2012 Arkansas State Wildlife Grant Pre-proposal

DEVELOPING A CONSERVATION ACTION PLAN FOR ARKANSAS KARST SPECIES OF GREATEST CONSERVATION CONCERN

Project Summary

This project will seek to develop a Conservation Action Plan for 34 Arkansas karst species of greatest conservation concern that sets priorities for habitat restoration and protection, including land acquisitions and conservation easements, of habitats were these species are found. Recent Arkansas State Wildlife Grant projects (T20-9 and T26-R-10) provide a framework for prioritizing conservation actions for these species and developing implementation activities. The next step (Phase Two) is to develop a system of karst conservation areas that maximizes the inclusion of multiple populations of each species and conduct a GAP analysis to determine percentage of karst conservation areas not currently in protected status.

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SWG Funds Requested: $43,000 (65%) or $33,000 (50%)

Amount and Source of Matching Funds: $23,154 (35%) or $33,000 (50%) match will be provided by The Nature Conservancy

Total Project Cost: $66,154 (75/35) or $66,000 (50/50)

FUNDING PRIORITY: This project addresses the 2012 Arkansas Wildlife Action Plan conservation action funding priority of restoring and maintaining native terrestrial habitats in karst recharge zones. The project is also a Phase Two adaptive management project and is the next phase of a larger project which uses results from previous Arkansas State Wildlife Grants (T20-9 and T26-R-10) to identify conservation actions for the protection of Arkansas karst species.

NEED: Karst is a terrain, generally underlain by limestone or dolomite, in which the topography is chiefly formed by the dissolving of rock, and which may be characterized by sinkholes, sinking streams, closed depressions, subterranean drainage, and caves (USEPA 1999). Often, species living in karst are specially adapted to rigorous environmental conditions that occur there. Because light is absent and food limited, many species exhibit morphological, physiological, and behavioral characteristics that make them well suited for existence in subterranean habitats. These organisms are often among the rarest and most unique species inhabiting karst, and they are important components of species conservation planning efforts outlined in the Arkansas Wildlife Action Plan (Anderson 2006).

Many Arkansas karst species of greatest conservation concern are rare, occurring in less than 5 locations, while others appear to be more common. However, for all species at least some populations are experiencing visitation and/or groundwater pollution threats. Therefore, all of these species are in need of additional conservation action and focus. Because conservation resources are limited, the decision of where to apply management actions must be made at an appropriate scale that maximizes species coverage. For subterranean species, the most appropriate scale is the ecoregion, and decision support tools, such as geospatial threat assessment, reserve selection, and GAP analysis, provide rigorous techniques to assist in the prioritization process. Recent Arkansas State Wildlife Grant projects (T20-9 and T26-R-10) by Inlander et al. (2011) and Slay (2011) provide a framework for prioritizing conservation actions for these species and developing implementation activities. The next step (Phase Two) is to develop a system of karst conservation areas that maximizes the inclusion of multiple populations of each species and conduct a GAP analysis to determine percentage of karst conservation areas not currently in protected status (i.e. not in public or conservation organization ownership). Following the gap analysis, targeted implementation activities can be assigned according to whether species occur within current protected lands (e.g. implementation projects in partnership with public lands resource managers that reduce threats on publicly owned karst sites) or within the expanded karst conservation areas (e.g. land acquisitions, implementation of BMPs on private lands to reduce threats, etc).

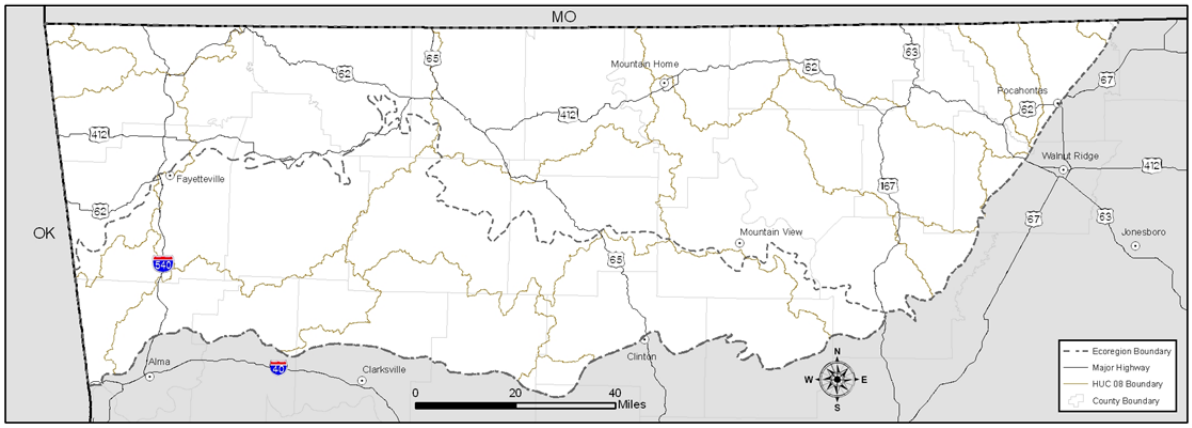

Figure 1. Project area for this study is the karst areas of northern Arkansas.

LOCATION OF WORK: Work will be conducted within portions of the Ozark Highlands ecoregion (Figure 1), within the Ozark Highlands - Arkansas River eco-basin.

OBJECTIVES: The goal of this project is to establish a Conservation Action Plan to prioritize, target, and implement conservation easements, land acquisitions, and best management practices to benefit 34 Arkansas karst species of greatest conservation concern.

APPROACH: First, GIS software will be used to develop a system of karst conservation areas in Arkansas that maximizes the inclusion of multiple populations of each species. The network of sites will be derived from karst habitats, species information, and threat assessments reported in the previous Arkansas State Wildlife Grant projects of Inlander et al. (2011) and Slay (2011). Second, a GAP analysis will be conducted to assess the overlap between the network of karst conservation areas and the current system of protected landscapes in Arkansas (lands in federal, state, or conservation organization ownership). Gap analysis is a conservation assessment methodology that compares the distribution of several elements of biological diversity to the distribution of lands and waters that have been set aside and are primarily managed for native species and natural ecosystem processes (Scott et al. 1993). Finally, targeted implementation activities will be recommended according to whether sites occur within current protected lands (e.g. implementation projects in partnership with public lands resource managers that reduce threats on publicly owned karst sites) or within the expanded karst conservation areas (e.g. land acquisitions, implementation of BMPs on private lands to reduce threats, etc).

EXPECTED RESULTS AND BENEFITS: The principal outcome of this project will be a Conservation Action Plan for 34 Arkansas karst species (Table 1) that sets priorities for habitat restoration and protection, including land acquisitions and conservation easements, of habitats were these species are found. This plan will provide a solid foundation for implementing voluntary conservation actions, targeting funds available through other avenues, and highlighting future funding priorities for these species.

BUDGET:

65% Award – 35% Match	**Requested SWG Funds**	**TNC Match**	**Total**
Personnel & Fringe:	$ 33,475.00	$ 17,706.00	$ 51,181.00
Operating Expenses			
Travel	$ 1,066.00	$ 1,060.00	$ 2,126.00
Supplies	$ 1,900.00	$ 856.00	$ 2,756.00
Overhead	$ 6,559.00	$ 3,532.00	$ 10,091.00
Subtotal	$ 43,000.00	$ 23,154.00	$ 66,154.00
TOTAL	**$ 66,154.00**		

50% Award– 50% Match	**Requested SWG Funds**	**TNC Match**	**Total**
Personnel & Fringe:	$ 25,000.00	$ 26,050.00	$ 51,050.00
Operating Expenses			
Travel	$ 1,066.00	$ 1,060.00	$ 2,126.00
Supplies	$ 1,900.00	$ 856.00	$ 2,756.00
Overhead	$ 5,034.00	$ 5,034.00	$ 10,068.00
Subtotal	$ 33,000.00	$ 33,000.00	$ 66,000.00
TOTAL	**$ 66,000.00**		

Table 1. Arkansas Karst Species of Greatest Conservation Need

Class	Common Name	Scientific Name	Priority Score
Amphibians	Grotto Salamander	*Eurycea spelaea*	**19**
Crayfish	Hell Creek Crayfish	*Cambarus zophonastes*	**80**
	Benton Cave Crayfish	*Cambarus aculabrum*	**80**
	Bristly Cave Crayfish	*Cambarus setosus*	**27**
Fish	Ozark Cavefish	*Amblyopsis rosae*	**34**
	Southern Cavefish	*Typhlichthys subterraneus*	**27**
Insects	ground beetle	*Rhadine ozarkensis*	**80**
Invertebrates Other	isopod	*Lirceus bidentatus*	**80**
	cave obligate harvestman	*Crosbyella distincta*	**65**
	cave obligate harvestman	*Crosbyella roeweri*	**65**
	cave obligate millipede	*Trigenotyla parca*	**65**
	cave obligate pseudoscorpion	*Apochthonius diabolus*	**65**
	cave obligate pseudoscorpion	*Apochthonius titanicus*	**65**
	cave obligate springtail	*Typhlogastura fousheensis*	**65**
	Foushee Cavesnail	*Amnicola cora*	**65**
	bat cave isopod	*Caecidotea macropropoda*	**57**
	springtail	*Pseudosinella dubia*	**50**
	amphipod	*Bactrurus pseudomucronatus*	**42**
	cave obligate isopod	*Caecidotea simulator*	**42**
	cave obligate planarian	*Dendrocoelopsis americana*	**42**
	Hubricht's Long-tailed Amphipod	*Allocrangonyx hubrichti*	**42**
	isopod	*Caecidotea dimorpha*	**42**
	Shelled Cave Springtail	*Pseudosinella testa*	**42**
	isopod	*Caecidotea ancyla*	**30**
	isopod	*Caecidotea steevesi*	**30**
	isopod	*Caecidotea stiladactyla*	**30**
	isopod	*Lirceus bicuspidatus*	**27**
	Ozark Cave Amphipod	*Stygobromus ozarkensis*	**27**
	springtail	*Arrhopalites clarus*	**25**
	pseudoscorpion	*Hesperochernes occidentalis*	**23**
	isopod	*Caecidotea salemensis*	**8**
Mammals	Ozark Big-eared Bat	*Corynorhinus townsendii ingens*	**80**
	Indiana Bat	*Myotis sodalis*	**46**
	Gray Bat	*Myotis grisescens*	**23**

LITERATURE CITED:

Inlander, E., C. Gallipeau, and M.E. Slay. 2011. Mapping the distribution, habitat, and threats for Arkansas' species of greatest conservation need. Final report submitted to Arkansas Game and Fish Commission, Little Rock, Arkansas. 188 pp.

Scott, J. M., F. Davis, B. Csuti, R. Noss, B. butterfield, C. Groves, H. Anderson, S. Caicco, F. D'Erchia, T. C. Edwards Jr., J. Ulliman, and G. Wright. 1993. Gap Analysis: A geographic approach to protection of biodiversity. Wildlife Monographs 123:1-41.

Slay, M.E. 2011. Reducing conservation data gaps: faunal inventory of 20 Arkansas karst species of greatest conservation concern. Final report submitted to Arkansas Game and Fish Commission, Little Rock, Arkansas. 81 pp.

QUALIFICATIONS:

Michael Slay has been working in karst conservation for 10 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 15 peer-reviewed journal articles related to the discovery and conservation of karst species.

Ethan Inlander has been applying geospatial technologies and physical sciences to conservation issues for over 12 years. He received his undergraduate and master's degrees from the Department of Geography at University of California Santa Barbara. Before joining The Nature Conservancy as the Ozark Rivers Program Director, Ethan applied geographical information systems technology to address multiple scale conservation problems in riparian and costal habitats of California. Since joining The Nature Conservancy, Ethan has applied these same techniques to identify and reduce impacts and habitat degradation to freshwater stream ecosystems, conduct local, watershed, and regional threat assessments of subterranean environments, and prioritize and implement karst and riverine conservation actions at multiple scales.