

Targeted conservation efforts for four karst species: Foushee cavesnail (*Amicola cora*), Foushee cave springtail (*Typhlogastrura fousheensis*), gray bat (*Myotis griscesens*), and Indiana bat (*Myotis sodalis*)

Summary: This project will seek to develop conservation actions for protecting endemic species found in Foushee Cave from development and disturbance and provide additional protection for Foushee Cave as a hibernaculum for endangered bats. Following delineation of the recharge boundary for Foushee Cave, parcel based priorities will be set for habitat restoration and protection, including acquisitions, easements, and conservation enrollment. Where conservation opportunities occur, we will provide information on available programs and assist with landowner negotiations to secure protection of Foushee Cave and land within the recharge boundary.

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SWG Funds Requested: \$30,000

Amount and Source of Matching Funds: \$30,000 (50%) from The Nature Conservancy, Ozark Underground Laboratory, and Tumbling Creek Cave Foundation.

Total Project Cost: \$60,000

Date Submitted: January 16, 2009

Need:

Foushee Cave, located in Independence County, Arkansas, is one of the most biologically significant caves in Arkansas (Graening, 2003). The cave is home to great diversity of organisms including the Foushee cavesnail (*Amnicola cora*), Foushee cave springtail (*Typhlogastrura fousheensis*), gray bat (*Myotis griscesens*), and Indiana bat (*Myotis sodalis*). Although the cave is gated, it is privately owned, has no special status (e.g., not a nature preserve, etc.), and the land within the drainage basin of the cave is not protected from development or other land use practices.

The Foushee cavesnail, *Amnicola cora*, was first described in 1979 (Hubricht, 1979). This snail occurs only in Foushee Cave, and recent surveys confirmed the snail still occurring in the cave (Graening, 2003; Slay and Taylor, 2007). While there is some ongoing monitoring being conducted by The Nature Conservancy, with funding provided by US Fish and Wildlife Service, there are currently no long-term efforts directed toward protecting this species.

The Foushee cave springtail was originally identified as *Schaefferia alabamensis* in Youngsteadt and Youngsteadt (1978). However, these cave springtail specimens were ultimately determined to be a new species and described as *Typhlogastrura fousheensis* by Christiansen and Wang (2006), and the name should be changed to *Typhlogastrura fousheensis* in the Arkansas Wildlife Action Plan. Recent studies did not record this species from surrounding caves, and the species appears to be endemic to Foushee Cave (Graening et al, 2004; Graening et al, 2006).

In addition to these two endemic invertebrates, both the endangered gray bat and endangered Indiana bat are known to hibernate in the cave during the winter (D. Kampwerth, USFWS, personal communication). The presence of these endangered bats facilitated the installation of an entrance gate, which currently affords the only protection for Foushee Cave and its inhabitants.

Because Foushee Cave is one of the most biologically significant caves in Arkansas and harbors several single-site endemics and endangered species, there is a need to develop conservation actions to protect this site and the surrounding landscape.

Funding Priorities Addressed:

This project will lay the necessary groundwork to accomplish the funding priority related to Foushee Cavesnail, gray bat, Indiana bat, and Foushee cave springtail (to protect habitat and recharge zone from development and disturbance and to protect bat hibernacula) identified by the Karst Taxa and Habitat Team and included in the 2009 Request for Preproposals.

Location of Work:

Work will be conducted within portions of the Ozark Highlands ecoregion, within the Ozark Highlands - White River eco-basin, White River Hills sub-ecoregion.

Conservation Priorities Addressed:

This project will lay the groundwork for accomplishing the funding priority determined by the State Wildlife Action Plan Steering Committee for 2009, namely to protect habitat and recharge zone from development and disturbance and to protect bat hibernacula at Foushee Cave for the Foushee Cavesnail, gray bat, Indiana bat, and Foushee cave springtail.

In addition, the project will address the following issues that impede accomplishing this priority:

1. Conduct recharge delineation for Foushee Cave.

2. Identify all land parcels that occur within recharge area.
3. Identify all land owners within in recharge area.
4. Determine highest priority parcels for acquisition, easement, or conservation enrollment.

Goal:

The goal of this project is to establish a mechanism to target and implement conservation easements and land acquisitions to benefit the Foushee Cavesnail, gray bat, Indiana bat, and Foushee cave springtail. To accomplish this goal, we will delineate the recharge area for Foushee Cave, identify all land parcels and land owners within recharge area, and determine highest priority parcels for acquisition, easement, or conservation enrollment.

Methods:

Using standard dye tracing techniques (Aley 1999), we will delineate the recharge boundary for Foushee Cave. Based on the recharge area, land parcel information from recent plat books will be georeferenced, using ArcGIS 9.3. These digitized land parcels will be used to identify all landowners with property within the recharge boundary for Foushee Cave. We will then facilitate contact with respective landowners to promote protection and restoration concepts. Where opportunities for land acquisition or conservation easement occur, we will provide information on available programs and assist with landowner negotiations to secure protection of Foushee Cave.

Expected Outcomes:

A delineated recharge boundary for Foushee Cave will provide the basis for all conservation efforts designed to protect species occurring in the cave. The recharge boundary will allow potential threats to be identified which could be addressed proactively. In addition, identifying land parcels for acquisition, easement, or conservation enrollment will allow agencies and non-governmental organizations such as Arkansas Natural Heritage Commission, Arkansas Game and Fish, and The Nature Conservancy to begin acquiring land.

Existing Resources Utilized:

This project takes advantage of past cooperation between The Nature Conservancy, Ozark Underground Laboratory, and Tumbling Creek Cave Foundation and builds on recent conservation efforts by the cooperators jointly and independently. All cooperators contribute expertise in dye tracing, recharge delineation, threats assessment, GIS based parcel prioritization, and land acquisition areas of this project.

Proposed Budget:

Requested SWG Funds:	TNC	OUL	TCCF
Personnel & Fringe:	\$ 3,300.00		
Operating Expenses			
Travel	\$ 600.00		
Supplies	\$ 350.00		
Dye tracing contract to OUL	\$ 20,000.00		
Overhead (23%)	\$ 5,610.00		
<i>Subtotal</i>	\$ 30,000.00		
TOTAL	\$ 30,000.00		

Matching Funds:	TNC	OUL	TCCF
Personnel & Fringe:	\$ 16,490.00	\$ 1,000.00	\$ 4,000.00

Operating Expenses			
Travel	\$ 1,400.00		
Supplies	\$ 1,500.00		
Overhead (23%)	\$ 5,610.00		
<i>Subtotal</i>	\$ 25,000.00	\$ 1,000.00	\$ 4,000.00
TOTAL		\$ 30,000.00	

Michael Slay has been working in karst conservation for eight 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 & Wildlife Service, US Forest Service, Arkansas Game & 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 10 peer-reviewed journal articles related to the discovery and conservation of karst species.

Tom Aley has been conducting groundwater hydrology studies for over forty years and is president of Ozark Underground Laboratory in Protem, Missouri. He is licensed Geologist in Arkansas and has conducted a majority of the dye trace studies involving recharge areas for threatened and endangered karst species in the Ozarks. Tom has also done extensive groundwater studies in many other states and multiple countries concerning water quality degradation and impact on both aquatic species and humans. Tom serves on two ESA recovery teams for endangered aquatic species, and has established the Tumbling Creek Cave Foundation for the protection of the Tumbling Creek Cavesnail, and cave species known only from a single cave in Missouri. Tom has authored and co-authored many peer-reviewed journal articles related to the conservation, protection, and ecology of karst species and habitats.