

CANE BRAKE AND BOTTOMLAND HARDWOOD FOREST HABITAT RESTORATION AT BENSON CREEK NATURAL AREA

Project Summary:

This project addresses the need for habitat management to increase quality of bottomland hardwood forest and canebrake habitat in the Mississippi Alluvial Valley of eastern Arkansas. The objectives of this project are to increase the quality of bottomland hardwood habitat, expand existing cane stands within forests, and prioritize old field sites for restoration and restore cane to selected areas within those sites. Habitat restoration will benefit a variety of wildlife species, including many species of conservation concern.

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Total Project Cost: \$49,200

Request: \$24,600

Matching funds (provided by ANHC and TNC): \$24,600

FUNDING PRIORITY ADDRESSED BY PREPROPOSAL

This preproposal addresses the implementation need for restoration and enhancement of canebrake and bottomland hardwood forest habitat in the Mississippi Alluvial Valley (MAV) to increase habitat quality for species of greatest conservation need (SGCN). Completion of the project will take two years.

ECOREGION WHERE PROJECT WILL BE CONDUCTED

The project presented in this preproposal will be conducted in the MAV ecoregion, specifically at Benson Creek Natural Area (BCNA) located in Monroe County, Arkansas.

PROJECT JUSTIFICATION

Historically, dense stands of cane were a prominent feature of the bottomland hardwood communities of the southeastern United States. Canebrakes were described as covering thousands of acres. Canebrakes occurred on the floodplain terraces beneath sparse forest canopy and also in canopy gaps in upland forest and savanna communities. These stands provide habitat for a variety of wildlife species, such as swamp rabbits and canebrake rattlesnakes, as well as variety of Arkansas Wildlife Action Plan SGCN (see Table 1). After European settlement, large expanses of cane were lost to land conversion for agriculture, alteration of flooding and fire regimes, and overgrazing. An estimated 98% of this ecosystem has been lost. As a result, it has been designated as a critically endangered ecosystem and is a conservation priority in the Southeastern United States.

Forest conditions that promote cane within bottomland hardwood stands are listed by the Lower Mississippi Valley Joint Venture (LMJV) as a component of desired stand conditions in the MAV. The LMJV also recommends taking action to identify areas for cane restoration and to further advance techniques used in restoration.

Natural disturbance processes such as fire are believed essential for long-term maintenance and regeneration of bottomland hardwood forests. Fire also promotes herbaceous layer development in mature open canopy forests and discourages invasion of woody vines and exotic species. The removal of organic buildup in swamps through fire played a role in successional structure and composition of forested wetlands and the maintenance of the ecosystem. Canebrakes are thought to have depended historically on flooding and fire disturbances.

BCNA contains 1,239 acres and is co-owned and managed by the Arkansas Natural Heritage Commission and The Nature Conservancy. It is located along the western side of Bayou De View and comprises cypress-tupelo swamp, bottomland hardwood forest, and cleared terraces. The Natural Area is adjacent to the Cache River National Wildlife Refuge and Dagmar Wildlife Management Area both of which have restorable cane brakes for which this project will serve as a demonstration. The geologic formations comprise older alluvial and terrace deposits from the Mississippi River and Bayou De View and more recent alluvium from adjacent uplands. The topography is flat and elevations run from 170 to 185 feet above mean sea level. Small patches of giant cane (*Arundinaria gigantea*) occur in several stands across the area. The natural area also includes 700 acres of former agricultural fields that have the potential to be restored to bottomland hardwood forest and canebrake habitat.

GOALS AND OBJECTIVES

The primary goal of this project is to enhance and restore bottomland hardwood and canebrake habitat for a variety of species of conservation concern as identified by the 2009 State Wildlife Action Plan Steering Committee (Table 1).

Objectives:

- 1) Increase quality of bottomland hardwood habitat by re-introducing fire on approximately 250 acres.
- 2) Expand existing cane stands within bottomland hardwood forests.
- 3) Prioritize old field sites for restoration and restore cane on selected sites.

METHODS**Objectives 1&2**

Prescribed fire will be restored to approximately 250 acres of bottomland hardwood forest. Prescribed burns will follow a written burn plan and will be conducted by Nature Conservancy staff. The application of fire will stimulate growth of cane, promote the expansion of existing cane stands, and increase habitat quality of the remaining bottomland harwood habitat. To further promote cane expansion, overstory/midstory reduction will be implemented on approximately 20 acres where cane is already dense. Patches of cane on the area treated for midstory/overstory reduction will be monitored to measure success of restoration/expansion.

Objective 3

Old field habitats will be surveyed and prioritized for cane restoration efforts. Restoration sites will be selected based on criteria that make them most suitable for cane planting. These variables will include but are not limited to: 1) soil type 2) drainage 3) adjacency to existing cane stands 4) competition from other vegetation and 5) accessibility. The amount of acres restored will depend on the availability of suitable sites, but should range from 2 to 15 acres.

Before planting, fields will be burned to remove existing vegetation. Herbicide may also be utilized where needed to reduce vegetative competition. Cane will be planted on selected sites using transplants or seedlings derived from tissue culture. Transplants and/or seedlings will be collected/derived from a local donor site to maintain genetic integrity. Fertilizer may be utilized to increase survival of planted cane, if deemed necessary based on site characteristics.

Survivorship of planted cane will be monitored and evaluated post-planting to determine restoration success.

PROJECT OUTCOMES

- Restore fire to 250 acres of bottomland hardwood forests for SGCN.
- Reduce overstory/midstory density on 20 acres over existing cane stands.
- Restoration of canebrake habitat to benefit SGCN.

The reintroduction of fire to bottomland hardwood forests at BCNA will increase habitat quality by removing organic debris build-up, promoting herbaceous vegetation, reducing invasive species, and restoring site appropriate structure and species composition. The application of fire will also stimulate cane growth and promote cane stand expansion across the forest.

Reduction of the overstory and midstory will create a more open canopy to promote the expansion of existing cane stands. The restoration of cane to old field sites will increase habitat availability for SGCN that rely on or prefer cane for foraging, cover, and nesting habitat.

In addition, this project will generate a method for prioritizing and selecting field sites for cane restoration which may be utilized at other sites in the MAV. This project will also serve to increase our understanding and knowledge of the efficacy of the utilized cane restoration techniques.

Table 1. Species of Greatest Conservation Need to Benefit from Restoration Activities.

Class	Common Name	Scientific Name	Habitat ¹
Insecta	Carolina roadside skipper	<i>Amblyscirtes carolina</i>	C
Insecta	Lace-winged roadside skipper	<i>Amblyscirtes aesculapius</i>	C
Insecta	Yehl skipper	<i>Poanes yehl</i>	C
Aves	Swainson's Warbler	<i>Limnothlypis swainsonii</i>	C, b
Aves	Kentucky Warbler	<i>Oporornis formosus</i>	B, c
Aves	Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	B, c
Aves	Wood Thrush	<i>Hylocichla mustelina</i>	B, c
Aves	Rusty Blackbird	<i>Euphagus carolinus</i>	B
Aves	Hooded Warbler	<i>Wilsonia citrine</i>	B, c
Aves	American Woodcock	<i>Scolopax minor</i>	B, c

¹ **c = cane, b = bottomland hardwood forest, uppercase indicates optimal habitat**

This project will build on the long-standing partnership between the Arkansas Natural Heritage Commission and The Nature Conservancy. ANHC and TNC have co-owned and managed Benson Creek Natural Area since 1993. Since that time, they have worked in concert to restore and protect biological diversity representative of the bottomland hardwood forests and swamp communities at BCNA. They have also worked together to acquire additional tracts to expand the natural area. Recent acquisitions bring the total acreage at BCNA to 1,239 acres, four times the original acreage of 303. Recently acquired tracts are old agricultural fields which will be restored to their natural communities over time.

PRELIMINARY BUDGET

The total cost for this project will be \$49,200 over two years. The Nature Conservancy respectfully requests \$24,600 (50%) from the Arkansas Game & Fish Commission through the State Wildlife Grant. TNC and ANHC will provide \$24,600 (50%) as match.

	<u>Direct Cost</u>	<u>Match</u>	<u>Total Cost</u>
Salary/Benefits	\$15,000	\$15,000	\$30,000
Operating Expenses	\$5,000	\$5,000	\$10,000
Subtotal	\$20,000	\$20,000	\$40,000
Indirect Costs (23%*)	\$4,600	\$4,600	\$9,200
Total	\$24,600	\$24,600	\$49,200

*The Nature Conservancy has a current 23% Negotiated Indirect Cost Rate (NICRA) that is accepted by USFWS.

Allison Fowler: Allison Fowler is a Field Ecologist for The Nature Conservancy in Little Rock, Arkansas. Her responsibilities include collecting and analyzing data on plant and avian communities in response to management activities, conducting post-fire evaluations, and assisting in coordinating invasive species efforts. Allison received a B.S. in wildlife ecology and management from Arkansas State University and an M.S. in Forest Resources from the University of Arkansas at Monticello. She has conducted research on Loggerhead Shrikes (*Lanius ludovicianus*) and swamp rabbits (*Sylvilagus aquaticus*). She has published one scientific paper on the habitat characteristics and abundance of swamp rabbits in eastern Arkansas.

Bill Holimon: Bill Holimon is an Ornithologist and is Chief of Research for the Arkansas Natural Heritage Commission. Bill received a B.S. in biology from the University of Arkansas at Little Rock and an M.S. in biology from New Mexico State University. Bill previously worked for The Nature Conservancy in Texas on conservation of two federally listed endangered bird species, the Golden-cheeked Warbler (*Dendroica chrysoparia*) and Black-capped Vireo (*Vireo atricapilla*). In addition, he has conducted extensive work on various taxa of Red Crossbills (*Loxia curvirostra*) throughout North America. Bill is a native Arkansan who has published four scientific papers on rare birds of Arkansas; three on grassland birds and the fourth on the endangered Red-cockaded Woodpecker (*Picoides borealis*).

Jennifer Akin: 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.

Douglas Zollner: Douglas Zollner is an ecologist currently serving as the Director of Conservation Science for the 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 Bachelor of Science from the University of Arizona in Watershed Management and a Master of Science from Texas Tech University in the Ecology of Arid Lands. He spent the 1980's working on conservation projects overseas, mostly in eastern and southern Africa.