Ecological Site Description

Shallow Limestone/Dolomite Upland Glade/Woodland R115BY009MO

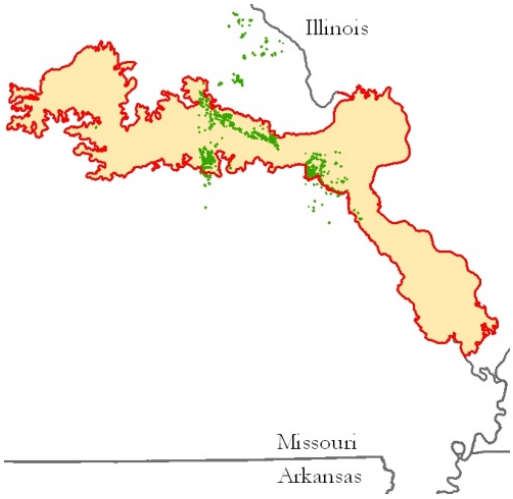
- (*Quercus muehlenbergii/Bumelia lanuginosa-Rhus aromatica/Schizachyrium scoparium-Bouteloua curtipendula*)
- (chinkapin oak/gum bumelia/little bluestem - sideoats grama)

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 "Certified" ESD will be published and will be available via the Web Soil Survey* [*http://websoilsurvey.nrcs.usda.gov*](http://websoilsurvey.nrcs.usda.gov) .)

Major Land Resource Area: 115B - Central Mississippi Valley Wooded Slopes, Western Part

Introduction

The Central Mississippi Valley Wooded Slopes, Western Part (area outlined in red on the map) consists mainly of the deeply dissected, loess-covered hills bordering the Missouri and Mississippi Rivers as well as the floodplains and terraces of these rivers. It wraps around the northeast corner of the Ozark Uplift, and constitutes the southern border of the Pre-Illinoisan-aged till plain. Elevation ranges from about 320 feet along the Mississippi River near Cape Girardeau in the south to about 1,020 feet on the highest ridges near Hillsboro, MO in the east. Local relief varies from 10-20 feet in the major river floodplains, to 50-100 feet in the dissected uplands, with bluffs of 200 to 350 feet along the Mississippi and Missouri Rivers. Underlying bedrock is mainly Ordovician-aged dolomite and sandstone, with Mississippian-aged limestone north of the Missouri River.



Shallow Limestone/Dolomite Glade/Woodlands (green areas on map) are mainly associated with the hilly lands in the Sac, Finley and James River Basins. Here they occur on Mississippian limestone. They also occur along the border with the Ozark Highlands at the eastern and southern edge of the region where they are associated with the Ordovician, Jefferson City-Cotter formation.

Physiographic Features

This site is on upland crests, shoulders and backslopes with slopes of 3 to 15%. 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.

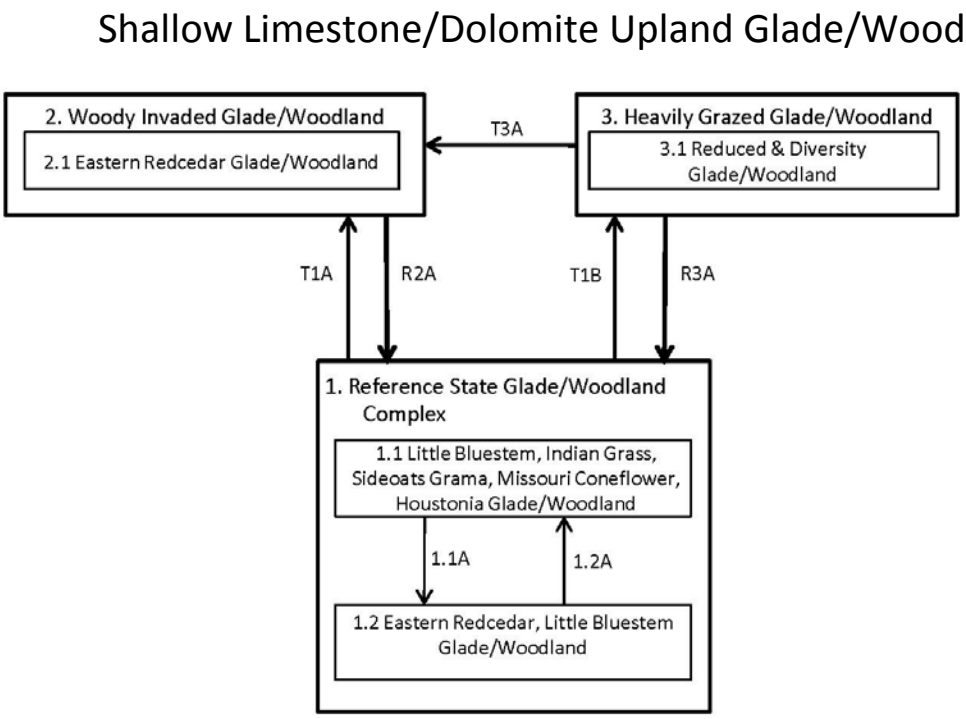
Soil Features
These soils are underlain with limestone and/or dolomite bedrock at less than 20 inches. The soils were formed under prairie vegetation, and have dark, organic-rich surface horizons. Parent material is limestone and dolomite residuum. These soils are loamy to clayey and are skeletal, with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

Ecological Dynamics
The shallow soils (less than 20" to bedrock) of the this ecological site limit the growth 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 chinquapin oak and post 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, 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/woodland 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 has proven to be an effect way to management these systems.

Glade/Woodland 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, are only found on limestone/dolomite glades. The glade/woodland complexes range from wide open grassy areas with shallow soils and bare bedrock, to areas with widely scattered chinquapin and post oaks on soils 12-20 inches deep.

State and transition diagram



Code	Practice
T1A, T3B	Fire suppression > 20 years
T1B	Cattle grazing & fire suppression
R2A	Cedar removal & prescribed fire
R3A	Grazing exclusion & prescribed fire
1.1A	Fire-free interval 10-20 years
1.2A	Fire interval 3-10 years

Ecological States

Reference State: Glade/Woodland - State 1
Glade/Woodland Complexes harbor a wide diversity of plants and animals. Many, like the dominant grasses little bluestem, Indian grass, and sideoats grama, are also found on prairies. But others, such as Missouri coneflower, calamint, and federally listed Missouri bladder-pod, are only found on limestone/dolomite glades. Desert-adapted animals, like scorpions and tarantulas, also occupy healthy glades. The glade/woodland complexes range from wide open grassy areas with shallow soils and bare bedrock, to areas with widely scattered chinquapin and post oaks on soils 12-20 inches deep. While most have suffered from grazing and fire suppression, good examples can be found.

Woody Invaded Glade/Woodland - State 2
This state is dominated by eastern redcedar. These can form relatively even-age stands, dating to when fire suppression became the dominant management characteristic on the site. Canopy closures can approach 100% with little or no ground flora.

Heavily Grazed Glade/Woodland - State 3
Grazing has reduced the cover, diversity and vigor of the native glade/woodland flora. Woody species encroachment, particularly by eastern redcedar, has increased the woodland density relative to the reference state,

Reference State Plant Community
Canopy Trees

Common Name	Botanical Name	Cover % (low-high)	Canopy Height (ft)
CHINQUAPIN OAK	*Quercus muehlenbergii*	5-10	30
DWARF HACKBERRY	*Celtis tenuifolia*	5-10	10
POST OAK	*Quercus stellata*	5-10	30
EASTERN RED CEDAR	*Juniperus virginiana*	5-10	20

Shrubs

Common Name	Botanical Name	Cover % (low-high)	Canopy Height (ft)
CHITTIM WOOD	*Bumelia lanuginosa*	5-20	8
FRAGRANT SUMAC	*Rhus aromatica*	5-20	3

Forbs

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

Grasses and sedges

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

Site Interpretations

Wildlife Species
Glade/Woodland Complexes harbor a wide diversity of plants and animals. Desert-adapted animals, like scorpions and tarantulas, occupy healthy glades.

Reptiles and amphibians associated with Shallow Limestone/Dolomite Upland Glade/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.

Glossary

Alfic – soil that has a clay-dominated subsoil (argillic horizon) with moderate to high amounts of bases such as calcium, and were typically formed under woody vegetation.

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).

Mollic – soil that has a thick, dark surface horizon and was typically formed under prairie vegetation

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

Ultic – soil that has a clay-dominated subsoil (argillic horizon) with low amounts of bases such as calcium, and were typically formed under woody vegetation

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