

*2008 State Wildlife Grant Pre-proposal*

**CENTRAL ARKANSAS GLADE AND WOODLAND RESTORATION**

**PROJECT SUMMARY:**

Restoration of glade and woodland communities will benefit Arkansas Wildlife Action Plan animal Species of Greatest Conservation Need at four unique locations in central Arkansas. The glade-woodland system will be restored through the use of prescribed fire and mechanical removal of invasive woody species. This project will address three priority implementation actions and benefit a suite of grassland bird and other species of conservation concern.

**PROJECT LEAD:**

Mike Melnechuk, Assistant Director of Stewardship  
The Nature Conservancy  
[mmelnechuk@tnc.org](mailto:mmelnechuk@tnc.org)  
601 N. University Avenue  
Little Rock, AR 72205  
Phone: (501) 614-5095  
Fax: (501) 663-8322

**PROJECT PARTNERS:**

Jennifer Akin  
Arkansas Natural Heritage Commission  
[JenniferA@arkansasheritage.org](mailto:JenniferA@arkansasheritage.org)  
(501) 324-9763

Total Project Cost: \$161,130

State Wildlife Grant Request: \$77,490 (48%)

Matching funds from The Nature Conservancy / Arkansas Natural Heritage Commission: \$83,640 (52%)

### Funding Priority Addressed by preproposal

This project will restore the complex of glade, prairie/glade, and woodland habitats using prescribed fire and mechanical removal of invasive woody species. Three conservation action funding priorities will be addressed:

- Restore and/or maintain prairies and native grasslands and shrub habitat for grassland and shrub breeding birds.
- Restore fire to fire-suppressed habitats to benefit Species of Greatest Conservation Need.
- Manage forests to benefit Species of Greatest Conservation Need.

This project is an on-the-ground restoration and stewardship project that implements priorities outlined in the Arkansas Wildlife Action Plan (habitat restoration and improvement) and will serve as a demonstration site for other state, federal, and private lands.

### ECOREGION WHERE PROJECT WILL BE CONDUCTED

Restoring glade and woodland habitat will benefit species of greatest conservation concern in the Ouachita Mountains and South Central Plains Ecoregions, specifically at Trap Mountain Nature Preserve, Middle Fork Barrens Natural Area, and Dry Lost Creek and Dunahoo Nature Preserves and adjacent private lands (Figure 1).

### BACKGROUND

Glades are open rocky areas dominated by warm-season grasses and drought adapted forbs. They can be extensive in size and appear as treeless openings within landscapes often dominated by woodland communities. The open, prairie like glades provides habitat structure for grassland birds such as nesting Bachman's Sparrow. Like many grass-dominated ecosystems, the dry woodlands and glades have undergone fire suppression in the past century. As a result prairie/glade openings have declined in size and declined in diversity due to encroaching woody vegetation, such as eastern red cedar (*Juniperus virginiana*). Historic timbering formed even-aged stands, which probably facilitated the invasion of fire intolerant woody species in the understory, reducing light to the herbaceous layer. Conversion from an open to a closed canopy negatively alters species composition, and adversely impacts herbaceous-layer plants and dependent animals. This project will restore the glade-prairie-woodland complex of communities at three unique locations in Central Arkansas.

The Trap Mountain Nature Preserve (790 acres), located in Hot Spring and Garland Counties, is situated along two ridgelines and the upper portions of Rush Fork watershed on Trap Mountain. Xeric glades occur in areas of shallow soil and bedrock (Arkansas Novaculite and Blaylock Sandstone) on ridgelines and south and north-facing slopes. Glades and rock outcrops cover approximately 10% of the preserve. A combination of old, dwarf, fire and drought tolerant tree species like post oak (*Quercus stellata*) and blackjack oak (*Quercus marilandica*) and young fire-intolerant woody vegetation occurs over a grassy understory, which is dominated by little bluestem (*Schizachyrium scoparium*), coreopsis (*Coreopsis lanceolata*), and wooly ragwort (*Senecio tomentosus*). The Ouachita Mountain endemic Arkansas cabbage (*Streptanthus obtusifolius*) occurs on the glades. The glades are edaphically controlled, with woody vegetation dying (or dying back to the rootstock) during periods of drought.

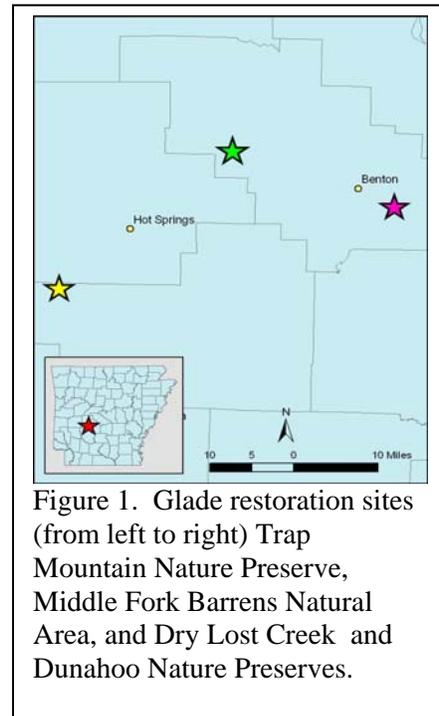


Figure 1. Glade restoration sites (from left to right) Trap Mountain Nature Preserve, Middle Fork Barrens Natural Area, and Dry Lost Creek and Dunahoo Nature Preserves.

Located in Saline County, Middlefork Barrens Natural Area (136 acres) contains a complex of glades, barrens, oak and oak-pine forest and woodlands on a shale substrate. Glades at the site range from seasonally wet, flat glades situated in erosional drainages to very dry hillside glades on south and west-facing slopes. The glades support 11 species of rare plants, several of which are globally rare and endemic to the Ouachita Mountains. These glades transition into and are surrounded by a matrix of oak and oak-pine woodlands. An eight mile reach of the Middle Fork centered on the natural area contains eight Arkansas Wildlife Action Plan mussel species of greatest conservation need.

An igneous geology of nepheline syenite occurs in a few places in central Arkansas, including TNC nature preserves Dry Lost Creek (235 acres) and Dunahoo (480 acres) and private lands adjacent in Saline County. Lands adjacent to the two preserves are owned By Alcoa corporation. The glades, outcrops, and woodlands over this igneous rock comprise one of the most globally significant habitat complexes in the South Central Plains Ecoregion. A number of plant species associated with calcareous substrates and base-rich soils over much of their range are also found on the nepheline syenite geology. Calcifilic plant species noted at the preserve include calamint (*Satureja arkansana*), fameflower (*Talinum calycinum*), and prairie spurge (*Euphorbia missurica*). Nepheline syenite is somewhat intermediate between acidic and basic rock types. The elements of biodiversity of greatest concern at the preserve are the natural communities and the conservative plant species associated with the glades. Natural community types of global significance include Nepheline Syenite Glade-Outcrop and the associated Xeric Woodlands. The key ecological processes influencing the communities are fire and drought.

#### **GOALS AND OBJECTIVES:**

The primary goal of this project is to restore glade and woodland habitat structure and species composition to benefit at least 14 species of conservation concern, identified by the 2008 State Wildlife Action Plan Steering Committee. Completion of this project will take two years.

#### **Objectives:**

1. Increase the amount of sunlight to promote native grasses and forbs by reducing eastern red cedar and small trees cover by 50-95% at four glade complexes.
2. Promote the reinvigoration of shrub habitat by encouraging the resprouting on native shrubs.
3. Restore habitat structure and species composition of glade/woodland community assemblages using mechanical thinning to reduce overstory basal area..
4. Restore suppressed ecological processes, particularly fire to increase the amount and quality of grassland habitat and woodland grassland understory.
5. Measure progress towards desired ecological conditions by conducting habitat restoration monitoring.

#### **METHODS**

##### Glade and Woodland Restoration—Objectives 1, 2, and 3

Restoring the glades at each project site will focus on the removal of invasive woody vegetation and the reintroduction of fire. The restoration challenges at each site differ slightly (e.g., eastern red cedar dominates glades at Middlefork Barrens, and hardwood encroachment threatens glade communities at the Trap mountain Nature Preserve). Restoration will include the following activities.

- Mechanical removal of eastern red cedar and large woody invasive species followed by herbicide application where necessary.
- Overstory harvest and thinning of loblolly pine plantations.
- Pile burning of woody debris.

##### Fire Restoration—Objective 4

Fire is the most important ecological process maintaining the distribution, composition, and diversity of glade and woodland communities. The reintroduction of fire should decrease the large woody component of the glades, reduce eastern red cedar, reinvigorate native shrubs, reduce the abundance of non-native

species, favor native warm season grasses, increase the size and connectedness of the glade openings, restore structure to the adjacent woodlands, and reinvigorate the woodland herbaceous layer and glade/woodland ecotone. Fire will be applied to sites by The Nature Conservancy and Natural Heritage Commission’s Prescribed Fire Crews.

Habitat Restoration Monitoring—Objective 4

The monitoring will evaluate the effects of habitat restoration activities, including woody vegetation removal, immediate post-burn effects, and native grass and forb response to restoration. Changes in vegetation composition will be monitored using permanent plots and transects. Photomonitoring will also be used to document the removal of woody vegetation and the establishment of high-quality, native species.

**PRODUCTS AND OUTCOMES**

- Reduce loblolly pine saplings, tall woody woody vegetation, and eastern red cedar cover on four glade complexes (500 acres).
- Reduced overstory basal area in treated glades and woodlands (100 acres).
- Three to five prescribed burns (400 acres) conducted at four glade complexes.
- Restoration activity and monitoring reports.

Expected Benefits

The restoration activities will restore habitat on four glade-woodland complexes in central Arkansas. The restoration of these habitats will provide beneficial habitat to the species of conservation concern (Table 1) by providing open grassland, open woodland, and shrub habitats that are rare in today’s landscape.

Table 1. Selected terrestrial species of the glade and surrounding woodland habitat as identified as Species of Concern under the State Wildlife Grant Program (AGFC CWCS Database).

<b>Common Name</b>	<b>Common Name</b>
Bachman's Sparrow	Whip-poor-will
Bewick's Wren	Yellow-billed Cuckoo
Eastern Towhee	Diana Fritillary
Northern Bobwhite	Long-tailed Weasel
Prairie Warbler	Collared Lizard
Painted Bunting	Western Diamondback Rattlesnake
Red-headed Woodpecker	Western Slender Glass Lizard

**EXISTING RESOURCES AND LONGTERM PROJECT MAINTENANCE**

This project will build on the longstanding partnership between The Nature Conservancy and the Arkansas Natural Heritage Commission. The partner’s commitment to conservation will be important for the long-term future of restoration activities. Future maintenance of the restoration will include continued monitoring and prescribed fire.

**PRELIMINARY BUDGET**

<b>Category</b>	<b>Total</b>	<b>TNC/ANHC (Match)</b>	<b>SWG</b>
Salary/Benefits	\$108,000	\$60,000	\$48,000
Operating Expenses	\$23,000	\$8,000	\$15,000
Capital Expenses			
Subtotal	\$131,000	\$68,000	\$63,000
Indirect Costs (23%)*	\$30,130	\$15,640	\$14,490
<i>Total</i>	<i>\$161,130</i>	<i>\$83,640</i>	<i>\$77,490</i>

\***Indirect Costs:** The Nature Conservancy has a current 23% Negotiated Indirect Cost Rate (NICRA) that is accepted by USFWS.

## **QUALIFICATIONS OF THE NATURE CONSERVANCY TO CARRY OUT THE PROJECT**

The Nature Conservancy (TNC) has worked in the glades and woodlands of Arkansas with our partners for approximately 15 years. TNC has developed a broad understanding of this at-risk ecosystem through years of scientific observation and use of adaptive management in implementation of restoration techniques. TNC maintains an excellent working relationship with conservation organizations such as the Arkansas Natural Heritage Commission. This relationship increases our capacity to organize teams made up of experts in the field of restoration of at-risk habitats. TNC also maintains science and conservation staffs that are trained in implementation of strategic actions and monitoring. Finally, through completion of other restoration activities, TNC has demonstrated the ability to successfully complete this project.

The Arkansas Natural Heritage Commission (ANHC) is charged with the responsibility of establishing and maintaining a System of Natural Areas. Natural areas are those lands specifically managed to preserve, and sometimes restore, natural communities that are now rare across the state. The ANHC also maintains the Natural Heritage Inventory, the central repository for information on rare species and natural communities in Arkansas. The Natural Heritage Inventory gathers information on the location of rare species and natural communities in the form of Element Occurrence Records. Data from the Natural Heritage Inventory are commonly used as a tool in land conservation programs, environmental review/information sharing, and habitat management plans.

Maria Melnechuk is the Terrestrial Ecologist for the Arkansas Field Office. She has worked with The Nature Conservancy in Arkansas for eight years. Her responsibilities include conducting ecological assessments, writing stewardship plans, and performing plant community monitoring, rare plant monitoring and post-fire assessments. Maria also assists with the implementation of fire management activities as well as stewardship and restoration activities throughout the state. She has a Bachelor of Science degree in biology from Hendrix College and a Master of Science in biology from the University of Arkansas at Little Rock.

Mike Melnechuk is the Assistant Director of Stewardship for the Arkansas Field Office. His responsibilities include assisting with the implementation of fire management activities in Arkansas as well as stewardship and restoration activities on the various preserves for TNC, the Arkansas Natural Heritage Commission, and occasionally military installations. Mike is also involved with ecological monitoring and herpetological surveys. He coordinates with the Director of Conservation, as to the day to day operations of the seasonal burn crew. He has a Bachelor of Science degree in geography/natural resource management from Western Michigan University.

Jennifer Akin is a Natural Community Ecologist for the Arkansas Natural Heritage Commission. Jennifer received a B.S. in biology and a M.S. in botany both from the University of Arkansas at Fayetteville. Jennifer has worked for The Nature Conservancy documenting the recovery of restored wetland and uplands and the National Park Service performing surveys in over two hundred vegetation types in the Sierra Nevada Mountains for production of a vegetation map. She has published two scientific papers on algae in relation to aquatic vegetation in Arkansas.

Theo Witsell of the Arkansas Natural Heritage Commission is one of the state's leading botanists. He has worked as the staff botanist for the Arkansas Natural Heritage Commission since 2000 and is responsible for maintaining the state's list of plant species of conservation concern as well as conducting statewide surveys for rare plants and plant communities. Theo is an active member of the Arkansas Vascular Flora Committee, a group of botanists writing a manual to the flora of Arkansas. He has published a number of scientific articles on rare plant species including the description of a new species, *Sabatia arkansana*, from shale glades in central Arkansas and has completed a comprehensive floristic inventory of Saline County.