

**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 funding priorities, including the highest priority of the bird taxa team, directly benefitting populations of nine grassland and woodland SGCN known from the site and increase opportunities for additional SGCN in the blackland region. This project will increase the quantity of high-quality habitat, provide connectivity by reducing fragmentation, and restore one of the state's rarest ecosystems to benefit AWAP SGCN.



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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 grassland community that 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 grassland community is treated 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 remnant is owned and managed by the Arkansas Natural Heritage Commission (ANHC). It consists of an array of blackland community types including limestone glade, oak and pine-oak blackland woodland/savanna, and riparian blackland forest. This mosaic of plant communities supports populations of nine species of greatest conservation need (SGCN) at the site.

The open, prairie like glades at SRGNA support the Byssus skipper and red milkweed beetle, SGCN that are dependent on host prairie plants to complete their life cycle. Another habitat specialist found at the natural area is the Diana fritillary; adults feed on nectar producing plants in the glades and woodlands and caterpillars feed on woodland violets. Grassland and woodland bird SGCN, such as Northern Bobwhite, Brown-headed Nuthatch, and Prairie Warbler, also occur at SRGNA.

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 size 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 grasses and forbs, 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. Because so much of the blackland ecosystem has been lost in Arkansas, restoration of remaining habitat occupied by SGCN is needed to optimize benefits for SGCN.

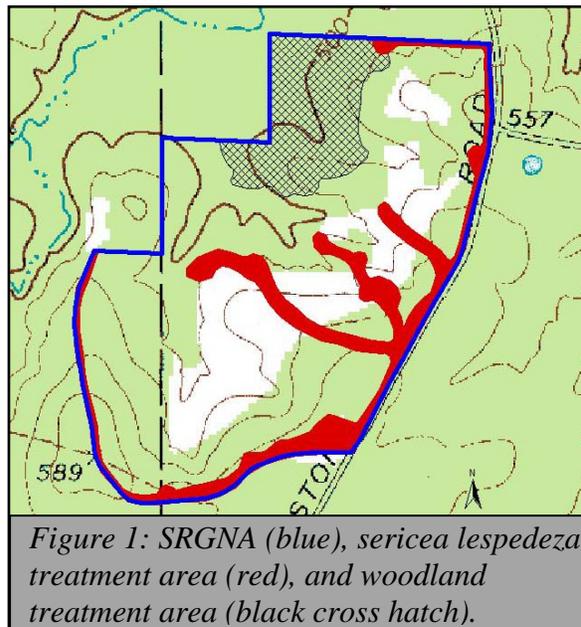
**FUNDING PRIORITIES:** This project will address two 2013 AWAP funding priorities for: (1) Grassland Birds – implementation of habitat restoration and management for native grasslands and (2) Woodlands, Savannas, and Glades – habitat management to maintain or

increase habitat quality for SGCN. Restoration and management of native grasslands for grassland birds is identified in the 2013 State Wildlife Grants RFP as the Bird Taxa Team's highest priority.

**LOCATION OF WORK:** Project will restore blackland communities of the West Gulf Coastal Plain Calcareous Prairie in 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 SGCN.



**APPROACH:** Objectives 1 and 3 will be addressed in both years of the project. Sericea lespedeza will be treated using a method developed by The Nature Conservancy, ANHC, and the Department of Defense, which includes a regime of mechanical, chemical, and prescribed fire 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 second spring, 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. A hand crew will restore structure and composition by thinning the mid- and understory. During the first spring, 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 fire will also be used to top-kill a portion of the understory and midstory. A follow-up herbicide treatment will occur during the second spring of the project.

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 ANHC measuring changes in 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. Dr. Baltosser will conduct surveys for Lepidoptera (Diana and Byssus skipper).

**EXPECTED RESULTS AND BENEFITS:** This project will benefit and increase source populations of SGCN that use SRGNA. Likewise, this will contribute to population dynamics and persistence of populations at other blackland prairie remnants through dispersal events. Restoration of blackland glade and oak and pine-oak blackland woodland/savanna at SRGNA will have the following benefits for SGCN.

- 1.) Increased quantity of high-quality habitat for grassland and woodland SGCN.
- 2.) Increased connectivity by eliminating fragmentation between glade openings.
- 3.) Increased scale of managed land providing a larger landscape benefitting SGCN and other wildlife.

This project will directly benefit populations of nine SGCN (Table 1) known from SRGNA and provide benefits to four other priority birds known from the blackland region.

Control and eradication of sericea lespedeza and thinning of woodlands coupled with prescribed fire will restore 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.

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

Restoration of blackland communities at SRGNA will also address specific SGCN conservation actions identified in the AWAP. These are: 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:** ANHC will provide non-federal match for restoration activities. Grant funding for salary will be used for staff paid from non-recurring federal funds.

<b>Category</b>	<b>Total</b>	<b>Match</b>	<b>Grant</b>
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
<b>Grand Total</b>	<b>\$ 53,500</b>	<b>\$ 18,725</b>	<b>\$ 34,775</b>

## 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 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. A budget change is reflected in Objectives 1 and 2 by reaching the 60% level in treatment coverage (the lower end of the treatment range). Further, only one prescribed burn and one thinning treatment of the pine-oak woodlands would be conducted during the project period.

Category	Total	Match	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
<b>Grand Total</b>	<b>\$ 37,450</b>	<b>\$ 18,725</b>	<b>\$ 18,725</b>