

Ecological Site Description

Shale Upland Prairie

R112XY021MO

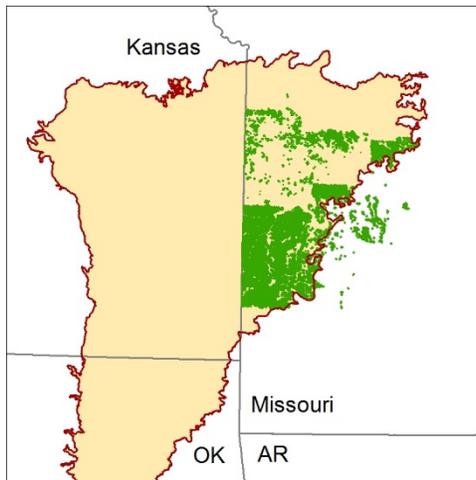
- (/Amorpha canescens/Schizachyrium scoparium - Andropogon gerardii)
- (/leadplant/little bluestem – big bluestem)

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: 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 sandstone and shale, and most upland soils are formed in residuum from these materials.

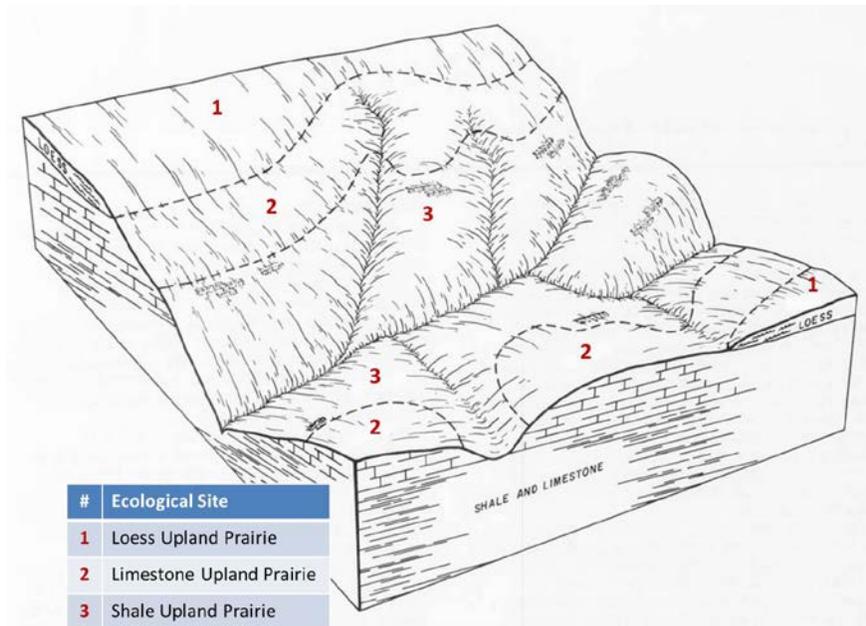


Shale Upland Prairies are within the green areas on the map (Missouri portion only; relationships to Kansas and Oklahoma Ecological Sites are currently under review). These sites are widely distributed in the uplands of the area. Soils are deep to shale bedrock.

Physiographic Features

This site is on summit crests, shoulders, and upper backslopes, with slopes of 1 to 9 percent. The site generates runoff to adjacent, downslope ecological sites. This site does not flood.

The following figure (adapted from Simmons, 1985) shows the typical landscape position of this ecological site, and landscape relationships with other ecological sites. It is within the area labeled “3” on the figure. A variety of upland ecological sites may be upslope, such as the Limestone Upland Prairie shown here. Sandstone/Shale Upland Prairie ecological sites are also commonly associated with this site.



Soil Features

These soils are underlain with shale bedrock at depths below 60 inches. The soils were formed under prairie vegetation, and have dark, organic-rich surface horizons. Parent material is loess and slope alluvium over residuum derived from shale. They have silt loam to silty clay surface layers, and clayey subsoils. Most of these soils are affected by seasonal wetness. Soil series associated with this site include Barden, Bronaugh, Mayes, Sampsel, Summit, and Zaar.

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 Shale Upland Prairie was dominated by little bluestem, big bluestem, Indiangrass and switch grass along with many secondary grasses such as tall dropseed, and assorted panicums. Numerous forbs also prevailed on this site. Common forbs included compassplant, rosinweed, sunflowers, and lespedeza along with low growing shrubs such as leadplant, Illinois bundleflower, and New Jersey tea.

With little to interrupt fire, this ecological site burned every 1 to 3 years. Fire removed dead plant litter and provided room for a lush growth of prairie vegetation. Fire also kept woody species at bay. Grazing by native large herbivores such as bison and elk also impacted these sites. Their activities altered composition and structure of the vegetation. Fuel loads would have been altered by heavy grazing and regular fire behavior, providing for a diversity of structure and composition. The partially wooded draws would have burned less intensely and less frequently. During fire free intervals woody species would have increased in abundance and spread out onto the prairie.

Today, Shale Upland Prairies are rare and scattered in the region, as the former prairies have been converted to pasture or cropland. The known remnants are degraded by fire suppression and uncontrolled grazing by domestic livestock. Continuous heavy grazing by livestock during the growing season will impact the vegetation composition. This grazing decreases vigor of the more

palatable plants and generally encourages a gradual increase in secondary plants such as tall dropseed, purpletop, silver bluestem and sideoats grama.

Many of the forbs are very palatable and readily grazed by livestock. These palatable forbs decrease with even moderate continuous grazing, but composition can be maintained using prescribed grazing. Forbs that increase include heathaster, tall goldenrod, Missouri goldenrod, western ragweed and Louisiana sagewort. Woody plants such as buckbrush, blackberry and sumac also increase with continuous overgrazing and the the absence of fire on site.

The absence of both grazing and fire will encourage a gradual increase of mulch and litter. Heavy accumulations of mulch and litter will negatively affect vegetation growth. Hbage production will be reduced. Bunchgrasses, especially little bluestem, are usually reduced. Heavy mulch accumulation also accommodates the encroachment of woody plant species such as buckbrush, blackberry, roughleaf dogwood, sumac, elm, persimmon, hawthorn and hackberry.

However, when properly managed, including the reintroduction of fire, existing remnants of Shale Upland Prairies show great resiliency and the stand composition can be improved and maintained indefinitely.

Reference State Plant Community

Shrubs

Common Name	Botanical Name	Cover % (low-high)	Canopy Height (ft)
SMOOTH SUMAC	<i>Rhus glabra</i>	5-10	3
LEAD PLANT	<i>Amorpha canescens</i>	5-20	4
NEW JERSEY TEA	<i>Ceanothus americanus</i>	5-10	3
WILD PLUM	<i>Prunus americana</i>	5-10	10
CAROLINA ROSE	<i>Rosa carolina</i>	5-10	2

Forbs

Common Name	Botanical Name	Cover % (low-high)
ELM LEAF GOLDENROD	<i>Solidago ulmifolia</i>	5-20
BRISTLY SUNFLOWER	<i>Helianthus hirsutus</i>	5-20
MILK VETCH	<i>Astragalus distortus</i>	5-20
BUTTERFLY WEED	<i>Asclepias tuberosa</i>	5-20
SCURFY PEA	<i>Psoralidium tenuiflorum</i>	5-20
BLAZING STAR	<i>Liatris squarrosa</i>	5-20
WHITE PRAIRIE CLOVER	<i>Dalea candida</i>	5-20
NARROW-LEAVED BLUETS	<i>Hedotis nigricans</i>	5-20
AMERICAN IPECAC	<i>Gillenia stipulata</i>	5-20
AROMATIC ASTER	<i>Symphotrichum oblongifolium</i>	5-20
COBAEA BEARDTONGUE	<i>Penstemon cobaea</i>	5-20
GOAT'S RUE	<i>Tephrosia virginiana</i>	5-20
FRINGELEAF WILD PETUNIA	<i>Ruellia humilis</i>	5-20
ILLINOIS BUNDLE FLOWER	<i>Desmanthus illinoensis</i>	5-20
ROUNDHEAD LESPEDEZA	<i>Lespedeza capitata</i>	5-20
MISSOURI GOLDENROD	<i>Solidago missouriensis</i>	5-20
COMPASSPLANT	<i>Silphium laciniatum</i>	5-20
PALE CONEFLOWER	<i>Echinacea pallida</i>	5-20
ROSWINEED	<i>Silphium integrifolium</i>	5-20

Grasses and sedges

Common Name	Botanical Name	Cover % (low-high)
LITTLE BLUESTEM	<i>Schizachyrium scoparium</i>	30-40
VIRGINIA WILDRYE	<i>Elymus virginicus</i>	10-20
BIG BLUESTEM	<i>Andropogon gerardii</i>	20-30
INDIAN GRASS	<i>Sorghastrum nutans</i>	10-20
SIDEOATS GRAMA	<i>Bouteloua curtipendula</i>	10-20
EASTERN GAMAGRASS	<i>Tripsacum dactyloides</i>	5-10
TALL DROPSEED	<i>Sporobolus asper</i>	5-10
POVERTY OATGRASS	<i>Danthonia spicata</i>	5-10
WOOLY PANICGRASS	<i>Dichanthelium acuminatum</i>	5-10
SWITCHGRASS	<i>Panicum virgatum</i>	5-10

Supporting Information

*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’s 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

Vegetation Height Tall (> 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

- Amphibian and reptile species associated with this ecological site's reference state condition: prairies with crawfish burrows may have Northern Crawfish Frog (*Rana areolata circumlosa*); 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*), and Bullsnake (*Pituophis catenifer sayi*).

Prairies with ephemeral vernal fishless wetlands: Western Chorus Frog (*Pseudacris triseriata triseriata*), Plains Leopard Frog (*Rana blairi*), Eastern Tiger Salamander (*Ambystoma tigrinum*), and Great Plains Narrow-mouthed Toad (*Gastrophryne olivacea*).

- Small mammals associated with this ecological site's reference state condition: Least Shrew (*Cryptotis parva*), Plains Pocket Gopher (*Geomys bursarius*), Prairie Vole (*Microtus ochrogaster*), Meadow Jumping Mouse (*Zapus hudsonius*), and Badger (*Taxidea taxus*).
- Many native insect species are likely associated with this ecological site, especially native bees, ants, beetles, butterflies and moths, and crickets, grasshoppers and katydids. 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.

Other invertebrate associates include the Grassland Crayfish (*Procambarus gracilis*).

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

Forestry

- **Management:** **This ecological site is not recommended for traditional timber management activity.** Historically this site was dominated by a ground cover of native prairie grasses and forbs. Some scattered open grown trees may have also been present. May be suitable for non-traditional forestry uses such as windbreaks, environmental plantings, alley cropping (a method of planting, in which rows of trees or shrubs are interspersed with rows of crops) or woody bio-fuels.

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

Fitzgerald, J.A. and D.N. Pashley. 2000a. Partners in Flight bird conservation plan for the Ozark/Ouachitas. American Bird Conservancy.

Fitzgerald, J.A. and D.N. Pashley. 2000b. Partners in Flight bird conservation plan for the Dissected Till Plains. American Bird Conservancy.

Heitzman, J.R. and J.E. Heitzman. 1996. Butterflies and moths of Missouri. 2nd ed. Missouri Department of Conservation, Jefferson City.

Jacobs, B. 2001. Birds in Missouri. Missouri Department of Conservation, Jefferson City.

Johnson, T.R. 2000. The amphibians and reptiles of Missouri. 2nd ed. Missouri Department of Conservation, Jefferson City.

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.

Pitts, D.E. and W.D. McGuire. 2000. Wildlife management for Missouri landowners. 3rd ed. Missouri Department of Conservation, Jefferson City.

Schwartz, C.W., E.R. Schwartz and J.J. Conley. 2001. The wild mammals of Missouri. University of Missouri Press, Columbia and Missouri Department of Conservation, Jefferson City.

Simmons, George T. 1985. Soil Survey of Cass County, Missouri. U.S. Dept. of Agric. Soil Conservation Service.