sparrow, Northern Bobwhite, Sedge Wren, Northern Harrier

Brushy – Mix of grasses, forbs, native shrubs (e.g., *Rhus copallina*, *Prunus americana*), native vines (*Rubus* spp., *Rosa carolina*) and small trees (e.g., *Cornus racemosa*):

Bell’s Vireo, Yellow-Breasted Chat, Loggerhead Shrike, Brown Thrasher, Common Yellowthroat

Winter Resident: Short-Eared Owl, Northern Harrier, Le Conte's Sparrow, Savannah Sparrow

- Amphibian and reptile species associated with this ecological site reference state condition: Ornate Box Turtle (*Terrapene ornata ornata*), Western Slender Glass Lizard (*Ophisaurus attenuatus attenuatus*), Prairie Ring-necked Snake (*Diadophis punctatus arnyi*), Prairie Kingsnake (*Lampropeltis calligaster calligaster*), Great Plains Skink (*Eumeces obsoletus*), Southern Prairie Skink (*E. septentrionalis obtusirostris*), and Bullsnake (*Pituophis catenifer sayi*).
- Small mammals associated with this ecological site reference state condition: Least Shrew (*Cryptotis parva*), Prairie Vole (*Microtus ochrogaster*), Plains Pocket Gopher (*Geomys bursarius*), Meadow Jumping Mouse (*Zapus hudsonius*), Badger (*Taxidea taxus*), and Thirteen-lined Ground Squirrel (*Spermophilus tridecemlineatus*).
- Many native insect species are likely associated with this ecological site, especially native bees, ants, beetles, butterflies and moths, and crickets, grasshoppers and katydid. However information on these groups is often lacking enough resolution to assign them to individual ecological sites.

Insect species known to be associated with this ecological site's reference state condition: Regal Fritillary butterfly (*Speyeria idalia*) whose larvae feed primarily on native prairie violets (*Viola pedata*, *V. pedatifida*, and *V. sagittata*); Mottled Dusky Wing butterfly (*Erynnis martialis*), Ottoe Skipper butterfly (*Hesperia ottoe*), Arogos Skipper butterfly (*Atrytone arogos iowa*), Golden Byssus butterfly (*Problema byssus kumskaka*), Delaware Skipper butterfly (*Atryone logan logan*), and Crossline Skipper butterfly (*Polites origenes*). The larvae of the moth *Eucosma bipunctella* bore into compass plant (*Silphium laciniatum*) roots and feed and the larvae of the moth *Eucosma giganteana* bore into a number of *Silphium* species roots and feed.

Native bees, important pollinators, that may be associated with this ecological site's reference condition include: *Colletes brevicornis*, *Andrena beameri*, *A. helianthiformis*, *Protandrena rudbeckiae*, *Halictus parallelus*, *Lasioglossum albipennis*, *L. coreopsis*, *L. disparilis*, *L. nymphaeum*, *Ashmeadiella buconis*, *Megachile addenda*, *Anthidium psoraleae*, *Eucera hamata*, *Melissodes coloradensis*, *M. coreopsis*, and *M. vernoniae*.

The Short-winged Katydid (*Amblycorypha parvipennis*), Prairie Mole Cricket (*Gryllotalpa major*), Green Grasshopper (*Hesperotettix speciosus*) and Two-voiced Conehead katydid (*Neoconcephalus bivocatus*) are possible orthopteran associates of this ecological site. A number of leaf beetle species (*Anisostena funesta*, *Chaetocnema fuscata* and *Crytocephalus striatulus*) may utilize this ecological site.

*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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