2011 Arkansas State Wildlife Grant Pre-proposal

FOUSHEE CAVE LAND ACQUISITION = PROTECTION FOR KARST-DEPENDENT ANIMAL SPECIES

Project Summary

Land acquisition of priority terrestrial habitat within the recharge zone of Foushee Cave will benefit seven karst-dependent Arkansas Wildlife Action Plan species of greatest conservation need. This project will acquire approximately 500 acres (one-third of the watershed) of essential habitat including the cave opening and underlying passageway to protect endemic species found in Foushee Cave from development and disturbance, protect groundwater quality, and provide additional protection of Foushee Cave as a hibernaculum for endangered bats.

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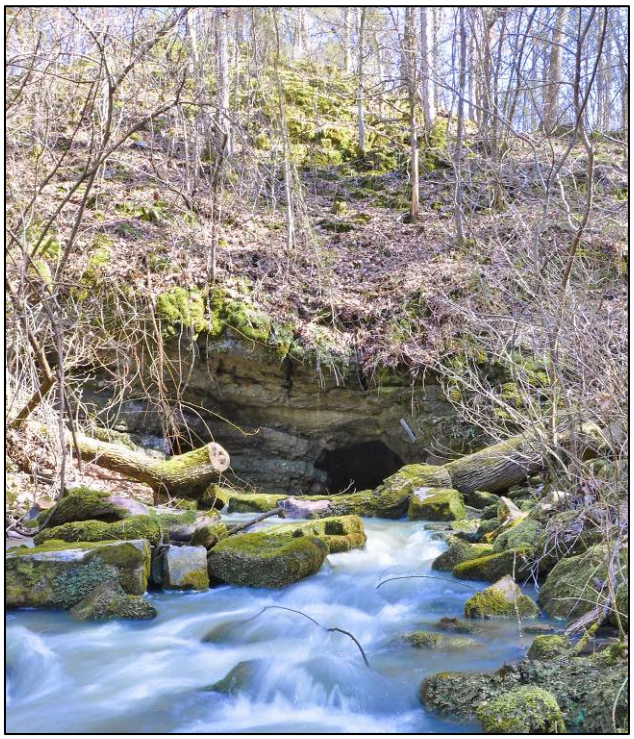

Foushee Cave captures surface water within its recharge area and discharges the captured groundwater to the spring flowing from the mouth of the cave.

SWG Funding Requested: $300,000 (50%)

Amount and Source of Matching Funds: $300,000 (50%) of non-federal cash match will be provided from the Arkansas Natural Heritage Commission

Total Project Costs: $600,000

FUNDING PRIORITY: This project addresses the conservation action funding priority "Restore and maintain native terrestrial habitats in karst recharge zones" by acquiring (thereby maintaining) high priority terrestrial habitat, the cave opening, and underlying passageway within the recharge zone of Foushee Cave. This is the second phase of a larger project which uses the results of another Arkansas State Wildlife Grant to target conservation actions for protection of karst-dependent animal species inhabiting Foushee Cave and the habitat that supports them.

NEED: Foushee Cave, located in Independence County, is an important karst ecosystem. Inventories have documented the occurrence of 38 cave animal species. Of these, ten are limited to groundwater habitats (stygobites) or are limited to caves (troglobites). This species richness, and especially the presence of ten obligate species, makes Foushee Cave one of the most biologically significant caves in Arkansas.

The cave supports seven Arkansas Wildlife Action Plan (AWAP) species of greatest conservation need (SGCN). The Foushee cavesnail (*Amnicola cora*) and Foushee cave springtail (*Typhlogastrura fousheensis*; misidentified as *Schaefferia alabamensis* in the AWAP) are endemic species only know from this unique site. In addition, the federally endangered Indiana bat and federally endangered gray bat are known to hibernate in the cave during the winter. The presence of these endangered species facilitated installation of a cave entrance gate which currently provides the only protection for Foushee Cave and its inhabitants. Although the cave is gated, it is privately owned, has no special status for protection, and the land within the drainage basin of the cave is not protected from development or other land use practices.

Conservation for the protection of species found in Foushee Cave and the surrounding terrestrial habitat has been a high priority project for the Arkansas Natural Heritage Commission (ANHC) and The Nature Conservancy (TNC) for many years. Protecting terrestrial habitat surrounding caves is just as important as protecting cave openings and passageway. Foushee Cave is surrounded by rugged steep slopes that are densely wooded which provide foraging habitat and flyways for the endangered bats and also the little brown bat (also documented at the site). In addition, protection of terrestrial habitats within a cave recharge zone protects the groundwater system and cave fauna from point source and non-point source contaminants. Aquatic cave ecosystems are highly sensitive to disruption or destruction from surface land use and land management activities that can impact the quality of water entering a cave system.

TNC recently completed phase one of this project through an Arkansas State Wildlife Grant (T30-8) by delineating the recharge zone of Foushee Cave, identifying land parcels and ownership within the recharge area, and determining the highest priority parcels for conservation. The TNC project delineated a recharge zone of 1,677 acres and a buffer zone of 138 acres through dye tracing. The buffer zone was included because of its close proximity to known cave passage which may contribute recharge water to Foushee Cave under different flow conditions than those tested during the study. Additionally, a vulnerability map was produced. Vulnerability was classified as extremely high (lands where water and organic material directly enter the cave), high (ridges and side slopes that drain directly into the extremely high locales), moderate (upland areas that border high vulnerability lands), and low (no areas within the recharge zone were classified as low vulnerability). Tracts were prioritized on a combination of factors including groundwater habitat, bat foraging habitat, parcel size, and willingness to sell. Land within the recharge zone is divided amongst eight landowners, two of which own more than 80% of the recharge area.

Grant T30-8 completed the necessary groundwork to maximize efficiency of conservation actions to protect the inhabitants of Foushee Cave and surrounding land. This proposal builds upon that knowledge and addresses phase two: protection through land acquisition. We propose to acquire high priority terrestrial habitat identified by Grant T30-8 through fee title and/or perpetual conservation easements (Figure 1). Discussions with the two landowners possessing more than 80% of the watershed have shown that they are willing sellers. Acquisition of land within the recharge zone will protect endemic species found in Foushee Cave from development and disturbance, protect groundwater quality, and provide additional protection of Foushee Cave as a hibernaculum for endangered bats.

Even though a cave entrance gate affords a level of protection to the caves' inhabitants, the property is in private ownership and is not formerly protected in perpetuity. Purchase of property by the state and subsequent dedication of the property into the state's system of natural areas will ensure perpetual legal protection under Arkansas law.

Foushee Cave is one of the most biologically significant and diverse cave systems in Arkansas harboring several single-site endemics and endangered species. Protection by land acquisition of this key cave system and watershed will greatly increase the ability of these karst-dependent species to persist long-term and will contribute to their recovery.

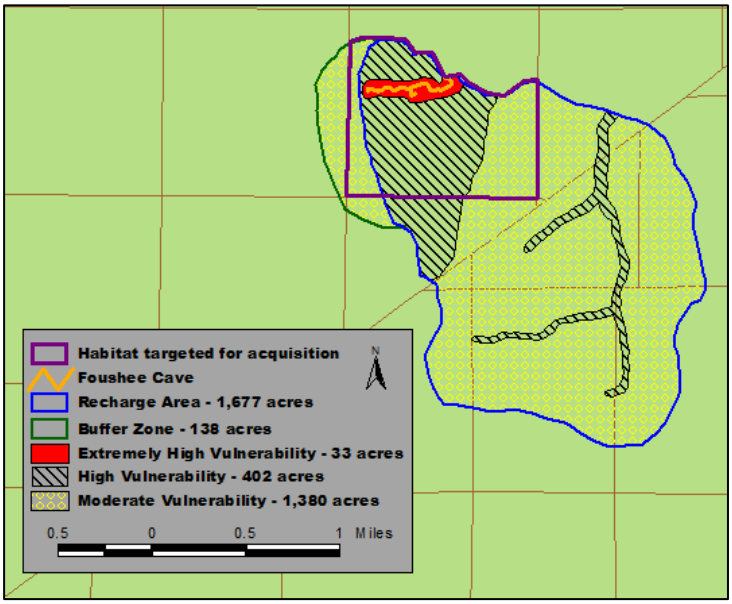

Figure 1. High priority habitat targeted for acquisition within the Foushee Cave recharge and buffer zones.

OBJECTIVES:

1. Implement protection of Foushee Cave and land within the recharge boundary. This will afford protection to populations of single-site endemic species (Foushee cave springtail and Foushee cavesnail) and other karst-dependent animal species. This objective addresses both AWAP conservation actions listed in the Foushee cave springtail species report: 1) maintain groundwater quality and 2) protect cave habitat and recharge zone from development or disturbance.

2. Increase protection of bat hibernacula. This objective addresses the only AWAP conservation action listed in the Indiana bat species report: protect hibernacula; and in the gray bat species report: protect caves used by this species.

EXPECTED RESULTS AND BENEFITS: This project provides protection at the ecosystem scale by acquiring land that encompasses the cave and approximately one-third of its watershed. Acquisition of priority terrestrial habitat including the cave opening and underlying passageway within the Foushee Cave recharge zone will (1) protect populations of single-site endemic species, (2) protect cave fauna from human disturbance and habitat loss from future development, (3) protect and maintain groundwater quality and the cave aquifer by decreasing threats from hydrological alteration, nutrient stress, nutrient loss, sedimentation, enrichment, and chemical pollution, (4) increase protection of the cave as a hibernaculum for endangered bats, and (5) protect essential surface foraging habitat used by bats thereby impacting population size by increasing adult and juvenile survival rates.

Table 1: AWAP SGCN which will benefit from this project (7). All species have been documented at Foushee Cave. AWAP Species Priority Score is listed in parenthesis.

Foushee cave springtail (65)	*Typhlogastrura fousheensis*
Foushee cavesnail (65)	*Amnicola cora*
Indiana bat (46)	*Myotis sodalis*
isopod (31)	*Caecidotea ancyla*
isopod (27)	*Lirceus bicuspidatus*
gray bat (23)	*Myotis grisescens*
grotto salamander (19)	*Eurycea spelaea*

Seven SGCN known from Foushee Cave will benefit from this project including several single-site endemics and endangered species (Table 1). Two of these SGCN have a relatively high AWAP species priority score of 65 out of 100 which implies a great need for conservation concern and action. In

addition, this project will benefit another 31 karst-dependent animal species documented from the site. Cumulatively, this project will aid in the protection of 38 species, the groundwater system, and the essential habitat that supports them.

APPROACH: Discussions with landowners' has shown that two owners are willing sellers. These landowners own the highest priority parcels: 100% of the extremely high vulnerability habitat, 95% of the high vulnerability habitat and 80% of the moderate vulnerability habitat. For this proposal, we want to acquire high priority terrestrial habitat including the cave opening and underlying cave passageway resulting in protection of approximately one-third of the recharge area. This is a remarkable opportunity to not only protect a cave opening but also a large portion of its watershed. This proposal is the first key step in protecting the inhabitants of Foushee Cave and the essential habitat that supports them. This project will allow us to begin strategic conservation actions leading to the long-term goal of protecting the entire recharge zone.

An appraisal report to the Uniform Appraisal Standard for Federal Land Acquisitions is currently underway and is expected to be completed during February 2011. For this project, we estimate acquisition of approximately 500 acres for the amount of funding requested and state match provided. This is based on an estimated market value of $1,200 per acre from comparable properties of similar size and location currently for sale. Once the appraisal report is complete, an accurate cost per acre and proposed number of acres acquired by this project will be available to include in a full proposal if requested.

Objectives 1 and 2 will be accomplished by purchasing fee title and/or perpetual conservation easements on approximately 500 acres of land at Foushee Cave. Federal funding and matching state dollars will be used to purchase land within the recharge and/or buffer zones. Acquisition of the proposed tract will protect 100% of the extremely high vulnerability habitat and more than 60% of the high vulnerability habitat.

For this project, we have targeted high priority terrestrial habitat which includes the cave opening and underlying passageway. Acquisition of priority habitat will provide the greatest benefits in protecting endemic species found in Foushee Cave from development and disturbance and provide additional protection of Foushee Cave as a hibernaculum for endangered bats.

Land acquisition at Foushee Cave will be completed with the assistance of TNC. TNC will play vital role by assisting in contacting and negotiating with landowners of targeted habitat. Because all high priority habitat and willing sellers have already been identified, these objectives will be completed within a two year period.

LOCATION OF WORK: This project will be conducted in the Ozark Highlands ecoregion, within the Ozark Highlands – White River eco-basin, White River Hills sub-ecoregion in Independence County.

BUDGET: The total cost of this project is $600,000. The federal share is $300,000 (50%) and the ANHC will provide non-federal cash match of $300,000 (50%).

If additional federal funding becomes available, the ANHC will match those additional funds with state dollars at a 50% cost share ratio which will result in protection of additional land at Foushee Cave. Similarly, if federal funding can only fund a portion of this project, this proposal can be adjusted to reflect available funding.

Category	Total	Match	Grant
Land Acquisition	$ 600,000	$ 300,000	$ 300,000
Total	$ 600,000	$ 300,000	$ 300,000

ORGANIZATION AND STAFF QUALIFICATIONS

The Arkansas Natural Heritage Commission is charged with the responsibility of establishing and maintaining a System of Natural Areas. The research section of the ANHC conducts field investigations to identify potential natural areas and to monitor the state's rare animals, plants, and natural communities. Natural areas are those lands specifically managed to preserve, and sometimes restore, natural communities and the rare species they support. The commission owns and manages 68 areas within the state's System of Natural Areas encompassing more than 50,000 acres.

The Nature Conservancy has helped conserve more than 250,000 acres of natural lands and waters in Arkansas. The Arkansas program currently owns or manages 36 nature preserves encompassing more than 20,000 acres and has ongoing cooperative projects with public and private landowners on more than 200,000 acres. These sanctuaries are found in every corner of the state.

ANHC and TNC have worked together for several decades to address habitat conservation, species protection, and water quality protection in the Ozark Karst Ecosystem. Both agencies have worked together at a landscape scale to aid in the recovery of karst-dependent animal species and their habitats spanning across state boundaries into Oklahoma and Missouri.

Project Leader: Bryan Rupar is the Chief of Land Acquisition and Stewardship for the Arkansas Natural Heritage Commission. Bryan received a B.S. in natural resource management from Grand Valley State University and a M.S. in forest resource management from the University of Arkansas at Monticello. Bryan previously worked for the US Forest Service in Michigan and as a consulting forester in southern Arkansas. Bryan oversees all acquisition projects for the commission, last year closing 11 properties and adding over 3,330 acres to the System of Natural Areas.

Michael Slay has been working in karst conservation for ten years in the five states that contain the caves and springs of the Ozark Highlands Ecoregion. Before joining The Nature Conservancy as the Ozark Karst Program Director, Mike coordinated karst research during positions held at the University of Arkansas, Buffalo National River NPS, Illinois Natural History Survey, and Missouri Department of Conservation. Since joining The Nature Conservancy, Mike has worked with multiple partners such as US Fish and Wildlife Service, US Forest Service, Arkansas Game and Fish Commission, Missouri Department of Conservation, Oklahoma Biological Survey, and Illinois Natural History Survey to conserve and protect karst species and habitats, including species found in spring habitats. Mike has coordinated the exploration, species monitoring, and habitat analysis in several hundred caves and springs, and he has assisted with the discovery of over 15 karst species new to science. Mike received his undergraduate degree and M.S. in Biology at the University of Arkansas. In addition to conducting karst research and implementing karst conservation actions, Mike has authored and co-authored 15 peer-reviewed journal articles related to the discovery and conservation of karst species.