Oak Woodland, Savanna, and Nepheline Syenite Glade Habitat Restoration at the Audubon Arkansas Center

Restoration of oak woodland, oak savanna, and nepheline syenite glades will benefit Arkansas Wildlife Action Plan Species of Greatest Conservation Need at the Audubon Arkansas Center in Little Rock. These systems will be restored through the use of prescribed fire, as well as mechanical and chemical removal of invasive plant species. The project will benefit a suite of grassland and woodland birds and other species of conservation concern, and be a visible demonstration to an urban audience.

Project Leader

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Nepheline syenite glade at the Audubon Center.

Project Partners

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Total Project Cost: $59,119
Total SWG Money Requested: $37,859

Sources and Amounts of Matching Funds/In-kind Services
Audubon Arkansas (equipment, volunteers): $11,160
Arkansas Game & Fish Commission (equipment, technical assistance): $10,100
Total Match: $21,260 (36%)

A. Need

This project will increase the quality of oak woodland, oak savanna, and nepheline syenite glade habitats for Species of Greatest Conservation Need (SGCN; Table 1) through prescribed fire, cedar removal, and invasive species eradication. This will occur at the Audubon Arkansas Center in southeastern Little Rock and adjacent private property. Audubon has a 99-year lease on 480 acres that includes approximately 30 acres of nepheline syenite glades and surrounding oak woodland and 45 acres of oak savanna. McGeorge Construction Company owns approximately 40 acres of nepheline syenite glades and surrounding oak woodland adjacent to Audubon's Center.

These fire-dependent ecosystems are degraded due to decades of fire suppression. Invasive species such as eastern red cedar, Chinese privet, saltbush, Bradford pear, crabapple, Johnson grass, Bermuda grass, and common vetch dominate the more open areas.

Nepheline syenite glade is the most significant biological community in Pulaski County. Nepheline syenite glades are among the rarest of the igneous outcrop-based ecosystems in the South and are considered globally critically imperiled (G1; NatureServe); there are fewer than five locations worldwide. The project site was once known to have an occurrence of the globally imperiled small-headed pipewort. We anticipate that prescribed fire treatment will eventually allow the species to return.

B. Objectives

Our primary goal is to begin restoring oak woodland, oak savanna, and nepheline syenite glade habitat structure and species composition to benefit at least 11 SGCN (Table 1). Our objectives are to:

1. Initiate a 3-5 year burn regime to maintain stand structure, allow regeneration of native plant species, and create suitable wildlife habitat.
2. Begin restoring the average percentage of native herbaceous groundcover to 50 percent or more.
3. Begin reducing the cover of invasive plant species to less than 10 percent.
4. Allow for the presence and dispersal of associated SGCN.
5. Engage an urban audience in habitat management and conservation of SGCN.
6. Measure progress towards desired ecological conditions by monitoring habitat restoration.

Table 1. Selected SGCN that could benefit from habitat restoration according to the Wildlife Action Plan.

Bachman's Sparrow
Bewick's Wren
Eastern Towhee
Northern Bobwhite
Painted Bunting
Red-headed Woodpecker
Whip-poor-will
Chuck-will's-widow
Yellow-billed Cuckoo
Western Slender Glass Lizard
Meske's Skipper

C. Expected Results & Benefits and Monitoring Methodology

Expected Results

1. Occurrence of the vegetation structure and composition characteristic of our target habitats: oak woodland, oak savanna, and nepheline syenite glade.
2. Occurrence of target species in appropriate habitat during the appropriate season(s).
3. Reduction of invasive plant species.

Benefits to Species of Concern

Restoration of target habitat types will improve the ability of the area to support SGCN. We anticipate that habitat restoration will allow colonization of SGCN that may have been extirpated and are not currently found on site. After restoration, the area will serve as a stepping-stone to other nearby habitat patches.

Monitoring

The Line Intercept (LI) and Cover Frequency (CF) methods will be used to measure the response of stand structure, density and composition of woody vegetation and herbaceous ground cover to restoration. The following parameters will be measured:

1. Percent cover and frequency of conservative glades species, other grasses and sedges, legumes, forbs, vines, evergreen and deciduous woody shrubs using established protocol.
2. Cover of the tree species/groups by size classes.
3. Percent canopy cover of tree species groups along the line transect in different height categories.
4. GIS and photo-monitoring will be used to document the removal of woody vegetation and the establishment of high-quality, native species.

Post-burn monitoring will measure the immediate response of vegetation to prescribed burns: scorch percent for the over- and midstory, scorch height, char height, and char degree in the overstory. Within a 5-m radius we will also record burn severity of the organic substrate and vegetation.

D. Approach

Fire is the most critical ecological process to maintaining the distribution, composition, and diversity of woodland, savanna, and glade communities. The reintroduction of fire should decrease the excessive moss and litter layer on the glades, reduce eastern red cedar, reinvigorate native shrubs, reduce the abundance of non-native species, favor native warm-season grasses, 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.

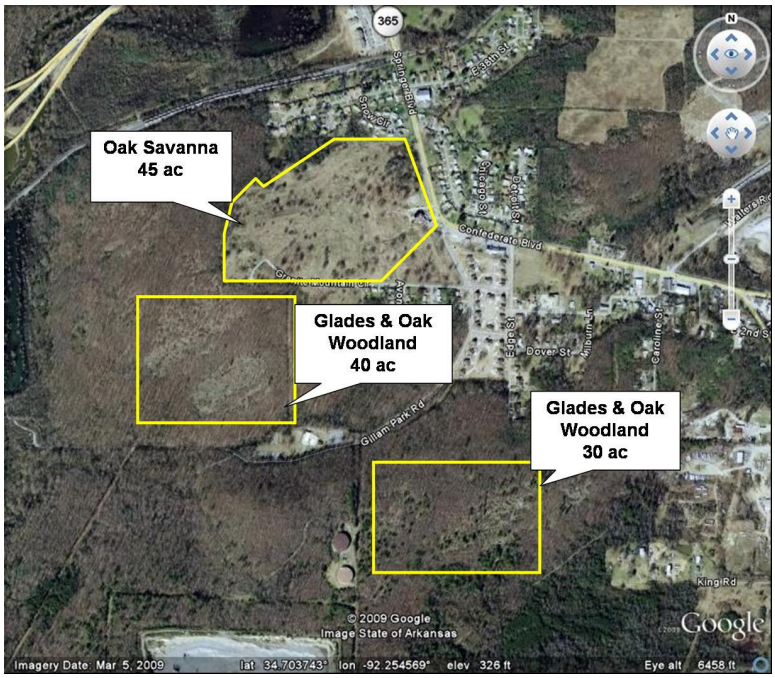

Figure 1. Restoration sites. Boundaries and acreage are approximate.

Audubon will develop the burn plan and The Nature Conservancy will take the lead on implementation of winter 2010/2011 burns. TNC personnel meet all qualifications outlined in U.S. Fish and Wildlife Service's memorandum regarding prescribed burning off-service lands. Because of the urban location we will exercise extra caution. TNC and Audubon will coordinate closely with the City of Little Rock, Little Rock National Airport, Little Rock Fire Department, AR Highway and Transportation Department, the Arkansas Forestry Commission, and the Granite Mountain Community Association. To reduce potential smoke impacts on surrounding smoke-sensitive targets, the burns will be conducted over several days in units of about 10 acres with fire lines surrounding each unit. The Arkansas Forestry Commission will construct fire lines. Audubon will seed lines with annual rye grass or winter wheat to prevent erosion.

In spring 2011 following the burns, Audubon will herbicide the savanna in preparation for reseeding with native warm-season grasses and forbs. Audubon will collect seeds from local sources such as Raft Creek WMA. Currently, the savanna's herbaceous layer is dominated by invasive plants such as Johnson grass,

Bermuda grass, fescue, and common vetch. Audubon will evaluate the extent and amount of application necessary, depending on vegetative response to the fire. AGFC's Pulaski Co. Private Lands Biologist will provide technical assistance and equipment for herbicide application and seed collection and dissemination. In addition, before and after the prescribed burns, Audubon will systematically eradicate woody invasive plant species by applying herbicide to cut stumps.

Audubon will involve volunteers including: Central Arkansas Master Naturalists, Boy Scouts, and Environmental and Spatial Technology (EAST) Labs. These groups have previously volunteered their time to improving habitat and recreational opportunities at Audubon's Center. The volunteers will assist with invasive species control, vegetation monitoring, and GIS mapping. Master Naturalists also will work during the prescribed burns on tasks not directly related to the fire such as supplying drinking water and keeping the public at a safe distance.

E. Location of Work

The project is located in the South Central Plains ecoregion. We will focus on oak woodlands, oak savannas, and nepheline syenite glades of the Audubon Arkansas Center and adjacent McGeorge Construction Company property in southeast Little Rock, Pulaski County.

F. Proposed Budget

	Match	SWG
Audubon Arkansas		
Salary and Benefits (surveys, burn plan, invasive species removal, volunteer management, project coordination, admin, etc.)		$15,000
Audubon equipment (brushcutters, backpack sprayers, boom sprayer)	$2,250[a]	
Volunteers – Central AR Master Naturalists, Boy Scouts, EAST Lab	$8,910[b]	
Herbicide (Roundup)		$900[c]
Fire line construction by AR Forestry Commission		$2,400[d]
Supplies (annual cover grass seed, gloves, flagging, etc.)		$100
Indirect Costs (23%)		$4232[e]
Subtotal	$11,160	$22,632
The Nature Conservancy		
Prescribed fire team		$12,380[f]
Indirect Costs (23%)		$2,847
Subtotal		$15,227
Arkansas Game & Fish Commission		
Equipment and Technical Assistance	$8,700[g]	
Herbicide (Plateau)	$1,400[h]	
Subtotal	$10,100	
TOTAL	**$21,260**	**$37,859**

Budget Justification:
a – Equipment for invasive species removal would cost $50/ac if rented.
b - Volunteers: 440 hours @ $20.25/hr = $8910, broken down into: Central AR Master Naturalists: two volunteers spend ten 8-hr days on burn & invasive species removal = $3,240; five more assist with a single work day = $810; EAST Lab: 3 students and a facilitator spend 40 hours on a habitat monitoring project = $3,240; Boy Scouts: 5 scouts help with invasive species removal on 2 days = $1,620.

c – Roundup: require six 2.5-gal containers @ $150 container. Quantity needed based on extent of woody plant infestation and Audubon's experience exotic species removal.
d – AR Forestry Commission charges $60/hr for fire line construction; sloped, wooded, and rocky terrain will require 2 hours labor per ¼ mile fire line. Need ~5 miles of lines * 8 hours labor/mile = 40 hours * $60/hour = $2,400.
e – Overhead at 23%. Audubon Arkansas is a field office of the National Audubon Society (NAS). Audubon Arkansas depends on the NAS for all services related to personnel, human resources, legal, financial and contractual. Audubon AR therefore pays 15% overhead to NAS on every dollar it expends. Additionally, Audubon AR has expenses related to its state headquarters at 4500 Springer Blvd. where we operate a very low cost operation. A 23% overhead minus the NAS required 15% leaves 8% to cover the overhead of the Arkansas Field Office which is a modest charge
f - Based on a $3,095 per Rx burn unit rate * 4 Rx burns, which is based on:

- 7 TNC personnel (1 RxB2 [burn boss], 2 SRB/ICT4, 4 FFT2)
- 4 ATV with 15 gallons water
- 1 RTV/UTV Type 7 engine (Kubota) with 80 gallons water
- 2 Type 6 Engines with 300 gallons water
- All burn day supplies/equipment which includes drip torch fuel, chainsaw/blower fuel, food, etc.
- Any 'day of burn' burn unit prep (e.g. snags, leaf blowing, etc.)

g - AGFC equipment and technical assistance on grass seed collection and establishment; WHIP pays $160/ac for seed establishment * 45 ac = $7200. Technical assistance from Pulaski Co. Private Lands Biologist Jason Honey @ $50/hr * 30 hr = $1500.
h – Plateau: apply at 18 oz/ac on 45 ac, thus requiring 7 gal @ $200/gal.

Qualifications

Audubon Arkansas' staff has extensive experience in wetlands reconstruction, reforestation, grassland restoration, invasive species control, managing contracts, working with landowners, monitoring, and public outreach. We have technical training and certification in prescribed burning, wildland fire the use of chainsaws, watershed planning, stream morphology, water quality monitoring, GIS, and vertebrate and invertebrate surveys. Audubon has successfully managed multiple government grants including State Wildlife Grants, Ivory-billed Woodpecker Private Stewardship Grant, and the Wetland Reserve Program.

Brent Kelley, Field Programs Coordinator, is the lead manager responsible for the project's success. Since 2006, Mr. Kelley has coordinated and managed multiple field projects including reforestation, stream-bank stabilization, water quality sampling and analysis, and storm water control projects. He has completed prescribed fire training programs I-100, S-190, and RX-300. He received his undergraduate degree in Botany from the University of Arkansas in 2001 and his Master's degree in Forest Entomology in 2006.

Daniel Scheiman, Ph.D., **Director of Bird Conservation**, will assist with invasive species control and habitat and wildlife monitoring. Dr. Scheiman manages Arkansas' Important Bird Areas program and several State Wildlife Grants. He has completed prescribed fire training programs I-100, S-190, and RX-300. He received his B.S. from Cornell University, M.S. from Eastern Illinois University, and Ph.D. from Purdue University, all in wildlife ecology. He has over ten years of bird research experience on topics such as bird-habitat relationships and population dynamics, resulting in several peer-reviewed publications.

The Nature Conservancy (TNC) has worked in the glades and woodlands of Arkansas with our partners for approximately 15 years. TNC has developed a broad understanding of this at-risk ecosystem through years of scientific observation and use of adaptive management in implementation of restoration techniques. TNC maintains an excellent working relationship with conservation organizations such as the Arkansas Natural Heritage Commission. This relationship increases our capacity to organize teams made up of experts in the field of restoration of at-risk habitats. TNC also maintains science and conservation staffs that are trained in implementation of strategic actions and monitoring. Finally, through completion of other restoration activities, TNC has demonstrated the ability to successfully complete this project.

Mike Melnechuk is the **Assistant Director of Stewardship** for the Arkansas Field Office of TNC. His responsibilities include assisting with the implementation of fire management activities in Arkansas as well as stewardship and restoration activities on the various preserves for TNC, the Arkansas Natural Heritage Commission, and military installations. Mr. Melnechuk is also involved with ecological monitoring and herpetological surveys. He coordinates with the Director of Conservation, as to the day to day operations of the seasonal burn crew. He has a Bachelor of Science degree in geography/natural resource management from Western Michigan University.