

RESTORING COASTAL PLAIN LIMESTONE GLADES, WOODLANDS AND SAVANNA OF THE BLACKLAND ECOSYSTEM AT STONE ROAD GLADE NATURAL AREA

Project Summary

Blackland communities of the coastal plain: limestone glades, oak and pine-oak woodlands and savanna will be restored at Stone Road Glade Natural Area by treating infestations of sericea lespedeza, thinning the mid- and understory of pine-oak woodlands, and using prescribed fire. This will address two important conservation action funding priorities and benefit at least nine SGCN known from the site by creating additional high-quality habitat, providing connectivity by reducing fragmentation, and restoring one of the state's rarest ecosystems to benefit Arkansas Wildlife Action Plan species of greatest conservation need.



Infestation of sericea lespedeza at Stone Road Glade Natural Area

Project Leader

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SWG Funding Requested: \$34,775 (65%)

Amount and Source of Matching Funds: \$18,725 (35%) will be provided from the Arkansas Natural Heritage Commission

Total Project Costs: \$53,500

NEED: The once abundant blackland ecosystem of the south central United States, with approximately 12 million acres of blackland prairies and woodlands prior to European settlement, was degraded to approximately 100,000 acres (1%) by 1975 with less than 5,000 acres of high-quality habitat. This has decreased further in the last 25 years by conversion to agricultural lands, urbanization, and other land uses.

The blackland region of Arkansas is located in the southwestern part of the state including parts of seven counties in the coastal plain. Within this area, calcareous soils such as limestone, chalk, and marl support blackland prairie, glade, woodland, and forest communities which are interspersed amongst the acidic pine and hardwood forests typical of the coastal plain.

The glades of the coastal plain are a unique community which occurs on a narrow, discontinuous band of outcropping limestone in only three of the blackland region's counties (Sevier, Howard, and Pike). The flora and fauna of the coastal plain limestone glades are very similar to the blackland prairies due to the similarity of the alkaline soils and the glade plant community is treated as the dry blackland prairie plant association within the West Gulf Coastal Plain Calcareous Prairie terrestrial habitat.

Stone Road Glade Natural Area (SRGNA), located in Howard County, supports the largest and highest quality limestone glades remaining in the coastal plain. This 108-acre blackland prairie remnant is owned and managed by the Arkansas Natural Heritage Commission (ANHC). The natural area consists of an array of blackland community types including limestone glade (dry blackland prairie), oak and pine-oak blackland woodland/savanna, and riparian blackland forest. This mosaic of plant communities supports nine known Arkansas Wildlife Action Plan species of greatest conservation need (SGCN).

The open, prairie like glades at SRGNA support the Byssus skipper and red milkweed beetle, both of which are dependent on host prairie plants to complete their life cycle. Another habitat specialist found at SRGNA is the Diana fritillary; adults feed on nectar producing plants in the glades and woodlands and caterpillars feed on woodland violets. Grassland and woodland priority birds such as Northern Bobwhite, Brown-headed Nuthatch, and Prairie Warbler have also been observed at the site.

Like many grasslands, the limestone glades and associated woodlands of the coastal plain have undergone fire exclusion in the past century. Examination of historic aerial photos and General Land Office survey notes of SRGNA indicate that glades and savannas declined in extent and open woodlands virtually disappeared between 1955 and 1993. Although much work has been conducted at SRGNA to reverse this condition, the blackland communities have not yet reached desired conditions. Additional work is needed to provide a larger landscape of high-quality habitat to support SGCN and thus allow for subsequent natural population expansion. For instance, *sericea lespedeza*, an aggressive non-native plant, has infested portions of the glades, woodlands and savanna. It is localized and treatable along the perimeter of the natural area but is spreading into the interior along skid trails. This plant aggressively colonizes bare soil, readily seeds, and spreads rapidly forming dense monotypic patches. It will out-compete prairie and glade plants, thereby lowering site diversity and quality. Work is also needed to restore the pine-oak woodlands at the site. Previous management thinned the overstory but mid- and understory habitat management is needed to provide the structure and composition preferred by grassland and woodland SGCN.

Specifically this project will address two 2012 Arkansas Wildlife Action Plan (AWAP) priority actions for: (1) Woodlands, Savannas, and Glades – habitat management to maintain or increase habitat quality for SGCN, and (2) Grassland Birds – manage landscapes for native

grasslands. Because so much of the blackland ecosystem has been lost in Arkansas, restoration of remaining habitat is needed to optimize benefits for SGCN.

LOCATION OF WORK: Project activities will restore blackland communities of the West Gulf Coastal Plain Calcareous Prairie terrestrial habitat within the South Central Plains Ecoregion at Stone Road Glade Natural Area in Howard County (Figure 1).

OBJECTIVES: Project completion will take two years. The objectives of this proposal are:

1. Decrease the abundance of sericea lespedeza and other non-native invasive plants to promote native grasses and forbs and restore species composition by reducing non-native plant coverage by 60-90% on 12-acres.
2. Restore habitat structure and species composition in pine-oak woodlands by reducing shade-tolerant shrub and midstory cover by 60-90% on 15 acres.
3. Restore a fire regime to increase the amount and quality of grassland habitat and woodland grassland understory on 108-acres with an average 70% unit coverage.
4. Measure progress towards desired ecological conditions by monitoring habitat response and response of species of greatest conservation need.

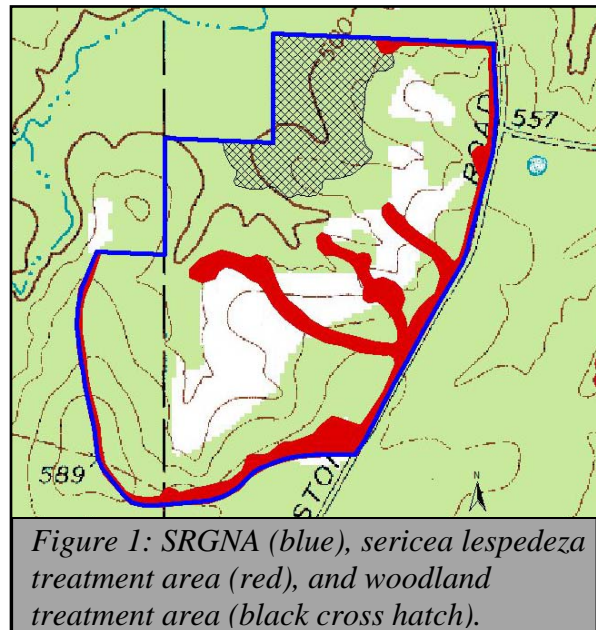


Figure 1: SRGNA (blue), sericea lespedeza treatment area (red), and woodland treatment area (black cross hatch).

APPROACH: Objectives 1 and 3 will be addressed in both years of the project period. Sericea lespedeza will be treated using a method developed between The Nature Conservancy, ANHC, and the Department of Defense which includes a regime of mechanical, chemical, and prescribed burning treatments. A legume specific herbicide will be applied to infested areas in the first summer followed by a winter burn to exhaust the seed bank. The next spring, sericea will be mowed with a bush-hog to reduce vigor and lower seed production. Foliar herbicide application will take place during the second summer to prevent plants from producing seeds followed by a second winter burn to reduce any viable seed stock. In the spring of 2014, mechanical and chemical treatments will be conducted on any remaining patches of sericea.

Objectives 2 and 3 will be addressed during both years of the project period. A hand crew will be used to restore structure and composition by thinning the mid- and understory. During the first spring of the project period, we will use foliar, hack-and-squirt, and cut stump herbicide application methods. Efforts will focus on a 15-acre treatment area within the pine-oak woodlands that has an unusually high abundance of shade-tolerant seedlings and saplings, namely sweet gum. Prescribed burning will also be employed to top-kill a portion of the understory and midstory. A follow-up treatment during the second spring of the project period will be required.

Objective 4 will be addressed by conducting baseline and monitoring surveys over the two year period. Habitat response from restoration activities will be monitored by measuring changes in community structure and plant species composition using transects, measuring

immediate post-burn effects, and monitoring photopoints to document removal of undesired species and establishment of native plant species. Surveys for insect SGCN will also be conducted for the Diana, Byssus skipper, and red milkweed beetle.

EXPECTED RESULTS AND BENEFITS: Restoration of degraded blackland glade and oak and pine-oak blackland woodland/savanna at Stone Road Glade will (1) create additional high-quality habitat for grassland and woodland bird and insect SGCN, (2) restore an ecological fire regime that is necessary to maintain this system, (3) provide connectivity by eliminating fragmentation between glade openings, and (4) increase the scale of managed land which will provide a larger landscape to benefit animal SGCN and other wildlife.

This project will benefit nine SGCN (Table 1) documented from SRGNA and should provide benefits to four other priority bird species known from the blackland region. Control and eradication of sericea lespedeza and thinning of woodlands coupled with prescribed fire will restore

Table 1: AWAP SGCN which will benefit from this project (13). Species known from SRGNA are identified in bold (9). AWAP Species Priority Score is listed in parenthesis.

Bachman’s Sparrow (33)	Painted Bunting (11)
Brown-headed Nuthatch (14)	Prairie Warbler (14)
Byssus skipper (31)	Red-headed Woodpecker (14)
Chuck-will’s-widow (14)	Red milkweed beetle (21)
Diana (25)	Whip-poor-will (14)
Lark Sparrow (17)	Yellow-billed cuckoo (14)
Northern Bobwhite (10)	

structure and composition to blackland communities which are rare in today’s landscape. These actions will provide a larger landscape of breeding and wintering habitat to support and encourage population growth of SGCN and other wildlife.

Restoration of blackland communities at SRGNA will also address key AWAP conservation actions of SGCN, such as: restore prairie to achieve habitat connectivity (red milkweed beetle), conduct prescribed burns (Brown-headed Nuthatch), restore native warm season grasses and forbs (Northern Bobwhite), create openings in forests and woodlands (Chuck-will’s-widow), maintain open mature pine forest habitat/maintain or restore historical fire regimes (Bachman’s Sparrow), restore oak-savanna (Red-headed Woodpecker), maintain or restore open habitat with scattered shrubs and trees (Painted Bunting), and maintain or restore a mosaic of grassland with shrub and bare ground components (Lark Sparrow).

BUDGET: The estimated total cost of this project is \$53,500. The federal share is \$34,775 (65%) and the total match is \$18,725 (35%). ANHC will provide non-federal match for restoration activities. Grant funding for salary of ANHC staff will be used for staff paid from non-recurring federal funds.

Category	Total	Match ANHC	Grant
Salary / Benefits	\$ 15,000	\$ 6,225	\$ 8,775
Contract Services	33,000	12,000	21,000
Supplies and Materials	500	500	0
Travel	5,000	0	5,000
Grand Total	\$ 53,500	\$ 18,725	\$ 34,775

ORGANIZATION AND STAFF QUALIFICATIONS

The Arkansas Natural Heritage Commission has worked alongside with other state agencies and private partners to develop a broad understanding of this at-risk ecosystem through years of scientific observation and use of adaptive management in implementation of restoration and conservation techniques. ANHC protects and maintains blackland prairie remnants in Arkansas at several locations including Terre Noire, Nacatoch Ravines, Stone Road Glade, and White Cliffs Natural Areas and has successful experience restoring and protecting blackland prairie and associated communities.

Project Leader: Jennifer Akin is a Conservation Biologist and Plant 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. In her current position, she is responsible for and conducts plant community monitoring projects documenting change in relation to habitat restoration and management activities at Natural Areas located across the state.

Patrick Solomon is a Land Management Specialist for the Arkansas Natural Heritage Commission. A majority of his work focuses on controlling/eradicating invasive plant species on state owned Natural Areas. Patrick received a B.A. from Rhodes College in Memphis, TN. Before working for ANHC, he served as a Peace Corps Volunteer in Central America and worked for The Nature Conservancy in Missouri, North Dakota, Minnesota, and Arkansas.

Dr. Bill Baltosser is a Professor in the Department of Biology at the University of Arkansas at Little Rock. His research interests include conservation biology and community and population ecology. Dr. Baltosser has conducted research on several Arkansas Wildlife Action Plan species of concern. He has completed a study in Arkansas on Diana fritillary (*Speyeria diana*) and is currently working on examining populations of the arogos skipper (*Atryone arogos*) in the Arkansas Valley. He has also performed research on a variety of butterflies in Arkansas and New Mexico.

ALTERNATE BUDGET: An alternate budget is provided at a 50%-50% cost share ratio. This budget change is reflected in Objectives 1 and 2 by the lower percentage provided in the range of treatment coverage. Furthermore, only one prescribed burn and one thinning treatment of the pine-oak woodlands would be conducted during the project period.

Category	Total	Match ANHC	Grant
Salary / Benefits	\$ 11,450	\$ 4,725	\$ 6,725
Contract Services	21,500	13,500	8,000
Supplies and Materials	500	500	0
Travel	4,000	0	4,000
Grand Total	\$ 37,450	\$ 18,725	\$ 18,725