Ecological Site Description

Low-Base Chert Exposed Backslope Woodland F116AY049MO

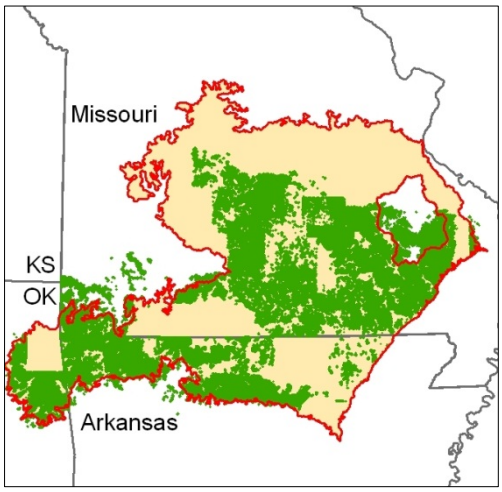
- *(Quercus velutina - Quercus alba (Pinus echinata)/Vaccinium/Carex - Schizachyrium scoparium*)
- (black oak – white oak (shortleaf pine)/huckleberry/sedge– little bluestem)

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: 116A – Ozark Highland

Introduction

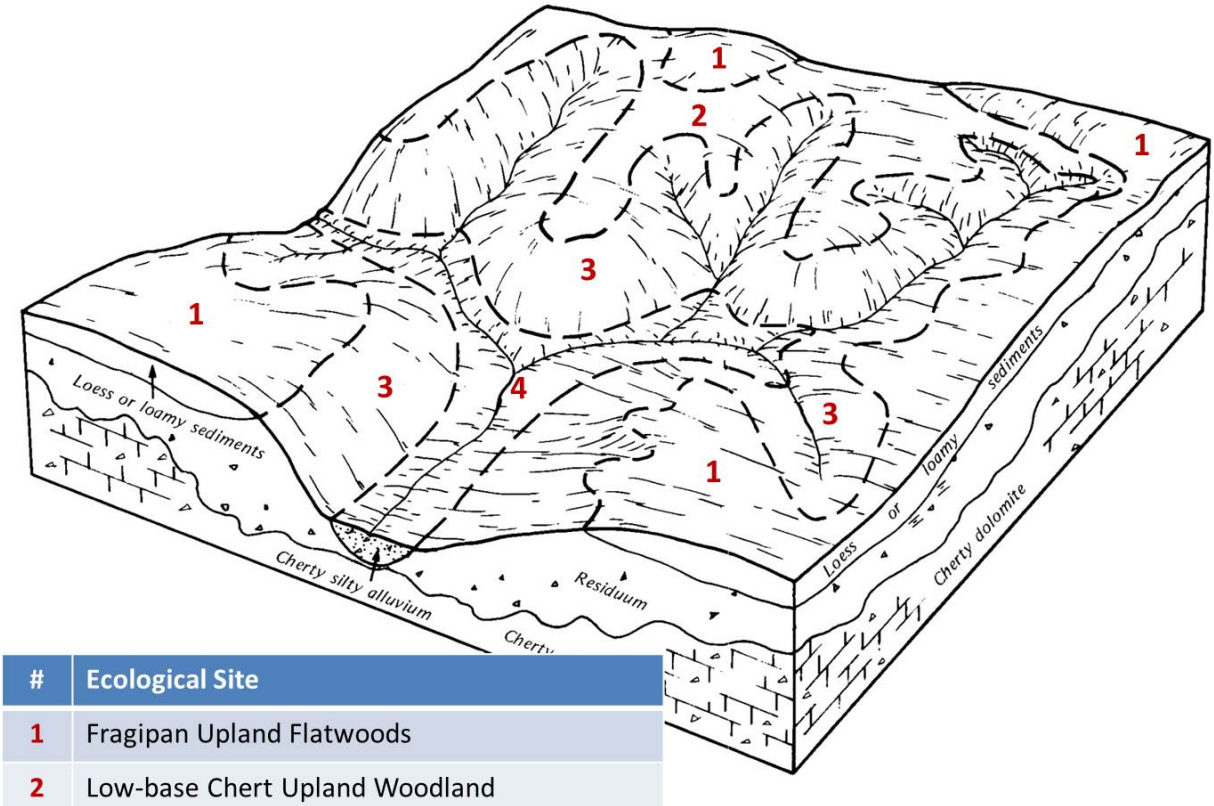
The Ozark Highland (area outlined in red on the map) constitutes the Salem Plateau of the Ozark Uplift. Elevation ranges from about 300 feet on the southeast edge of the Ozark escarpment, to about 1,600 feet in the west, adjacent to the Burlington Escarpment of the Springfield Plateau. The underlying bedrock is mainly horizontally bedded Ordovician-aged dolomites and sandstones that dip gently away from the uplift apex in southeast Missouri. Cambrian dolomites are exposed on deeply dissected hillslopes. In some places, Pennsylvanian and Mississippian sediments overlie the plateau. Relief varies, from the gently rolling central plateau areas to deeply dissected hillslopes associated with drainageways such as the Current and Eleven Point Rivers.



The Low-Base Chert Exposed Backslope Woodlands are within the green areas on the map. They occupy the southerly and westerly aspects of steep, dissected slopes, and are mapped in complex with the Low-Base Chert Protected Backslope Woodlands ecological site. Low-Base Chert Backslope ecological sites are widely distributed throughout the Ozark Highland, particularly south and west of the Ozark border counties along the boundary with major resource land area (MLRA) 115B. Soils are typically very deep, acidic, and low in bases such as calcium, with an abundance of chert fragments. Soil acidity is an important factor affecting the distribution of both tree and ground flora species and their growth. As a soil profile approaches or arrives at lower levels of pH, exchangeable aluminum comes into solution and can directly impact plant growth and composition. Black and scarlet oaks and shortleaf pine are more abundant on soils with these low base concentrations or quantities. Soils having low concentrations of calcium and containing few calcium bearing minerals along with increased levels of aluminum may also be vulnerable to base depletion by timber harvesting, plant uptake, and leaching.

Physiographic Features
This site is on upland backslopes with slopes of 15 to 60 percent. It is on exposed aspects (south, southwest, and west), which receive significantly more solar radiation than the protected aspects. The site receives runoff from upslope summit and shoulder sites, and generates runoff to adjacent, downslope ecological sites. This site does not flood.

The following figure (adapted from Wolf, 1989) 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, on lower backslopes with southerly to westerly exposures. Low-base Chert Protected Backslope Woodland sites are on the corresponding northerly to easterly exposures. Upper slopes and shoulders are in the Low-base Chert Upland Woodland ecological site, labeled "2". Upslope crests that have a layer of loess are often Fragipan Upland Flatwoods sites, labeled "1".



#	Ecological Site
1	Fragipan Upland Flatwoods
2	Low-base Chert Upland Woodland
3	Low-base Chert Backslope Woodland & Forest
4	Gravelly Upland Drainageway Forest

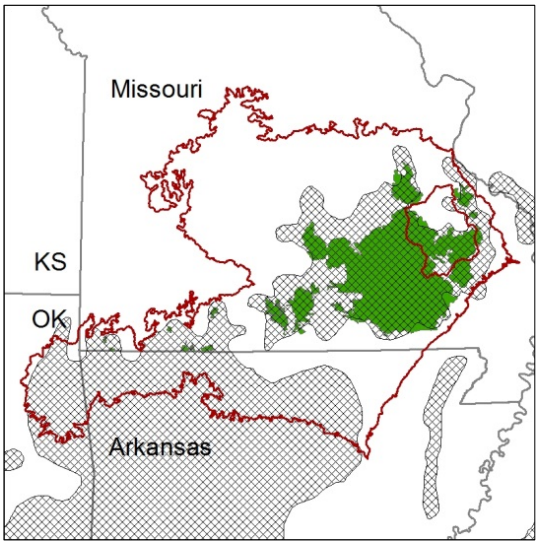
Soil Features
These soils have acidic subsoils that are low in bases. Some soils have a fragipan rooting barrier at about 24 inches, and some soils have dolomite or chert bedrock at less than 60 inches. The soils were formed under woodland vegetation, and have thin, light-colored surface horizons. Parent material is slope alluvium over residuum weathered from limestone and dolomite. They have gravelly to very gravelly and cobbly silt loam surface horizons, and skeletal subsoils with high

amounts of chert gravel and cobbles. They are not affected by seasonal wetness. Soil series associated with this site include Bendavis, Clarksville, Doniphan, Jollymill, Nixa, Poynor, Scholten, Tick, and Wilderness.

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.

Species composition and structure of the reference plant community varies for this ecological site based on its relative location to the Ozark Highlands historic native shortleaf pine range. Fragmentary evidence from old records indicate that the original timber stands in the Ozark Highlands contained a large volume of shortleaf pine on small, scattered areas, (green area on adjacent map) but a relatively small volume of shortleaf pine on extensive areas (Fletcher and McDermott, 1957). Because of this situation, this ecological site is classified into two community phases. When the ecological site occurs outside of the historic native pine range, the community phase expressed is a well-developed Oak Woodland dominated by an overstory of black oak and white oak. Within the historic native pine range, the community phase is characterized as Oak-Pine Woodland, with shortleaf pine as a common overstory species. Extreme soil chertiness, low soil bases and complicated landscape complexes are unifying soil features of these rather divergent community phases. Woodlands are distinguished from forests by their relatively open understory and the presence of sun-loving ground flora species.



Range map with cross-hatching showing the historic distribution of shortleaf pine in the Midwest. Green shading show areas where shortleaf pine was a dominate overstory species.

This ecological site is similar to Low-Base Chert Upland Woodland, except that it may be less dense with more afternoon sunlight covering the woodland floor and less productive. The canopy is moderately tall (60 to 70 feet) but less dense (60 to 80 percent cover) than protected slopes. Increased light from the more open canopy causes a diversity of ground flora species to flourish. Within the historical native pine range (Cross-hatched area on above map) this ecological site was dominated by drought and fire-tolerant shortleaf pine, with occasional to frequent black, white, and post oaks. These oak-pine woodlands ranged from open park-like woodlands to more closed woodlands. Canopy closure likely varied from 40 to 80 percent and tree height from 70 to 100 feet. Native prairie grasses dominated the open understory, along with a diverse mix of native legumes, asters, sunflowers and other forbs. Most of this oak-pine community was cleared by extensive

logging around 1890 to1920. Persistent sprouting of oak species, especially black and scarlet oak, replaced the pine in the overstory.

Fire played an important role in the maintenance of these community phases. Their high, flat landscape positions likely supported a high fire frequency of every 3 to 5 years on edge of central plateau to over 10 years on ridges in the river breaks. These periodic fires kept woodlands open, removed the litter, and stimulated the growth and flowering of the grasses and forbs. During fire free intervals, woody understory species increased and the herbaceous understory diminished. The return of fire would open the woodlands up again and stimulate the abundant ground flora.

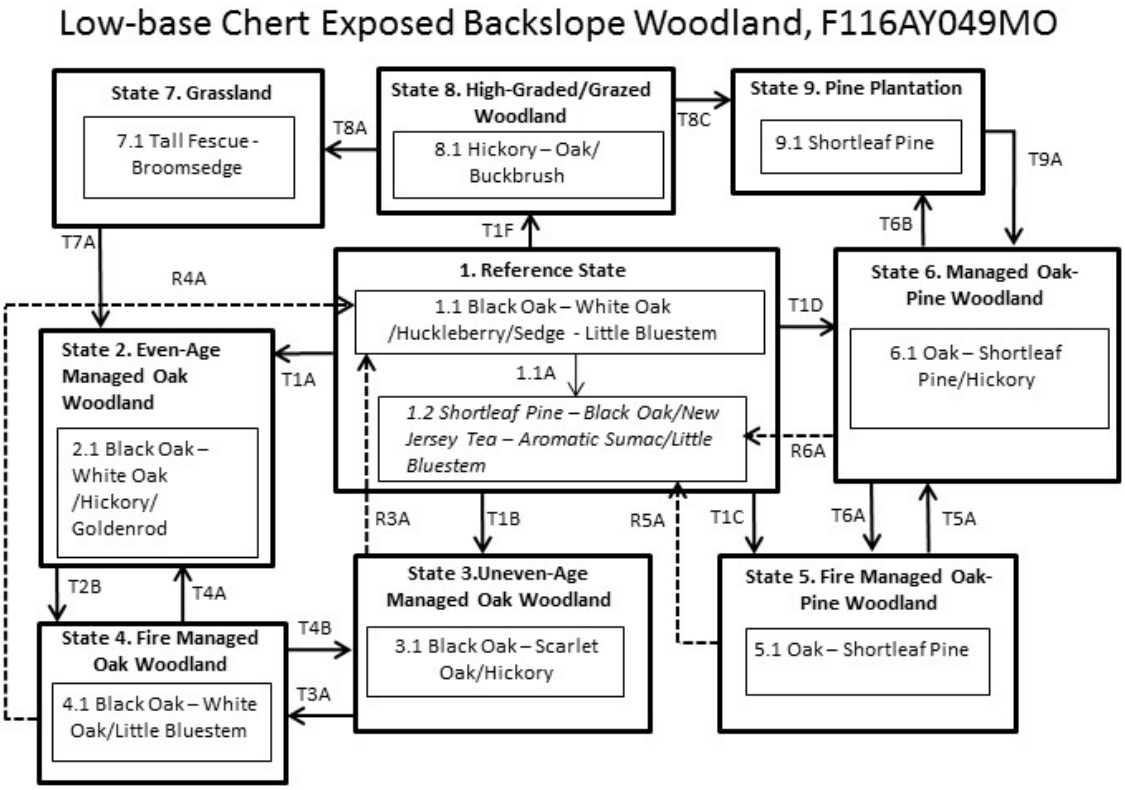
This ecological site was also historically subjected to occasional disturbances from wind and ice, as well as grazing by large native herbivores, such as bison, elk, and deer. Wind and ice would have periodically opened the canopy up by knocking over trees or breaking substantial branches off canopy trees. Grazing by large native herbivores would have effectively kept understory conditions more open, creating conditions more favorable to oak reproduction and sun-loving ground flora species.

Today, most of these ecological sites have been largely cleared and converted to pasture, undergone repeated timber harvest and uncontrolled domestic grazing or converted to pine plantations. Most existing woodland ecological sites have a younger (50 to 80 years) canopy layer whose species composition and quality has been altered by timber harvesting practices. In the long term absence of fire, woody species, such as oak and hickory, encroach into these woodlands. Once established, these woody plants can quickly fill the existing understory increasing shade levels with a greatly diminished ground flora. Most occurrences today exhibit canopy closure of 80 to 100 percent.

These ecological sites are moderately productive. Maintenance of the Oak and Oak-Pine Woodlands will require disturbances that will encourage more sun adapted species and reduce shading effects. Removal of the younger understory and the application of prescribed fire have proven to be effective restoration methods for restoring the more open structure and increasing the diversity of the ground flora species. Characteristic plants in the ground flora can be used to gauge the restoration potential of a stand along with remnant open-grown old-age trees. Managed areas show exceptional resiliency. In the Oak-Pine Woodland community phase in particular, these practices encourage recruitment of shortleaf pine when mature pines are nearby to provide a seed source. Despite the widespread removal of pine from this system, there are many areas with some pine present on this ecological site. Where present, selective cutting and prescribed fire can help recruit pine, restore the more open structure, and increase the diversity of ground flora species.

A state-and-transition model diagram is depicted in Figure 1. Detailed descriptions of each state, transition, plant community, and pathway follow the model. This model is based on available experimental research, field observations, professional consensus, and interpretations. It is likely to change as knowledge increases.

Figure 1: State and Transition Diagram



***Note**: The reference state for this ecological site can fluctuate between phases 1.1 and 1.2 within the historic natural range of shortleaf pine, although within the native pine range phase 1.2 was dominant.*

Code	Event/Activity
T1A	Pines absent; fire suppression; even-age management
T1B, T4B	Pines absent; fire suppression; uneven-age management
T1C	Within the native pine range; prescribed fire; managed harvests
T1D	Within the native pine range; fire suppression; managed harvests
T1F	Poorly planned harvest (high grading); uncontrolled grazing
T2B, T3A, T6A	Thinning; prescribed fire; managed harvests
T2A	Uneven-age management
T4A, T5A	Fire suppression; managed harvests
T7A	Tree planting; long-term succession (+50-60 years)
T8C, T6B	Clearing and conversion to pine plantation
T8A	Clearing ; pasture planting; prescribed grazing
T9A	Thinning; allow oak sprouting; fire suppression
R4A	Forest stand improvement; extended rotations; prescribed fire
R3A, R5A, R6A	Prescribed fire; uneven-age management; extended rotations
1.1A	Within native pine range

Ecological States

State 1: Reference
The historical reference state for this ecological site was old growth oak or oak-pine woodland. The reference state was dominated by black oak, post oak and white oak or with shortleaf pine as a common overstory component within the Ozark historic pine range. Maximum tree age was likely 150 to 300 years. Periodic disturbances from fire, wind or ice maintained the woodland structure and diverse ground flora species. Occasional catastrophic fires would have set some areas back to an early seral community. Long disturbance-free periods allowed an increase in both the density of trees and the abundance of shade tolerant species.

Two community phases are recognized in the reference state, with shifts between phases based on geographic location. The reference state for this ecological site can fluctuate between phases 1.1, Black Oak – White Oak/Huckleberry/Sedge – Little Bluestem and phase 1.2, Black Oak – Shortleaf Pine/New Jersey Tea – Aromatic Sumac/Little Bluestem. Within the native pine range phase 1.2 was dominant.

State 2: Even-Age Managed Oak Woodland
Where all of the shortleaf pine was removed, this system became dominated by oaks. This state starts with a sequence of early seral mixed oak woodlands, which mature over time. These woodlands tend to be rather dense, with a sparse understory and ground flora. Thinning can increase overall tree vigor and improve understory diversity. However, in the absence of fire, the diversity and cover of the ground flora is still diminished. Prescribed fire without extensive timber harvest will, over time, cause a transition to Fire Managed Oak Woodland (State 4).

State 3: Uneven-Age Managed Oak Woodland
Where pine was removed from the system, but uneven-age management was applied, this system became dominated by oaks. Uneven-Age Managed Woodlands can resemble the non-pine Reference State. The biggest differences are tree age, most being only 50 to 90 years old and denser understories. Composition is also likely altered from the reference state depending on tree selection during harvest. In addition, without a regular 15 to 20 year harvest re-entry into these stands, they will slowly increase in more shade tolerant species and white oak will become less dominant. Without periodic disturbance, stem density and fire intolerant species, like hickory, increase in abundance.

State 4: Fire Managed Oak Woodland
The Fire Managed Oak Woodland state results from managing woodland communities from states 2 or 3 with prescribed fire. This state can resemble phase 1.1 of the reference state, but with younger maximum tree ages and lower ground flora diversity.

State 5: Fire Managed Oak-Pine Woodland
Where some shortleaf pine remained after initial harvest, this state may occur. The Fire Managed Oak-Pine Woodland state results from managing State 6 with selective thinning and prescribed fire. A more open structure with abundant ground flora can be restored. But without planting or seeding of pine, they will not return to the reference state. In addition, it will take time to recover older maximum tree ages and ground flora diversity and cover.

State 6: Managed Oak-Pine Woodland
Where some shortleaf pine remained after initial harvest, the Managed Oak-Pine Woodland state may occur. While mature pines let more light to the ground than oak, these even-aged woodlands tend to be rather dense, with a depauperate understory and ground flora due to an increase in oak and hickory densities. Thinning can increase overall tree vigor and improve understory diversity. However, in the absence of fire, the diversity and cover of the ground flora is still diminished. A return to the phase 1.2 of the reference state will require prescribed fire along with no harvest or long rotations to restore uneven-age structure and pine densities and increase maximum tree age.

State 7: Grassland
Conversion of woodlands to non-native cool season grassland species such as tall fescue has been common. Low available water, abundant surface fragments, low organic matter contents and soil acidity make non-native grasslands difficult to maintain in a healthy, productive state on this ecological site. Occasionally, these pastures will have scattered patches of tall, mature pine. If grazing and pasture management is discontinued, the site will eventually transition to State 2. Forest Stand Improvement and Tree Planting practices can hasten this process.

State 8: High-Graded/Grazed Woodland
Ecological sites subjected to repeated, high-grading timber harvests and uncontrolled domestic grazing transition to this state. This state exhibits an over-abundance of hickory and other less desirable tree species, and weedy understory species such as buckbrush, gooseberry, poison ivy and Virginia creeper. The vegetation offers little nutritional value for cattle, and excessive stocking damages tree boles, degrades understory species composition and results in soil compaction and accelerated erosion and runoff. This state can be transitioned to a grassland state through clearing and grassland planting or to a pine plantation through clearing, tree planting and fire control.

State 9: Pine Plantation
Many areas were planted to plantations of shortleaf pine from the 1940's to the early 1960's. They are now mature plantations that are usually a mono-culture of a dense pine overstory with a brushy understory of oaks and hickories and a dense carpet of pine needles on the ground. They lack the diversity and structure. Restoration to phase 1.2 of the reference state is a long-term prospect, requiring extensive thinning, long-term prescribed fire, and perhaps planting of native ground flora species.

Reference State Plant Community
Canopy Trees

Common Name	Botanical Name	Cover % (low-high)	Canopy Height (ft)
WHITE OAK	*Quercus alba*	30-50	60
BLACK OAK	*Quercus velutina*	30-50	70
MOCKERNUT HICKORY	*Carya tomentosa*	5-30	60
POST OAK	*Quercus stellata*	10-30	60
SHAGBARK HICKORY	*Carya ovata*	5-20	60
SCARLET OAK	*Quercus coccinea*	5-20	70
SASSAFRAS	*Sassafras albidum*	5-20	40
SHORTLEAF PINE	*Pinus echinata*	0-20 *(30-80)**	70

**Higher cover percentages within green areas in the Ozark historic native pine range (see map on page 3)*

Shrubs

Common Name	Botanical Name	Cover % (low-high)	Canopy Height (ft)
AROMATIC SUMAC	*Rhus aromatica*	10-20	5
LOW BUSH BLUEBERRY	*Vaccinium pallidum*	10-30	3
FARKLEBERRY	*Vaccinium arboreum*	10-20	8
LEADPLANT	*Amorpha canescens*	5-10	3

Forbs

Common Name	Botanical Name	Cover % (low-high)
VIRGINNIA SPIDERWORT	*Tradescantia virginiana*	5-20
WHORLED MILKWEED	*Asclepias quadrifolia*	5-20
BABY WHITE ASTER	*Symphyotrichum anomalum*	5-20
BLAZING STAR	*Liatris aspera*	5-20
LARGE FLOWER TICK CLOVER	*Desmodium glutinosum*	5-20
ELM-LEAVED GOLDENROD	*Solidago ulmifolia*	5-20
SMALL-LEAF TICK-TREFOIL	*Desmodium marilandicum*	5-20
EASTERN BEEBALM	*Monarda bradburiana.*	5-20
PURPLE CONEFLOWER	*Echinacea purpurea*	5-20
HAIRY SUNFLOWER	*Helianthus hirsutus*	5-20
NAKED FLOWER TICK TREFOIL	*Desmodium nudiflorum*	5-20
FIRE PINK	*Silene virginica*	5-20
ARROWLEAF VIOLET	*Viola sagittata*	5-20
HAIRY BEDSTRAW	*Galium pilosum*	5-20
CREEPING LESPEDEZA	*Lespadeza repens*	5-20
SLENDER LESPEDEZA	*Lespedeza virginica*	5-20

Grasses and sedges

Common Name	Botanical Name	Cover % (low-high)
PENNSYLVANIA SEDGE	*Carex pensylvanica*	10-30
LITTLE BLUESTEM	*Schizachyrium scoparium*	20-30
WOODBANK SEDGE	*Carex cephalophora*	10-20
BIG BLUESTEM	*Andropogon gerardii*	10-20
WOODLAND BROME	*Bromus pubescens*	10-20
BOTTLEBRUSH GRASS	*Elymus hystrix*	10-20
FUZZY SEDGE	*Carex hirsutella*	10-20
INDIAN GRASS	*Sorghastrum nutans*	10-20
VIRGINIA WILDRYE	*Elymus virginicus*	10-20
PROVERTY OATGRASS	*Danthonia spicata*	10-20
BROOMESEDGE	*Andropogon virginicus*	10-20

Site Interpretations

Wildlife

- Oaks provide hard mast for wildlife; scattered shrubs provide soft mast.
- Sedges and native grasses provide green browse; native 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.

- Bird species associated with Chert Oak Woodlands include Indigo Bunting, Red-headed Woodpecker, Eastern Bluebird, Northern Bobwhite, Summer Tanager, Eastern Wood-Pewee, Whip-poor-will, Chuck-will's widow, and Red-eyed Vireo.
- Reptiles and amphibians associated with mature Chert Oak 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.
- Bird species associated with Oak-Pine Woodlands are Carolina Chickadee, Great Crested Flycatcher, Pine Warbler, White-breasted Nuthatch, Cooper's Hawk, Yellow-throated Warbler, Summer Tanager, Black-and-white Warbler, and Northern Bobwhite.
- Reptile and amphibian species associated with Oak-Pine Woodlands include ornate box turtle, northern fence lizard, five-lined skink, broad-headed skink, six-lined racerunner, rough earth snake, and timber rattlesnake.

Forestry

- Management: The average field collected site index value is 54 for oaks and 55 for shortleaf pine. These site index values range from 42 to 70. Timber management opportunities are moderate. Create group openings of at least 2 acres. Large clearcuts should be minimized if possible to reduce impacts on wildlife and aesthetics. Uneven-aged management using single tree selection, group selection cuttings of ½ to 1 acre, or crop tree release are other options that can be used if clear cutting is not desired or warranted. Using prescribed fire as a management tool could have a negative impact on timber quality or should be used with caution on a particular site if timber management is the primary objective.

- Limitations: Large amounts of coarse fragments throughout profile; bedrock may be within 60 inches. Surface stones and rocks are problems for efficient and safe equipment operation and will make equipment use somewhat difficult. Disturbing the surface excessively in harvesting operations and building roads increases soil losses, which leaves a greater amount of coarse fragments on the surface. Hand planting or direct seeding may be necessary. Seedling mortality due to low available water capacity may be high. Mulching or providing shade can improve seedling survival. Mechanical tree planting will be limited. Erosion is a hazard when slopes exceed 15 percent. On steep slopes greater than 35%, 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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