Glade Information Sheet

Conservation Practice Information Sheet ***(IS-MO643G)***

Restoring and Managing a Glade

What is a Glade?

Glades or barrens are found throughout the Ozarks and occasionally throughout Missouri on steep south and west facing slopes. Glades also occur on hill tops. These are locally known as "Balds". Glades characteristically have shallow, rocky soils with exposed bedrock and an abundance of wildflowers and native grasses with only a few trees and shrubs. Periodic fires, native herbivores and local conditions of topography, bedrock, and soil greatly influence glade development.

Drought tolerant forbs and grasses are common on glades. A few plant species, such as Missouri bladderpod, glade coneflower and bottlebrush blazing star are restricted to glade communities. A few trees, such as eastern red cedar, and shrubs also occur on glades. Glades support a variety of different wildlife species including tarantula, eastern collard lizard, painted bunting, and prairie warbler. Wild turkey, bobwhite quail and white-tail deer also occur on glades.

Some examples of flowering plants found on glades include pale purple coneflower, yellow coneflower, Missouri primrose, Missouri black-eyed Susan, purple prairie clover, lead plant, lanceleaf coreopsis, scaly blazing star and aromatic aster. Common grasses include sideoats grama, little bluestem, big bluestem, Indian grass, and switchgrass.

Typically glades are surrounded by a savanna or open woodland. A savanna is an area of widely scattered trees with a lush understory of native grasses and wildflowers. Post, chinquapin, blackjack, and black oak and shortleaf pine are a few tree species found on upland savannas and woodlands near glades. Trees found near glades are often stunted and express poor development because of shallow droughty soils and poor growing conditions.

Many glades have been degraded by fire suppression, overgrazing, rock quarrying, the spread of undesirable vegetation such as serecia lespedeza, and even plant and rock collectors. These desert-like communities are sensitive to disturbances caused by overgrazing and plant and rock collectors. Improper management or disturbances from rock and plant collectors will quickly erode the thin soils and destroy habitat for reptiles and other animals. Historically, periodic fire kept woody encroachment under control; however, with fire suppression glades and the surrounding woodland communities were engulfed by eastern red cedar and other woody vegetation. Many large "cedar thickets" seen on Ozark hillsides today are actually degraded glade and woodland communities where on small, isolated openings native grasses and wildflowers can still be found.

Glade Information Sheet

Conservation Practice Information Sheet ***(IS-MO643G)***

Different Types of Glades in Missouri

Missouri's glades are classified into several different communities based on bedrock. Limestone, sandstone, igneous, shale, and chert glades occur in Missouri. Limestone glades are the most common and occur throughout the Ozarks; some over 1,000 acres in size. Many limestone glades have been destroyed by rock quarrying and overgrazing. Sandstone glades are common around Stockton, Truman and Pomme De Terre Lakes. Geocarpon (*Geocarpon minimum*) is a state endangered plant that occurs only on sandstone glades. Igneous glades occur in the Saint Francis Mountain region in southeast Missouri. Igneous glades are very resistant to erosion. Shale glades are found in the Lincoln Hills region in northeast Missouri. Chert glades are only found in southwest Missouri in Jasper and Newton Counties. Only about 200 acres of chert glades exist in Missouri.

An igneous glade in Madison County.

Restoring Glades

Glade restoration often begins with the removal of undesirable woody vegetation – primarily eastern red cedar. Woody vegetation should also be removed from the surrounding savanna or woodland. In some cases undesirable herbaceous vegetation, such as tall fescue or serecia lespedeza, may be present. If possible, spray these areas before cutting down the woody vegetation. Otherwise it will be difficult, if not impossible, to spray the vegetation with all the downed trees. If serecia lespedeza is present, seek professional advice from an NRCS Conservationist or MDC Biologist or Forester for treatment recommendations.

Removing cedars and other woody vegetation is essential to restoring glade complexes.

Woody Cover Control on Glades

Woody vegetation should be removed using a chainsaw. Avoid using a bulldozer or tree clipper as heavy machinery will damage exposed bedrock and rocky outcroppings.
Cut woody vegetation should be left to burn or stacked in piles and burned. Because of the extreme volatility of cut cedar, consider leaving the cedar slash for 1 or 2 years before burning, or burn piles when there is snow on the ground or shortly after a rain. A good rule of thumb is to remove all cedar slash within 50 feet of the planned firebreak before conducting a prescribed burn. In time, prescribed burning will remove most of the dead woody vegetation. Leave up to 30% desirable woody vegetation on the glade.

The remaining woody vegetation should be widely scattered across the glade, with most trees remaining in draws or near the open woodland. The remaining woody vegetation should be made up of eastern red cedar and post, chinquapin, black, or blackjack oak. Other species may also be left to provide greater diversity.

To assist with prescribed burning, a permanent firebreak or service road can be used for a firebreak. The width of a permanent firebreak should be at least 2 times the height of the vegetation to be burned. and should also encircle the associated glade. Permanent firebreaks can be constructed using a small dozer or skid-loader. Avoid constructing the firebreak across the glade or along the edge of the glade.

Glades are found along the contour of south and west facing slopes. In this picture, despite little management, glade #1 has remained fairly open and in good condition. Glade #2 is currently being restored by removing woody vegetation and prescribed burning. Notice the permanent firebreak (#3) around glade #2. A large woodland and savanna surrounds glade #2. The permanent firebreak will allow the landowner to burn the entire area as one unit.

Seeding Glades

In most cases reseeding will not be necessary. Removing the competing woody vegetation will rejuvenate suppressed native grasses and forbs. Ideally, wait at least until the year after the burn before determining if sufficient forbs and grasses are present. If native forbs and/or grasses are not present or greater plant diversity is the objective seeding will be required - see NRCS FOTG practice standard - RESTORATION and MANAGEMENT OF RARE or DECLINING HABITAT (643) for recommended rates. Consult with a conservationist to determine if only forbs, only grasses or both forbs and grasses should be reseeded. See the attached seeding tables for recommended species.

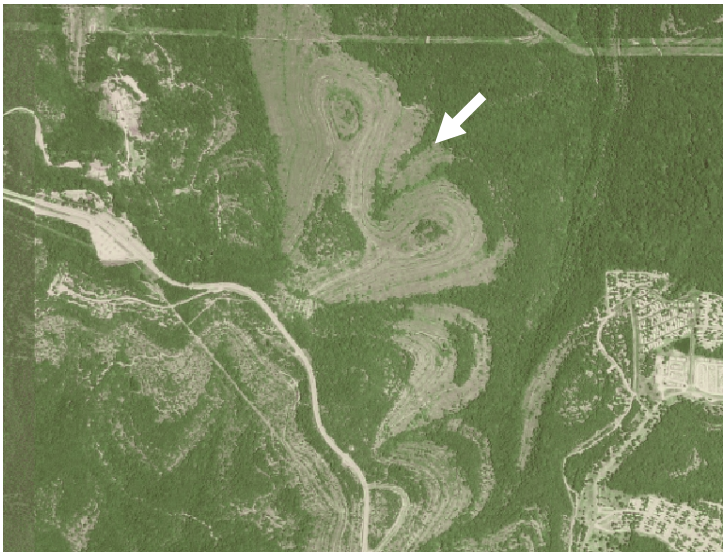
If possible conduct a prescribed burn in the fall or winter before overseeding native grasses and/or forbs. Native grasses and forbs should be dormant seeded (November through February). Seed can be broadcasted using light equipment, such as an ATV spreader, or by hand. If broadcasting seed by hand, mix the seed with an inert carrier (1:3 ratio) such as saw dust or moist sand and spread the mix using a crisscross pattern across the glade to evenly distribute the seed over the entire area.

Glade Information Sheet

Conservation Practice Information Sheet ***(IS-MO643G)***

Long-Term Management Recommendations

Prescribed fire is essential to maintaining a glade. Without it, woody vegetation will overtake the area. Prescribed burns should be conducted on a 3 to 5 year rotation, preferably sometime between November and February. A conservationist may recommend more frequent burning to control invading woody vegetation or burning at another time of the year. Because of the steep terrain and difficultly in constructing firebreaks, the entire glade and woodland can be burned as one unit.



A large restored glade and savanna complex in southwest Missouri.

For additional information on glade, contact your local USDA Service Center or Missouri Department of Conservation office.

Photos courtesy of the Missouri Department of Conservation. 2004.

TABLE 1 – APPROVED GRASS/GRASS LIKE – species selection will only be made from appropriate habitat type based on planting site evaluation.

Common Name	Scientific Name	Habitat Type *
GRASSES/GRASS LIKE		
Winter bent grass	*Agrostis hyemalis*	S, DP, MP, WP
Big bluestem	*Andropogon gerardii*	S, DP, MP, WP, G
Splitbeard bluestem	*Andropogon ternarius*	DP, G
Broomsedge	*Andropogon virginicus*	S, DP, MP, WP, G
Sideoats grama	*Bouteloua curtipendula*	S, DP, MP, G
River oats	*Chasmanthium latifolium*	S, MP, WP
Canada wildrye	*Elymus canadensis*	S, MP, WP
Virginia wildrye	*Elymus virginicus*	S, MP, WP, G
Cluster fescue	*Festuca paradoxa*	S, DP, MP, WP
Junegrass	*Koeleria cristata*	S, DP, MP
Switchgrass	*Panicum virgatum*	S, DP, MP, WP, G
Beaked rush	*Rhynchospora globularis*	MP, WP
Little bluestem	*Schizachyrium scoparium*	S, DP, MP, G
Tall nutgrass	*Scleria triglomerata*	S, DP, MP, WP, G
Indian grass	*Sorghastrum nutans*	S, DP, MP, G
Prairie cordgrass	*Spartina pectinata*	WP
Tall dropseed	*Sporobolus compositus*	S, DP, MP, G
Prairie dropseed	*Sporobolus heterolepis*	S, DP, MP, G
Porcupine grass	*Stipa spartea*	DP, MP
Purple top	*Tridens flavus*	S, MP
Eastern gamagrass	*Tripsacum dactyloides*	S, DP, MP, WP
Short's sedge	*Carex shortiana*	S, MP, WP
Six weeks fescue	*Vulpia octoflora*	S, DP, MP, G

*** S = Oak Savanna, DP = Dry Prairie, MP = Mesic Prairie, WP = Wet Prairie, G = Glade**

TABLE 2 – APPROVED FORBS - species selection will only be made from appropriate habitat type based on planting site evaluation.

Common Name	Scientific Name	Habitat Type *
	FORBS	
Yarrow	*Achillea millefolium*	MP
Leadplant	*Amorpha canescens*	S, DP, MP, G
Meadow anemone	*Anemone canadensis*	WP
Purple milkweed	*Asclepias purpurascens*	S
Marsh milkweed	*Asclepias incarnata*	WP
Butterfly milkweed	*Asclepias tuberosa*	S, DP, MP, G
Sky blue aster	*Aster azureus*	S, DP
Smooth aster	*Aster laevis*	S
New England aster	*Aster novae-angliae*	WP
Aromatic aster	*Aster oblongifolius*	DP, MP, G
Purple daisy aster	*Aster patens*	
Willow aster	*Aster praealtus*	WP
Silky aster	*Aster sericeus*	DP, G
White wild indigo	*Baptisia alba*	S, DP, MP, WP, G
Blue wild indigo	*Baptisia australis*	S, DP, MP, WP, G
Cream wild indigo	*Baptisia bracteata*	DP, MP, G
Beggar tick **(A)**	*Bidens frondosa*	WP
Fringed poppy mallow	*Callirhoe digitata*	DP, MP
Purple poppy mallow	*Callirhoe involucrata*	DP, G
Prairie hyacinth	*Camassia angusta*	MP, WP
Partridge pea **(A)**	*Cassia fasciculata*	S, DP, MP, G
Indian paintbrush **(A)**	*Castilleja coccinea*	DP, MP, WP, G
New Jersey tea	*Ceanothus americanus*	S, DP, MP, G
Grandiflora coreopsis	*Coreopsis grandiflora*	DP, MP
Coreopsis	*Coreopsis lanceolata*	DP, MP, G
Finger/Prairie Coreopsis	*Coreopsis palmata*	S, DP, MP, G
Plains coreopsis	*Coreopsis tinctoria*	DP, G
Tickseed coreopsis	*Coreopsis tripteris*	S, DP, MP, WP, G
Rattlebox	*Crotalaria sagittalis*	DP, G
White prairie clover	*Dalea candida*	S, DP, MP, G
Purple prairie clover	*Dalea purpurea*	S, DP, MP, G
Illinois bundle flower	*Desmanthus illinoensis*	MP, WP, G
Showy tick trefoil	*Desmodium canadense*	S, DP, MP, WP, G
Beggar's lice	*Desmodium canescens*	S, DP, MP, G
Shooting star	*Dodecatheon meadia*	S, DP, G
Pale purple coneflower	*Echinacea pallida*	S, DP, MP, G
Yellow coneflower	*Echinacea paradoxa*	S, DP, G
Purple coneflower	*Echinacea purpurea*	S, MP, WP, G
Ozark glade coneflower	*Echinacea simulata*	S, DP, MP, G
Rattlesnake master	*Eryngium yuccifolium*	S, DP, MP, G
Boneset	*Eupatorium perfoliatum*	WP
Flowering spurge	*Euphorbia corollata*	S, DP, MP, G
Curly cup gum plant	*Grindelia lanceolata*	S, DP, MP, G

Common Name	Scientific Name	Habitat Type *
Sawtooth sunflower	*Helianthus grosseserratus*	DP, MP, WP, G
Ashy Sunflower	*Helianthus mollis*	DP, MP, G
Western sunflower	*Helianthus occidentalis*	DP, MP, G
Woodland sunflower	*Helianthus strumosus*	S
Ox-eye/false sunflower	*Heliopsis helianthoides*	S, DP, MP, G
Alum root	*Heuchera richardsonii*	DP, G
Copper flag	*Iris fulva*	MP, WP
Blue flag	*Iris virginica shrevei*	WP
Roundhead lespedeza	*Lespedeza capitata*	S, DP, MP, G
Lespedeza hirta	*Lespedeza hirta*	S, DP, MP, G
Slender lespedeza	*Lespedeza virginica*	S, DP, MP, G
Rough blazing star	*Liatris aspera*	S, DP, G
Glade blazing star	*Liatris mucronata*	S, DP, G
Blazing star	*Liatris pycnostachya*	DP, MP, WP, G
Squarrosa blazing star	*Liatris squarrulosa*	S, DP, MP, G
Cardinal flower	*Lobelia cardinalis*	WP
Blue lobelia	*Lobelia siphilitica*	WP
Barbara's button	*Marshallia caespitosa*	DP, MP, WP
Sensitive briar	*Mimosa nuttalli*	S, DP, MP, G
Savanna bergamot	*Monarda bradburiana*	S, DP, G
Bergamot	*Monarda fistulosa*	S, DP, MP, WP, G
Missouri Primrose	O*enothera missouriensis*	DP,G
Sampson's snakeroot	*Orbexilum pedunculatum*	S, MP, WP
Spanish needles	*Palafoxia callosa*	S, DP, G
Wild quinine	*Parthenium integrifolium*	S, DP, MP, G
Lousewort/Wood betony	*Pedicularis canadensis*	DP, MP, G
Purple beardtongue	*Penstemon cobaea*	S, DP, G
Beardtongue	*Penstemon digitalis*	DP, MP, WP, G
Prairie beardtongue	*Penstemon tubaeflorus*	S, DP, MP
Obedient plant	*Physostegia virginiana*	S, MP, WP, G
Prairie parsley	*Polytaenia nuttallii*	DP, MP, WP
Prairie cinquefoil	*Potentilla arguta*	DP, MP, G
Scurfy pea	*Psoralidium tenuiflorum*	MP, WP
Slender mountain mint	*Pycnanthemum tenuifolium*	S, DP, MP, WP, G
Mountain mint	*Pycnanthemum virginianum*	WP
Prairie coneflower	*Ratibida columnifera*	DP, MP, G
Gray-head coneflower	*Ratibida pinnata*	S, DP, MP, G
Prairie rose	*Rosa setigera*	MP
Black-eyed Susan **(B)**	*Rudbeckia hirta*	S, DP, MP, G
Missouri Black-eyed Susan	*Rudbeckia missouriensis*	DP, G
Sweet coneflower	*Rudbeckia subtomentosa*	MP, WP
Brown-eyed Susan	*Rudbeckia triloba*	WP
Wild petunia	*Ruellia humilis*	DP, G
Pitchers sage	*Salvia azurea*	DP, MP, G
Maryland senna	*Senna marilandica*	S, MP, WP
Royal catchfly	*Silene regia*	S, DP, MP
Rosinweed	*Silphium integrifolium*	S, DP, MP, WP, G

Common Name	Scientific Name	Habitat Type *
Compass Plant	*Silphium laciniatum*	DP, MP, WP, G
Cup plant	*Silphium perfoliatum*	WP
Prairie dock	*Silphium terebinthinaceum*	S, DP, MP, WP, G
Blue-eyed grass	*Sisyrinchium campestre*	DP
Gray goldenrod	*Solidago nemoralis*	S, DP, MP, G
Savanna goldenrod	*Solidago petiolaris*	S, DP, G
Riddell's goldenrod	*Solidago riddellii*	WP
Rigid/Stiff goldenrod	*Solidago rigida*	S, DP, MP, WP, G
Showy goldenrod	*Solidago speciosa*	S, DP, MP
Goat's rue	*Tephrosia virginiana*	S, DP, MP, G
Ohio spiderwort	*Tradescantia ohiensis*	S, DP, MP, WP
Blue vervain	*Verbena hastata*	WP
Wingstem sunflower	*Verbesina helianthoides*	S, DP, MP
Ironweed	*Vernonia missurica*	MP, WP
Culver's root	*Veronicastrum virginicum*	S, MP, WP
Golden alexander	*Zizia aurea*	S, DP, MP, WP, G

*** S = Oak Savanna, DP = Dry Prairie, MP = Mesic Prairie, WP = Wet Prairie, G = Glade**

A = Annual **B = Biennial**