

Title: Distribution, health, and status of *Spea bombifrons*, *Gastrophryne olivacea*, *Scaphiophus hurterii*, and *Pseudacris streckeri* in Arkansas

Project Summary: We will determine the distribution and status of four imperiled amphibian species in Arkansas: *Spea bombifrons*, *Gastrophryne olivacea*, *Scaphiophus hurterii*, and *Pseudacris streckeri*. These species have very restricted distributions in Arkansas and agricultural practices and land-use changes are hypothesized to threaten their continued survival throughout the Arkansas River Valley. We will assess the status of extant populations of these species throughout the Arkansas River Valley by visiting historic locations, mapping suitable habitat, and conducting presence / absence assessments using call and visual encounter surveys.

Project Leader: Dr. Matthew E. Gifford, University of Arkansas at Little Rock

Researcher: Dr. Chelsea A. Korfel, University of Arkansas at Little Rock

Project Partner: Kelly J. Irwin, Arkansas Game and Fish Commission

Project Budget:

SWG Funds Requested: \$58,311

Match Provided: \$20,410 (35% match scenario) or \$29,170 (50% match scenario)

Total Project: \$78,721 (35% match scenario), \$87,481 (50% match scenario)

Project Statement

Need:

Priority Actions Addressed, per Arkansas Wildlife Action Plan for the species *Spea bombifrons*, *Gastrophryne olivacea*, *Scaphiophus hurterii*, *Pseudacris streckeri* – “Determine distribution. Conduct presence / absence surveys. The limited number of known localities and sustained habitat loss due to agricultural conversion threaten survival in the Arkansas River Valley.”

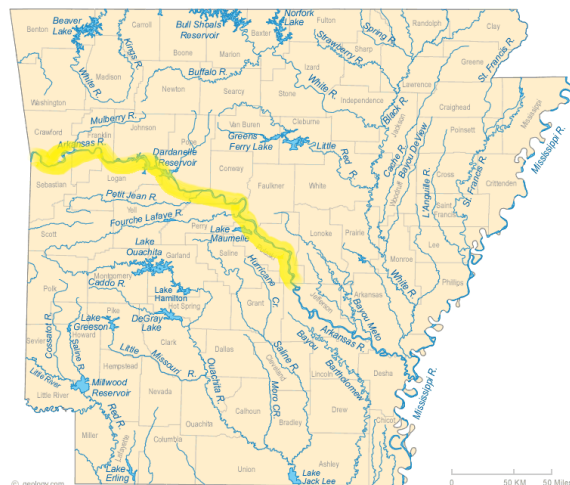
1. The distributions of *Spea bombifrons*, *G. olivacea*, *Scaphiophus hurterii*, and *P. streckeri* are not well known within Arkansas (Trauth et al. 2004). Habitat alteration due to agricultural conversion is threatening the survival of these species in the Arkansas River Valley, and establishing an understanding of their current distributions is a critical first step before conservation actions can be implemented. Each of these amphibian species is listed as either imperiled or critically imperiled in Arkansas (Trauth et al. 2004).
2. While these species are not considered conservation priorities on a broader scale, the populations of *Spea bombifrons*, *G. olivacea*, and *P. streckeri* are unique in that their populations within Arkansas occur at the geographic limits of their distribution (Trauth et al. 2004). Populations existing at the periphery of a species’ distribution likely experience environmental conditions different from those at the core of their geographic range, and consequently populations may be less stable at the periphery than at the core of their distribution.
3. There are only two known locations for *Spea bombifrons* within the state (Trauth et al. 2004). The potential for presence of additional populations exists, but few surveys have been conducted for this species. The known populations in Arkansas are disjunct from the nearest distribution for this species in Oklahoma; however, more populations likely persist between these known localities.

Purpose and Objectives:

1. Update distribution records of the species *Spea bombifrons*, *Gastrophryne olivacea*, *Scaphiophus hurterii*, and *Pseudacris streckeri*.
2. Assess abundance of each population.
3. Generate conservation recommendations for these imperiled species based on available habitat, and population information.

Location:

These species inhabit the Arkansas River Valley in the Arkansas River Valley and Central Arkansas ecoregions (Trauth et al. 2004). Sampling efforts will occur in Sebastian, Crawford, Franklin, Johnson, Logan, Pope, Yell, Conway, Perry, Faulkner, and Pulaski counties adjacent to the Arkansas River and its floodplain tributaries and lowlands.



Approach:

Known Records – Published records (Trauth et al., 2004) document known locations where distributions closely follow the Arkansas River drainage. There are two records of *Spea bombifrons*, four records of *Gastrophryne olivacea*, 11 records of *Scaphiophus hurterii*, and 12 records of *Pseudacris streckeri*. Queries of museum records for new localities (subsequent to publication of Trauth et al. 2004) will be used to direct initial surveys and these locations will be visited first and repeatedly throughout our study.

Survey Methods– Three survey methods will be used, nocturnal breeding call surveys, automated recording units (ARUs), and diurnal visual encounter surveys (VES). Survey routes will be generated using GoogleEarth imagery to identify potentially favorable habitat, and ARUs will be deployed in optimal habitats following ground-truthing. Target habitats for our species include grasslands with sandy soils, marsh and stream edges, and rocky and moist, wooded hills and ravines (Trauth et al. 2004).

1. Nocturnal breeding call surveys (Heyer et al. 2004) will be conducted during and shortly after rainfall events from February through June. When target species are located standardized data will be recorded, e.g., species, estimates of the number of calling individuals, associated herpetofauna, habitat description with notes regarding amphibian utilization, weather. We will follow the established methods of Driscoll (1998) to estimate the population size based on the intensity of calling males.
2. In ten selected locations identified based on optimal habitat conditions, frog loggers (i.e., ARUs) will be deployed to continuously monitor for target species. These devices have been successful in monitoring *Spea bombifrons* in other surveys (Corn et al. 2000) and allow for detection of cryptic fossorial species, such as *Spea*, during episodic breeding events. From recorded calls, we will also be able to estimate the population size.
3. Diurnal VES methods (Heyer et al. 1994) will be employed when and where practicable, with attendant data collection of other herpetofauna species present, age estimates, sex, photographs, habitat conditions, and weather. VES will be conducted using a transects and will be standardized by accounting for active search hours.

Expected Results and Benefits:

1. Creation of current distribution maps for *Spea bombifrons*, *Gastrophryne olivacea*, *Scaphiophus hurterii*, *Pseudacris streckeri* based on new records confirmation of historic records.
2. Provide population abundance estimates and data on habitat utilization and breeding phenology.
3. Provide essential information necessary to make conservation action recommendations.

Literature Cited:

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Trauth, SE. HW Robison and MV Plummer. 2004. The Amphibians and Reptiles of Arkansas. The University of Arkansas Press. Pp 128-197.

Budget:

Item	Request	Match (35%)	Match (50%)
Research Technician (UALR)	\$25,000		
Fringe (1%)	\$250		
Staff Time (AGFC)		\$7,040	\$10,780
Professor Time (UALR)		\$9,120	\$14,040
Lodging	\$5,040		
Per Diem	\$3,024		
Mileage Reimbursement	\$4,536		
Frog Loggers	\$7,600		
Lab facility (UALR)		\$4,250	\$4,250
SUBTOTAL	\$53,010		
Overhead (UALR 10%)	\$5,301		
TOTAL	\$58,311	\$20,410	\$29,170

Qualifications:

Matthew E. Gifford is an assistant professor in the Department of Biology at the University of Arkansas Little Rock. He received his Ph.D. from Washington University in St. Louis and his M.S. from the University of Texas at Tyler. He has authored or co-authored 21 peer-reviewed papers in scholarly journals. He oversees a dynamic lab group where work focuses on evolutionary and ecological physiology in addition to ecology of herpetofauna. Current projects involve amphibians, lizards and snakes. He is well acquainted with field work throughout Arkansas.

Chelsea A. Korfel is a lecturer in the Department of Biology at the University of Arkansas Little Rock. She recently received her Ph.D. from the Department of Evolution, Ecology, and Organismal Biology at The Ohio State University. She earned a M.S. degree from the same institution in the Department of Natural Resources. Her dissertation research included surveying for the amphibian disease chytridiomycosis (caused by the fungal pathogen *Batrachochytrium dendrobatidis*) both geographically and taxonomically in Ohio. Chelsea also looked at the relationship between chytridiomycosis and amphibian hosts in environments with variable temperatures. Chelsea has experience with the Ohio Frog and Toad Call Survey, a citizen science program designed to identify amphibian species and locations throughout the state.

Kelly J. Irwin is the Arkansas Game and Fish Commission herpetologist. He has a Master's of Science degree in Wildlife and Fisheries Science from Texas A&M and has served as Herpetologist for the Commission since 2000. Kelly has written or co-authored 75+ popular and peer reviewed articles on herpetology and vertebrate paleontology. He is intimately familiar with the river systems and amphibian species of the state, and he has led conservation efforts and monitoring studies on a number of endemic and endangered herpetofaunal species.