Ecological Site Description

Shallow Igneous Knob Glade R116CY006MO

- *(/Schizachyrium scoparium - Croton michauxii var. elliptica/Cladonia)*
- (/little bluestem – Michaux's croton/lichen)

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*](http://websoilsurvey.nrcs.usda.gov) .)

Major Land Resource Area: 116C – St. Francois Knobs and Basins

Introduction

The St Francois Knobs and Basins (area outlined in red on the map) is the structural center of the Ozark Dome. Elevation ranges from about 450 feet along the rivers in the southern part of the area, to 1,772 feet on the summit of Taum Sauk Mountain, the highest point in Missouri. Prominent features of this MLRA are the Precambrian igneous knobs and hills that rise conspicuously to various elevations, interspersed with smooth-floored basins and valleys overlying dolomite and sandstone. Ecological Sites defined for this MLRA are associated with the igneous parent materials, either in knob or basin positions. Areas influenced primarily by dolomite and/or sandstone are included in ecological sites within MLRA 116A (Ozark Highlands).

Shallow Igneous Knob Glades (green areas on the map) occur in the western part of the area, and on outlying igneous knobs in adjacent counties. Sites are on shoulders and backslopes of knobs and along shut-ins, particularly on south and west facing slopes. They typically occur in complex with dry igneous woodlands, and with extensive areas of exposed bedrock. Igneous glades are flanked by areas of deeper soils supporting igneous woodlands. Soils are shallow to volcanic bedrock.

Physiographic Features

This site is on upland knob crests, shoulders and backslopes with slopes of 3 to 45%. 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 rhyolitic volcanic bedrock at less than 20 inches. The soils were formed under a mixture of prairie and woodland vegetation, and have dark, organic-rich surface horizons. Parent material is volcanic residuum. These soils are loamy and are skeletal, with high amounts of rhyolitic gravel, cobbles and stones. Soils are very shallow, with extensive areas of exposed bedrock. They are not affected by seasonal wetness. Soil series associated with this site include Taumsauk.

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 vegetational communities. Not all scenarios or plants are included. Key indicator plants, animals and ecological processes are described to help guide land management decisions.

Shallow Igneous Knob Glades harbor a wide diversity of lichens, plants and animals. The dominant grasses include little bluestem, broomsedge and sideoats grama. These glades are home to many unusual desert-adapted plants and animals, such as the sundrop flower, eastern collared lizard, scorpions and tarantulas. The igneous knob glades range from open grassy areas with very shallow soils and sometime expansive bare igneous bedrock outcrops, to areas with widely scattered mosaic of blackjack and post oaks on locations with soil depths at the deeper extreme of the range for this soil component. On protected slopes, open woodlands are more common. Here the deeper soil depth range for this soil component and protected aspects allow more woody components to dominate. While most sites have suffered from fire suppression, good examples can still be found.

The shallow soils of the Shallow Igneous Knob Glades 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. Fire also played an important role in the maintenance of these systems. These systems typically 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 blackjack oak and post oak occupied islands and microhabitats 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, eastern redcedar, black hickory and winged elm can quickly fill in a glade system, especially if grazing has diminished the vigor of the diverse flora. 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	*Quercus marilandica*	0-5	15
POST OAK	*Quercus stellata*	0-5	20
EASTERN REDCEDAR	*Juniperus virginiana*	0-5	10

Shrubs

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

Lichens

Common Name	Botanical Name	Cover % (low-high)
EARTH LICHEN	*Catapyrenium lachneum*	5-20
CUP LICHEN	*Cladonia leporina*	5-20
CUP LICHEN	*Cladonia strepsilis*	5-20
PUNCTELIA	*Punctelia hypoleucites*	5-20
SULPHUR LICHEN	*Pleopsidium chlorophana*	5-20

Forbs

Common Name	Botanical Name	Cover % (low-high)
TWISTSPINE PRICKLY PEAR	*Opuntia macrorhiza*	0-10
SCALY BLAZING STAR	*Liatris squarrosa*	0-10
MICHAUX'S CROTON	*Croton michauxii var. elliptica*	0-10
THREESEED MERCURY	*Acalypha virginica*	0-10
SLENDER BUSHCLOVER	*Lespedeza virginica*	0-10
OLD FIELD GOLDENROD	*Solidago nemoralis*	0-10
FOXGLOVE BEARDTOUNGUE	*Penstemon digitalis*	0-10
POORJOE	*Diodia teres*	0-10
PRAIRIE PLOX	*Phlox pilosa*	0-10
LANDCE LEAVED COREOPSIS	*Coreopsis lanceolata*	0-10
STIFF COREOPSIS	*Coreopsis palmata*	0-10
PINEWEED	*Hypericum gentianoides*	0-10
CROW POISON	*Nothoscordum bivalve*	0-10
FLOWERING SPURGE	*Euphorbia corollata*	0-10
SUNDROP	*Oenothera fruitcosa*	0-10
WHITE PRAIRIE CLOVER	*Dalea candida*	0-10
GOAT'S RUE	*Tephrosia virginiana*	0-10
HAIRY SUNFLOWER	*Helianthus hirsutus*	0-10

Grasses and sedges

Common Name	Botanical Name	Cover % (low-high)
CHRUCH MOUSE THREE AWN	*Aristida dichotoma*	5-10
PORCUPINEGRASS	*Hesperostipa spartea*	5-10
BROOMSEDGE	*Andropogon virginicus*	5-10
WESTERN PANIC GRASS	*Dichanthelium acuminatum*	5-10
POVERTY OAT GRASS	*Danthonia spicata*	5-10
SIDEOATS GRAMA	*Bouteloua curtipendula*	5-10
LITTLE BLUESTEM	*Schizachyrium scoparium*	5-10
BUSH'S SEDGE	*Carex bushii*	5-10
INDIANGRASS	*Sorghastrum nutans*	5-10

Site Interpretations

Wildlife Species

- Wildlife habitat: oaks provide hard mast; numerous native legumes provide high-quality wildlife food; native warm-season grasses provide extensive 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:

  Turkey will utilize this ecological site for food (seeds, green browse, soft mast, and 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, Blue-winged Warbler, Brown Thrasher, Indigo Bunting, Red-headed Woodpecker, Eastern Bluebird, Prairie Warbler, White-eyed Vireo, Summer Tanager and Eastern Wood-Pewee.

- Amphibian and reptile species that may be associated with this ecological site's reference state: Collared Lizard (*Crotaphytus collaris collaris*), Five-lined Skink (*Eumeces fasciatus*), Six-lined Racerunner (*Cnemidophorus sexlineatus*), Northern Fence Lizard (*Sceloporus undulates hyacinthinus*), Flat-headed Snake (*Tantilla gracilis*), Eastern Coachwhip (*Masticophis flagellum flagellum*), Red Milk Snake (*Lampropeltis triangulum syspila*), Ground Snake (*Snora semiannulata*) and Prairie Ring-necked Snake (*Diadophis punctatus arnyi*).

- Small mammals likely associated with this ecological site's reference state condition: Eastern Woodrat (*Neotoma floridana*) and *Peromyscus* species.

- Invertebrates – Many native insect species are likely associated with this ecological site's reference state condition, especially native bees, ants, beetles, butterflies and moths, and crickets, grasshoppers and katydids.

  Insect species likely associated with this ecological site's reference state condition: Lichen Grasshopper (*Trimerotropis saxatilis*), a prickly pear borer moth (*Melitara prodenialis*), native ants (*Pheidole tysoni, Formica schaufussi),* and native bees *(Colletes aestivalis, Andrena helianthiformis, Protandrena rudbeckiae, Lasioglossum coreopsis, Anthidium psoraleae* and *Dianthidium subrufulum*).

  Other invertebrates: Black Widow spider (*Latrodectus mactans*) and Striped Bark Scorpion (*Centruroides vittatus*)

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 created by cooling and crystallization of magma forming igneous rock. Granite and rhyolite are typical igneous bedrocks in Missouri

Knob – precambrian ancient exposed igneous rocks of prominent rounded mountain tops

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

References

Bowles, M.L., J.L. McBride, and R.F. Betz. 1998. Management and restoration ecology of the federal threatened Mead's Milkweed, *Asclepias meadii* (Asclepiadaceae). Ann. Missouri Bot. Gard. 85:110–125.

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.

Kisvarsanyi, E.B. 1981. Geology of the Precambrian St. Francois terrain, southeastern Missouri. Missouri Department of Natural Resources Division of Geology and Land Survey, Rolla, Missouri.

Nelson, Paul W. 2010. The Terrestrial Natural Communities of Missouri. Missouri Department of Conservation, Jefferson City, Missouri.

Nelson, Paul W and Douglas Ladd. 1980. "Preliminary report on the identification, distribution and classification of Missouri glades".

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.

Weaver, Jennifer L. and Allan J. Bornstein. 2012. A Survey of the Vascular Flora of Some Igneous Glades at Buford Mountain Conservation Area, Missouri. Castanea, 77(3):245-256.