2009 Arkansas State Wildlife Grant Pre-proposal

RESTORING DOLOMITE GLADE AND FEN HABITAT IN THE ARKANSAS OZARKS

Project Summary

Dolomite glades and an Ozark fen will be restored at Rock Creek Natural Area (RCNA) and Harold E. Alexander WMA through removal of invasive woody species and use of prescribed fire. This will restore a rare natural community in Arkansas (the fen), provide connectivity between glades, and create quality open glade habitat that is currently absent from RCNA. 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.

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Ozark fen at Rock Creek Natural Area

SWG Funding Requested: $31,500 (50%)

Amount and Source of Matching Funds: $31,500 (50%) will be provided from the Arkansas Natural Heritage Commission and Arkansas Game and Fish Commission

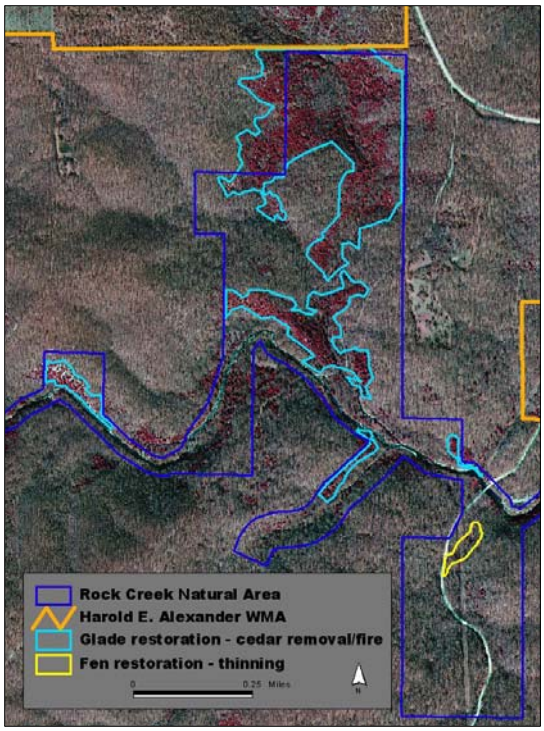
Total Project Costs: $63,000

FUNDING PRIORITIES (2) AND ADDITIONAL PROJECT ATTRIBUTES (3): A system of glades and a seep-fen community (88-acres) at Rock Creek Natural Area (RCNA) and Harold E. Alexander Wildlife Management Area (WMA) will be restored through removal of invasive woody species and use of prescribed fire. This project addresses two conservation action funding priorities: (1) Glades, Habitat Management to maintain or increase habitat quality – including forest management for species of greatest conservation need (SGCN), and (2) Seeps, 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 and threat abatement) and will serve as a demonstration site for similar projects on other state, federal and private lands. It also integrates Arkansas Wildlife Action Plan (AWAP) priorities with natural resource efforts of the Arkansas Game and Fish Commission (AGFC) as part of a larger, long-term, multi-partner conservation endeavor to restore and maintain the glade/woodland assemblage of communities of Wildlife Management Areas in the Arkansas Ozarks. This project will benefit several SGCN (Table 1) while also benefiting other wildlife.

ECOREGION WHERE PROJECT WILL BE CONDUCTED: Project activities will restore glade and fen communities of the Central Interior Highlands Calcareous Glade and Barrens and Ozark-Ouachita Riparian terrestrial habitats in the Ozark Highlands Ecoregion at Rock Creek Natural Area and Harold E. Alexander WMA in Sharp County, Arkansas (Figure 1).

Figure 1: State Wildlife Grant project area.



NEED: European settlement dramatically altered the structure and composition of native natural communities in the Ozark Highlands through fire suppression, introduction of exotic species, stream modification, habitat fragmentation and land use conversion. This created new successional trajectories for our natural communities, resulting in declines of biodiversity and increases in the number of species considered imperiled.

RCNA contains one of the highest concentrations of rare plant species in Arkansas. Eighteen rare plants occur in a series of calcareous seep-fen and dolomite glade communities along Rock Creek and its tributaries. Rock Creek, a tributary of the Spring River, has high water quality due to several springs feeding into the creek and the lack of development in the creek's watershed. The 415-acre natural area lies within the 13,444-acre Harold E. Alexander WMA and is co-managed by the Arkansas Natural Heritage Commission (ANHC) and the AGFC.

The area consists of a mosaic of oak-hickory forest, woodland and savanna interspersed with dolomite glades, and Ozark fens. Fens are the result of groundwater percolating through limestone or dolomite which then seeps or flows to the surface. They are rare in Arkansas, restricted to counties in the Central Plateau. Several types of fens are present at RCNA including forested fens and open (treeless) fens. The dolomite glades and fens support a specialized flora and fauna not present in the surrounding forested matrix. These fens are the southern-most large refugia known for many northern fen species, as indicated by disjunct populations of numerous plant species. In addition, the Ozark Clubtail Dragonfly, an AWAP SGCN, has also been documented at Rock Creek and represents an extreme eastern extension.

Open glades provide valuable habitat for priority birds (Painted Bunting, Bachman's Sparrow, Chuck-will's-widow, and Prairie Warbler) and xeric-adapted animal species (Scrubland Tiger Beetle).

An apparently rare species, the Lichen Grasshopper (*Trimerotropis saxatilis*), known only from four sites in Arkansas, is speculated to be closely tied to the ecological quality of glades. Research indicates that populations of this species, which will be submitted as an addition to the AWAP, increased when management improved glade quality through prescribed fire and reduction of woody species.

Studies of Ozark fens in Missouri found an array of rare arachinids, odonates, and orthopterans highly associated with fens. The federally listed endangered Hine's Emerald Dragonfly has been found in Ozark fens just over the Arkansas border in Missouri; RCNA is located 18 miles south of the Missouri border. Staff from the Fish and Wildlife Service have searched for the dragonfly at Rock Creek without luck but agree that the habitat looks suitable to support the species. Continued surveys are warranted because at many sites multiple surveys across years were needed before the species was discovered.

Dolomite glades and an Ozark fen at RCNA are degraded and have declined in size due to fire suppression. These communities contain high woody plant stem densities, increased litter and duff, a minimal herbaceous layer, and invasive species (e.g., eastern red cedar). The structural and compositional conversion of these habitats is detrimental to the specialized flora and habitat-dependent animal species of conservation concern. Restoration of these communities is necessary for the long-term survival of these species. We propose active management including thinning/removing invasive woody species and using prescribed fire to restore dolomite glades and an Ozark fen (a rare natural community) at RCNA and adjacent glade habitat at Harold E. Alexander WMA. Restoration will increase habitat quality, patch size, and connectivity of habitats thereby providing foraging and breeding habitat and facilitating metapopulation dynamics.

PROJECT GOAL/OBJECTIVES: Restore dolomite glades and fen 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 create openings in woodlands and forests (Chuck-will's-widow), restore native warm season grasses and forbs (Northern Bobwhite), and maintain or restore open habitat with scattered shrubs and trees (Painted Bunting). These actions will be accomplished through mechanical cedar removal followed by prescribed fire on the dolomite glades and thinning of hardwood species in the fen. Project completion will take two years.

Objectives:

1. Increase the amount of sunlight and reduce leaf litter and duff to promote native grasses and forbs and restore habitat structure and species composition by reducing eastern red cedar cover by 60-90% on 86.5-acres of dolomite glades (ANHC 73.5-acres, AGFC 13-acres).
2. Restore suppressed ecological processes, namely fire, to increase the amount and quality of grassland habitat on 80-acres of dolomite glades with an average 70% unit coverage.
3. Restore habitat structure and species composition by reducing the shrub and midstory cover by 40-60% on 1.5-acres of Ozark fen.
4. Measure progress towards desired ecological conditions by monitoring habitat response and response of species of greatest conservation need.

METHODS: Objective 1 will be addressed during the first year of the project period. Eastern red cedar will be mechanical removed, piled, and burned after a drying period. Mechanical removal of cedars is necessary because the abundance of cedars has affected fire intensity through reduced 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 during the second year 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, invigorate the herbaceous layer, and increase the size and connectedness of glade openings. An established burn unit (330-acres) will be used to treat the mosaic of glades with

prescribed fire. The burn unit consists of 80-acres of glades and 250-acres of surrounding oak-woodlands. The remaining 6.5 acres of glades will also be treated for cedar removal but lie outside the burn unit and will be treated with fire in a subsequent year beyond the grant project period.

Objective 3 will be addressed during the first year of the project period. Hardwood shrubs and small trees will be cut, the stumps treated with herbicide, and the slash burned or removed from the site. A hand crew will remove unwanted vegetation to minimize disturbance to the delicate nature of this calcareous system and a moderate level of vegetation will be removed to mitigate adverse effects on groundwater levels which support the unique flora and fauna.

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 permanent plots and transects (glade and fen) and monitoring photopoints to document removal of woody species and establishment of native plant species (glade and fen). Surveys will be conducted to assess the projects impacts on SGCN and will focus on insect and amphibian species.

MEASUREABLE PRODUCTS/OUTCOMES: Restoring the degraded dolomite glades and Ozark fen at Rock Creek and Harold E. Alexander WMA will (1) increase suitable habitat for animal SGCN, (2) restore a rare natural community (fen) to benefit species of conservation concern, (3) provide connectivity by restoring glades that have become disjunct due to encroachment of woody species, and (4) create quality open dolomite glade habitat that is currently absent from RCNA. Reintroduction of fire coupled with mechanical removal of woody species will restore community structure, reduce abundance of invasive species, favor native warm season grasses, and stimulate the herbaceous layer.

This project should benefit several SGCN (Table 1) dependent on glades and wetlands (fen) and possibly two other rare species: the Lichen Grasshopper and the federally listed Hine's Emerald Dragonfly. Restoration activities will help mitigate problems faced by SGCN that are identified in the AWAP, such as habitat loss and degradation, and fire suppression within glade habitat (Swamp Metalmark, Painted Bunting, and Scrubland Tiger Beetle). All species in Table 1 have been documented in nearby portions of the eastern Ozarks and therefore provide opportunities for dispersal from source populations once habitat is restored.

Table 1: *Arkansas Wildlife Action Plan SGCN which should benefit from this project (13). All species are known to occur in the eastern Ozarks.*

Ozark Clubtail Dragonfly	Bachman's Sparrow
Ozark Snaketail Dragonfly	Chuck-will's-widow
Scrubland Tiger Beetle	Northern Bobwhite
Swamp Metalmark	Painted Bunting
Four-toed Salamander	Prairie Warbler
Ringed Salamander	Yellow-billed cuckoo
Blue-winged Warbler	

EXISTING RESOURCES AND LONGTERM PROJECT MAINTENANCE: Habitat restoration activities will be a joint partnership between ANHC and AGFC completed through contracts and agency staff. ANHC staff will survey and monitor response of habitat and SGCN. Once restored, management activities to maintain habitat (e.g., prescribed fire) will be incorporated into each agency's annual stewardship budgets. Prescribed fire will prevent fire intolerant eastern red cedars from reestablishing and will maintain fen vegetation vigor.

BUDGET: The estimated total cost of this project is $63,000. The federal share is $31,500 (50%) and the total match is $31,500 (50%). ANHC and AGFC will provide non-federal match for restoration activities (salary/benefits and operating expense). Capital expenses are not a component of this project.

Category	Total	Match ANHC	Match AGFC	Grant
Salary / Benefits	$ 27,500	$ 0	$ 1,500	$ 26,000
Operating Expenses	35,500	29,075	925	5,500
Grand Total	$ 63,000	$ 29,075	$ 2,425	$ 31,500

ORGANIZATION AND STAFF QUALIFICATIONS

The Arkansas Natural Heritage Commission 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. 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 this information which is then factored into land management practices at the state, regional, and national levels. ANHC has proven success in restoring degraded glade and prairie habitats through removal of invasive woody species such as eastern red cedar and use of prescribed fire. Areas of Middle Fork Barrens, Saratoga Blackland Prairie, and Terre Noire Natural Areas were restored using these techniques and support a rich diversity of rare plant and/or animal species of conservation concern.

The mission of the Arkansas Game and Fish Commission is to wisely manage all the fish and wildlife resources of Arkansas while providing maximum enjoyment for the people. "The control, management, restoration, conservation, and regulation of birds, fish, game and wildlife resources of the State, including hatcheries, sanctuaries, refuges, reservations and all property now used for said purposes and the acquisition and establishment of same, the administration of the laws now and/or hereafter pertaining thereto" is vested in the Arkansas Game and Fish Commission by Amendment 35 to the Arkansas Constitution, approved in the general election of November 7, 1944.

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.

Doug Fletcher is the Chief of Stewardship for the Arkansas Natural Heritage Commission. Doug received a B.S. in Wildlife Management and a M.S. in Biology from Arkansas State University at Jonesboro, Arkansas. Doug has conducted numerous herpetological surveys in several areas across the State of Arkansas and has documented county records and range extensions resulting from the survey work.

Eddie Linebarger is the Regional Supervisor of the Eastern Ozarks AGFC region and has worked for the Commission since April 1972. He received a B.S. Degree from Arkansas Tech University in 1971. He worked on Wildlife Management Areas and private land management for 20 years, served as Regional Coordinator for 6 years, and as Regional Supervisor for over 9 years. He has worked extensively on early successional habitat management, post-oak savannah restoration and pine and pine-oak woodland restoration efforts. He has been closely connected with Bobwhite Quail management efforts throughout the State and serves on the State Quail Committee, the AGFC Quail Committee and the Southeast Quail Study Group.

Martin Blaney is the statewide Habitat Coordinator for the AGFC. He has served the agency for 23 years with the responsibility of coordinating many habitat-related contractual projects on state-owned Wildlife Management Areas. Since graduation from the University of Arkansas at Monticello with a B.S. Degree in Forestry in 1979, he has gained vast experience in forest resource management, including prescribed fire, as well as conducting landscape level habitat restoration projects.