2015 Arkansas State Wildlife Grant Pre-proposal

RESTORING GLADE, WOODLAND, AND AQUATIC HABITAT TO BENEFIT SPECIES OF GREATEST CONSERVATION NEED

Project Summary

Open glades and woodlands at Middle Fork Barrens Natural Area and the Mildred and John Cooper Nature Preserve will be restored through non-native invasive species control, the removal of woody encroachment, and prescribed fire implementation. Additionally, aquatic habitat within the Saline River will be improved through erosion control. This project will also serve as a demonstration of effective glade and woodland restoration techniques for conservation partners, thereby extending ecological benefits well beyond the project's scope. These restoration actions will create additional high-quality habitat, build upon past restoration projects, and provide connectivity to previously restored high-quality habitat, thereby addressing three funding priorities and benefiting a diverse suite of at least 18 species of greatest conservation need (SGCN).

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***Middle Fork Barrens Natural Area**: Desired post-restoration conditions in glade openings using prescribed fire and mechanical and chemical methods.*

SWG Funding Requested: $102,050 (65%)

Amount and Source of Matching Funds: $54,950 (35%)
will be provided from the
Arkansas Natural Heritage Commission and The Nature Conservancy

Total Project Costs: $157,000

NEED: Glades are open, rocky areas dominated by forbs and warm-season grasses. Like many grass-dominated ecosystems, glades and associated woodlands have undergone fire suppression in the past century. As a result, glade openings have declined in both size and diversity due to encroaching woody vegetation, especially eastern red cedar. Herbaceous species diversity is noticeably lower under the shade of surrounding woody plants. Historical fire suppression has also facilitated woody succession in glade-associated woodlands, which become dense with a minimal herbaceous understory. Ultimately, conversion to a closed canopy adversely affects animal species dependent on open stand structure and its associated plant composition. Livestock grazing, logging, conversion to fescue and other invasive plant species, and fragmentation have also harmed glades, but fire suppression has had the largest negative effect.

Middle Fork Barrens Natural Area (MFBNA) encompasses a 205-acre complex of open glades, barrens, oak and oak-pine forest and woodlands on a shale substrate. Located in the eastern portion of the central Ouachita Mountains, this natural area contains glades ranging from seasonally wet, flat glades situated in erosional drainages to very dry hillside glades on south and west-facing slopes. These glades transition into and are surrounded by a matrix of oak and oak-pine woodlands. Botanically diverse, the natural area supports 11 species of rare plants, several of which are globally rare and endemic to the Ouachita Mountains.

Woodland species such as the red-headed woodpecker occur at the natural area, and the woodland/glade complex provides habitat for Bachman's sparrows. An eight-mile reach of the Saline River middle fork centered on the natural area contains eight Arkansas Wildlife Action Plan mussel and fish SGCN. The Diana fritillary also exists within the natural area's glade complex; adults feed on nectar-producing plants in the glade openings and woodlands, and caterpillars feed on woodland violets, the host plant. The project in this proposal will build upon the success of State Wildlife Grant ARFO-3874-04-22-09 by restoring additional habitat needed to support sustainable populations of the many SGCN at MFBNA dependent on open glades and woodlands.

The Mildred and John Cooper Nature Preserve (CNP) supports 123 acres of riparian forest along two miles of the Saline River middle fork. Located less than one mile from MFBNA, CNP serves as forested buffer for the Saline River and its documented mussel beds, which include the Arkansas fatmucket, a SGCN that is also federally threatened.

Fire is the most important ecological process maintaining the distribution, composition, and diversity of glade and associated woodland communities. Unfortunately, decades of fire suppression prior to state and private conservation ownership at MFBNA and CNP have altered the sites' species composition and structure, resulting in densification to forested stands. Further, the encroachment of invasive plant species threatens the diversity of these habitats, and erosion causes increased sediment loading in the Saline River, which threatens aquatic SGCN. Thus, the restoration of glade and woodland community structure, re-establishment of fire, and erosion-control measures are needed if SGCN preferring these habitats are to increase or even persist. Restoration of glade, woodland, and aquatic habitat at two locations within central Arkansas will create additional high-quality habitat and increase the scale of managed land, thereby providing a larger landscape for SGCN.

FUNDING PRIORITIES: This project addresses three 2015 Arkansas Wildlife Action Plan funding priorities for:

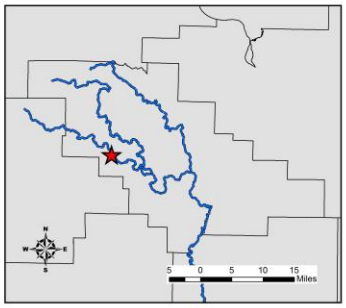
1. Woodlands, Glades, and Upland Hardwood Forest Grassland Birds – implementation and/or evaluation of habitat restoration and management for woodlands, glades, and upland hardwood forest grasslands
2. Woodlands and Glades Habitat – habitat management to maintain or increase habitat quality or increase patch size for SGCN
3. Aquatic Habitat – restore, enhance, and/or maintain the integrity of aquatic habitats

PURPOSE AND OBJECTIVES: The primary goal of this project is to restore and improve the quality of glade, woodland, and aquatic habitat at two locations in central Arkansas by reducing woody encroachment and invasive plant species on 230 acres using prescribed fire and mechanical and chemical methods, as well as by implementing erosion-control measures, thereby increasing viability of SGCN. Project completion will take two years; proposal objectives are:

1. Increase the scale of high-quality glade and woodland habitat to benefit SGCN
2. Improve Saline River water quality for SGCN by controlling erosion
3. Increase knowledge of effective glade and woodland restoration techniques by using this project as a demonstration for conservation partners, thereby extending ecological benefits well beyond the project's scope
4. Measure progress toward desired ecological conditions by measuring the response of SGCN

LOCATION OF WORK: Project activities will restore glade, woodland, and aquatic habitat for SGCN in the Ouachita Mountains ecoregion, specifically at MFBNA and CNP in Saline County (Figure 1).

Figure 1: Saline County map showing project site in relation to the upper Saline River forks.



APPROACH:

Objective 1 will be addressed in both years of the project. A total of 230 acres of glade and woodland habitat will be restored using prescribed fire, mechanical treatments, and herbicide applications.

Eastern red cedar will be treated at MFBNA using two techniques: felling rows and girdling in rows not felled, and felling using the cut-and-lay method. Other woody invasive species will be mechanically removed. Follow-up herbicide treatments will be used as necessary.

Sericea lespedeza will be treated at MFBNA using mechanical and chemical methods. Fescue will be reduced through herbicide treatments.

The Arkansas Natural Heritage Commission (ANHC) and The Nature Conservancy (TNC) will conduct prescribed-fire implementation at MFBNA and CNP, which will decrease the large woody component of the glades, reduce eastern red cedar, reduce the abundance of non-native plant

species, favor native warm-season grasses, reinvigorate native shrubs, 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.

Objective 2 will be addressed in both years of the project. Streambank restoration (on both sides) over approximately 500 feet total at MFBNA will entail the installation of grade control structures, rock vanes, and bankful benches along with the re-establishment of riparian areas as appropriate. The ANHC will develop and implement a natural channel design with channel dimensions, pattern, and profile that will be based upon reference reach conditions for its physiographic region. The ANHC and/or contractors will create and implement construction and design plans. To reduce wash-outs, roads at MFBNA and CNP will be rehabilitated with regrading and/or the installation of water bars, water brakes, and new culverts.

Objective 3 will be addressed in both years of the project. This project will serve as a demonstration for professional land-manager groups, spurring dialogue centered on glade and woodland restoration techniques, informing similar projects, and elevating awareness of the State Wildlife Grant program, Arkansas Wildlife Action Plan, and project partners. Ultimately, the sharing of restoration techniques among conservation partners will extend ecological benefits well beyond the project's scope.

Objective 4 will be addressed in both years of the project. We will use transects and general area searches pre- and post-treatment to survey bird and butterfly diversity and SGCN.

EXPECTED RESULTS AND BENEFITS: Restoring degraded open glades, woodlands, and aquatic habitat at MFBNA and CNP will (1) create additional high-quality habitat for glade and woodland SGCN, (2) help restore an ecological fire regime that is necessary to maintain this system, (3) provide connectivity by restoring degraded habitat adjacent to existing high-quality habitat and in newly acquired areas, (4) improve the water quality of the Saline River for aquatic SGCN, (5) serve as a demonstration of effective glade and woodland restoration techniques for conservation partners, and (6) increase the scale of managed land, thereby providing a larger landscape that we will maintain in future years to benefit SGCN and other wildlife. This project will benefit 18 SGCN at MFBNA and CNP (Table 1).

Table 1: SGCN that will benefit from this project (18). Species known from the natural area, nature preserve, and immediate vicinity are in bold.

Arkansas fatmucket	**Ouachita kidneyshell**
Bachman's sparrow	**Ouachita madtom**
Black sandshell	Painted bunting
Brown-headed nuthatch	**Prairie warbler**
Chuck-will's widow	**Purple lilliput**
Diana fritillary	**Red-headed woodpecker**
Flutedshell	**Southern pocketbook**
Little spectaclecase	**Whip-poor-will**
Northern bobwhite	**Yellow-billed cuckoo**

BUDGET: The ANHC and TNC will provide non-federal match for restoration activities.

Category	Total	Match ANHC	Match TNC	Grant
Salary / Benefits	$ 15,500	$ 0	$ 5,500	$ 10,000
Contract Services	139,500	43,450	5,000	91,050
Equipment	500	500	0	0
Travel	1,500	0	500	1,000
Grand Total	$157,000	$43,950	$11,000	$102,050

ORGANIZATION AND STAFF QUALIFICATIONS:

The Arkansas Natural Heritage Commission and The Nature Conservancy have successful experience restoring and protecting glade, woodland, and aquatic communities. They have worked together and with other partners to develop a broad understanding of this at-risk ecosystem through years of scientific observation and the use of adaptive management in implementation of restoration and conservation techniques. Each agency protects and maintains glade remnants in Arkansas.

Project Leader: **Bryan Rupar** is the Chief of Land Acquisition and Stewardship for the Arkansas Natural Heritage Commission. Bryan received a B.S. in Natural Resource Management from Grand Valley State University and an M.S. in Forest Resource Management from the University of Arkansas at Monticello. Bryan previously worked for the U.S. Forest Service in Michigan and private forestry firms in southern Arkansas. Bryan oversees all acquisition, stewardship, and restoration projects for the 61,000-acre System of Natural Areas.

Jason Throneberry is the Aquatic Ecologist for the Arkansas Natural Heritage Commission (ANHC). Jason received a B.S. in Fisheries and Wildlife Biology from Arkansas Tech University and an M.S. in Biology (emphasis in non-game fisheries) from Tennessee Technological University. Since starting with the ANHC, he has worked with many government and non-government organizations to survey for and keep database records of fish, mussel, macroinvertebrates, and karst species that are considered rare and/or endemic within the state. Jason is also the agency expert on conservation rank calculation and protocols, having given many presentations and instructional seminars on the topic. Recently, Jason and a panel of experts reviewed all fish species in Arkansas and assigned state conservation ranks, which will be used by conservation agencies for future conservation planning.

Douglas Zollner is the Director of Conservation Science for The Nature Conservancy, Arkansas Field Office. He has been working with the Conservancy for 20 years. Zollner also serves as the Conservancy's National Fire Restoration Coordinator, coordinating Conservancy efforts to reduce the threat of altered fire regimes to biodiversity across ownerships at landscapes in the U.S. and Mexico. Zollner has over 30 years of working experience with ecological assessments and conservation planning, woodland and watershed restoration, fire ecology, ecological modeling, and developing and implementing measures of conservation success in an adaptive management context. He received a B.S. from the University of Arizona in Watershed Management and an M.S. from Texas Tech University in the Ecology of Arid Lands.