2009 Arkansas State Wildlife Grant Pre-proposal

RESTORING BLACKLAND PRAIRIE AND OAK-HICKORY WOODLAND AT TERRE NOIRE NATURAL AREA TO BENEFIT SPECIES OF GREATEST CONSERVATION NEED

Project Summary

Eastern red cedar will be removed and prescribed fire applied to restore blackland prairie and woodland community structure and composition on recent land additions (185-acres) to Terre Noire Natural Area (TNNA). This will create a larger block of quality blackland habitat and provide connectivity to existing high-quality blackland communities at TNNA. Surveys to monitor response of habitat and Arkansas Wildlife Action Plan species of greatest conservation need (SGCN) will be conducted. This project will address two conservation action funding priorities and benefit several SGCN.

Project Leader
Jennifer Akin, Plant Community Ecologist
Arkansas Natural Heritage Commission
1500 Tower Building, 323 Center Street
Little Rock, AR 72201
(501)324-9763, Fax (501)324-9618
JenniferA@arkansasheritage.org

Project Partners
Brad Townsend
Arkansas Game and Fish Commission
(877)777-5580
batownsend@agfc.state.ar.us

Seth Pearson
The Nature Conservancy
(501)912-9080
spearson@tnc.org

Dr. Bill Baltosser, Professor, Department of Biology
University of Arkansas at Little Rock
(501)569-3521
whbaltosser@ualr.edu

Diana fritillary (male) feeding on purple coneflower at Terre Noire Natural Area

---

SWG Funding Requested: $28,500 (50%)

Amount and Source of Matching Funds: $28,500 (50%) will be provided from the Arkansas Natural Heritage Commission and Arkansas Game and Fish Commission

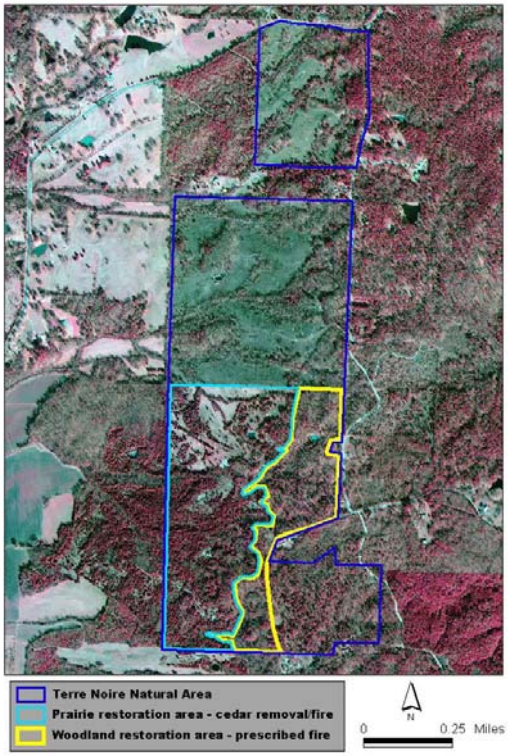
Total Project Costs: $57,000

FUNDING PRIORITIES (2) AND ADDITIONAL PROJECT ATTRIBUTES (3): This project will restore 185-acres of blackland prairie and oak-hickory woodland at Terre Noire Natural Area (TNNA) by removal of eastern red cedar and use of prescribed fire. Two conservation action funding priorities will be addressed: (1) Prairie and Native Grasslands, Habitat Management to maintain or increase habitat quality – including forest management for SGCN, and (2) Oak Woodlands, Habitat Management to maintain or increase habitat quality – including forest management for SGCN.

This on-the-ground restoration project implements conservation actions outlined in the Arkansas Wildlife Action Plan (habitat restoration/improvement; fire management and threat abatement) and will serve as a demonstration site for similar projects on other state, federal and private lands. The project integrates Arkansas Wildlife Action Plan priorities with other natural resource efforts as part of a larger, long-term, multi-partner conservation endeavor to restore and maintain viable blackland ecological communities in Arkansas. This project will benefit several species of greatest conservation need (Table 1) while also benefiting other wildlife.

ECOREGION WHERE PROJECT WILL BE CONDUCTED: Project activities will restore blackland prairie and associated oak-woodlands of the West Gulf Coastal Plain Calcareous Prairie terrestrial habitat located within the Blackland Prairie subdivision of the South Central Plains Ecoregion at Terre Noire Natural Area in Clark County, Arkansas (Figure 1).

Figure 1: Grant project area.



NEED: Blackland prairies and woodlands were historically abundant in south central United States occurring primarily in northeast and east central Texas, with smaller tracts in southwest Arkansas, northwest Louisiana, Mississippi and Alabama. Prior to European settlement, there were approximately 12 million acres of this blackland ecosystem. In 1975, approximately 1% (~100,000-acres) of the blackland ecosystem remained as remnant tracts with less than 5,000-acres of high quality habitat. This amount has decreased further in the last 25 years by conversion to agricultural lands, urbanization, and other land uses. Major threats to blackland remnants include altered fire regimes, establishment and encroachment of invasive native and non-native plant species (eastern red cedar and white sweet clover), conversion to non-native pasture grasses (tall fescue and bermuda grass), and habitat fragmentation through development.

TNNA is one of the highest quality blackland prairie complexes remaining in the state. It is co-owned by the Arkansas Natural Heritage Commission (ANHC) and The Nature Conservancy (TNC). Protection of tracts within the larger Terre Noire Conservation Area began in 1988 with acquisition of a 75-acre parcel. The natural area has grown to more than 494-acres as additional parcels were acquired; the most recent include two properties (a total of 250-acres) acquired in 2007 and 2008. The site consists of an array of blackland community types including prairie, oak-hickory woodlands, oak and pine-dominated forests, and bottomland oak forests. This mosaic of plant communities supports nine known Arkansas Wildlife Action Plan species of greatest conservation need and seven species of rare plants of state concern. In addition, an undescribed burrowing crayfish (*Procambarus* sp. nov.) was discovered in open blackland prairie at Terre Noire in 2004. TNNA and Rick Evans Grandview Prairie Wildlife Management Area are the only known locations for this apparently rare species.

Grassland associated birds such as Henslow's Sparrow (*Ammodramus henslowii*) and Painted Bunting (*Passerina ciris*) and woodland birds including Bachman's Sparrow (*Aimophila aestivalis*) and Yellow-billed Cuckoo (*Coccyzus americanus*) have also been observed at TNNA. In addition, TNNA is one of only two sites in Arkansas known to host an anthophorid bee (*Tetraloniella albata*) which appears to be a pollen-specialist dependent solely upon purple prairie clover, an indicator of good quality blackland prairie. Another habitat specialist found at TNNA is the Diana fritillary (*Speyeria diana*). Diana adults feed on nectar producing plants in the prairie and woodlands and caterpillars feed on woodland violets, the host plant.

Fire is the most important ecological process maintaining the distribution, composition and diversity of blackland prairie, woodland and forest communities. Decades of fire suppression have altered the species composition and structure of prairie and woodlands on the new additions at TNNA. Prairie openings have declined in size due to encroaching woody vegetation and coupled with grazing likely facilitated the invasion of eastern red cedar and other woody species. It also facilitated woody succession in the oak-hickory woodlands resulting in high stem density and a minimal herbaceous layer.

Because so much of the blackland ecosystem has been lost in Arkansas, restoration of remaining habitat is needed to optimize benefits for species of greatest conservation need. Restoration of degraded blackland prairie and woodlands at TNNA will increase habitat productivity for grassland and woodland bird and insect species of conservation concern by increasing foraging and breeding habitat and increasing connectivity by eliminating fragmentation within the natural area.

PROJECT GOAL/OBJECTIVES: Restore blackland prairie and oak-hickory woodland habitat structure and species composition to benefit species of conservation concern, measure progress toward desired ecological conditions, and monitor the effects on species of greatest conservation need.

This project directly addresses conservation actions identified in Arkansas Wildlife Action Plan species reports including restore prairies to achieve habitat connectivity (anthophorid bee), maintain or restore historical fire regimes (Bachman's Sparrow), restore native grasslands (Henslow's Sparrow), and restore native warm season grasses and forbs (Northern Bobwhite). These actions will be accomplished through a combination of mechanical cedar removal and prescribed fire restoring blackland prairie and woodlands on 185-acres of the recent acquisitions adjoining the natural area. Restoration of the area will provide habitat connectivity and reduce fragmentation within TNNA. Project completion will take two years.

Objectives:

1. Increase the amount of sunlight to promote native grasses and forbs and restore habitat structure and species composition by reducing eastern red cedar cover by 60-90% on 80-acres.
2. Restore suppressed ecological processes, namely fire, to increase the amount and quality of grassland habitat and woodland grassland understory on 185-acres with an average 65% unit coverage.
3. Measure progress towards desired ecological conditions by monitoring habitat response and response of species of greatest conservation need.

METHODS: Objective 1 will be addressed in both years of the project period. Eastern red cedar will primarily be removed using a Hav-Roc tree saw, an implement developed specifically for cedar removal, attached to a rented multi-terrain loader. Cedar will be cut, piled and burned after a drying period. In addition, cedar will be injected and girdled in areas of large diameter trees too large to fell or where stem density is too high to cut and pile for burning. Mechanical removal of cedars is necessary because the abundance and size of the cedars in the prairie openings reduces ground wind speed thereby reducing intensity of fire. In addition, shading by cedars has reduced fuel loads, further reducing fire intensity which results in less cedar kill during prescribed burns.

Objective 2 will be addressed in both years of the project period. The reintroduction of fire will reduce woody vegetation that has become established as a result of fire suppression, favor native warm

season grasses and forbs, increase the size and connectedness of prairie openings, restore structure to adjacent woodlands, and invigorate the herbaceous layer of prairie and woodlands.

Objective 3 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 the line-intercept method along transects (prairie), measuring immediate post-burn effects (prairie and woodlands), and monitoring photopoints to document removal of eastern red cedar and establishment of native plant species (prairie). Surveys for insect species of greatest conservation need will also be conducted for the Diana fritillary (prairie and woodlands), an anthophorid bee (prairie), and a robberfly (prairie).

MEASUREABLE PRODUCTS/OUTCOMES: Restoration of the degraded blackland prairie and oak-hickory woodlands at Terre Noire will (1) increase suitable habitat for grassland and woodland bird and insect species of conservation concern, (2) help restore an ecological fire regime that is necessary to maintain blackland prairie communities for species of conservation concern, and (3) provide connectivity of restored habitat to existing, high-quality blackland prairie and woodland in adjacent portions of TNNA.

Reintroduction of fire coupled with removal of cedar will restore community structure to the degraded blackland prairie and oak woodlands, reduce abundance of invasive species, favor native warm season grasses, and invigorate the herbaceous layer thereby increasing the abundance of graminoid and nectar producing plants. Maintaining high plant diversity is essential for nectar feeding species such as the anthophorid bee and Diana fritillary. High plant diversity also attracts greater insect diversity which benefits the robberfly and grassland and woodland birds.

Restoration of degraded blackland prairie and woodland will create a larger block of quality blackland habitat and provide connectivity to existing high-quality blackland communities at TNNA. This project will benefit species of greatest conservation need (Table 1) known from TNNA (nine species and an undescribed crayfish) and should provide benefits to many species observed at Rick Evans Grandview Prairie Wildlife Management Area, species that require large blocks of blackland habitat.

Table 1: *Arkansas Wildlife Action Plan SGCN which will benefit from this project (16). Species known from Terre Noire Natural Area are identified in bold.*

anthophorid bee	Migrant Loggerhead Shrike
Diana	**Northern Bobwhite**
robberfly	Northern Harrier
Texas milkweed beetle	**Painted Bunting**
Bachman's Sparrow	**Prairie Warbler**
Henslow's Sparrow	Sedge Wren
Lark Sparrow	**Yellow-billed cuckoo**
Le Conte's Sparrow	**undescribed crayfish**

EXISTING RESOURCES AND LONGTERM PROJECT MAINTENANCE: ANHC, Arkansas Game and Fish Commission (AGFC), and TNC the have worked closely together for more than a decade to restore and monitor existing blackland preserves as well as expand blackland conservation efforts. Habitat restoration activities will be conducted by ANHC and TNC staff with assistance from AGFC. Dr. Bill Baltosser of the University of Arkansas at Little Rock and ANHC staff will survey and monitor response of habitat and species of greatest conservation need. Once restored, management activities to maintain habitat will be incorporated into ANHC and TNC annual stewardship budgets.

BUDGET: The estimated total cost of this project is $57,000. The federal share is $28,500 (50%) and the total match is $28,500 (50%). ANHC and AGFC will provide non-federal match for restoration activities and survey work (operating expense). Capital expense is not a component of this project.

Category	Total	Match ANHC	Match AGFC	Grant
Salary / Benefits	$ 14,100	$ 0	$ 0	$ 14,100
Operating Expenses	42,900	23,500	5,000	14,400
Grand Total	$ 57,000	$ 23,500	$ 5,000	$ 28,500

ORGANIZATION AND STAFF QUALIFICATIONS

The Arkansas Natural Heritage Commission, The Nature Conservancy, and the Arkansas Game and Fish Commission have successful experience restoring and protecting blackland prairie communities. They have worked together and with 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. Each agency protects and maintains blackland prairie remnants in Arkansas. The Arkansas Game and Fish Commission's Rick Evans Grandview Prairie represents the largest, contiguous tract of blackland prairie in public ownership in the nation.

Project Leader: Jennifer Akin is a 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.

Michael D. Warriner is a field ecologist with the Arkansas Natural Heritage Commission. In that role, Warriner conducts surveys on animal species of conservation concern, particularly invertebrates. He also coordinates citizen-science activities for the agency, including forming partnerships with volunteer groups. Warriner holds B.S. and M.S. degrees in Biology.

Brad Townsend has worked as the Habitat Biologist for the Arkansas Game and Fish Commission since 2003. He received a B.S. Degree in Forestry from the University of Arkansas at Monticello in 2003. His work area includes seven counties, and Wildlife Management areas in Southwest Arkansas, including Rick Evans Grandview Prairie WMA, the largest contiguous tract of Blackland Prairie in Public Ownership in the nation. He is a member of the Society of American Foresters and an Arkansas Registered Forester.

Seth Pearson has been an employee of The Nature Conservancy for over four years and serves as the Land Steward for the Arkansas Field Office. Seth is responsible for planning and implementing stewardship and restoration work on preserves through out the state. He is also active in prescribed fire implementation throughout the state. Seth graduated from Purdue University with a Bachelors of Science Degree in Biology with a specialization in Ecology, Evolution, and Population Biology. The Nature Conservancy owns, and is experienced with the use of, a Hav-Roc tree saw which was developed specifically for cutting eastern red cedar. Successful prairie restoration via eastern red cedar removal has been accomplished on TNC preserves and ANHC Natural Areas.

Douglas Zollner is the Director of Conservation Science for TNC, Arkansas Field Office. He has been working with the Conservancy for 12 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 US and Mexico. Zollner has over 25 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 a M.S. from Texas Tech University in the Ecology of Arid Lands.

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 (*Atyrone arogos*) in the Arkansas Valley. He has also performed research on a variety of butterflies in Arkansas and New Mexico.