

TITLE: Examining the possible disappearance of the Stargazing darter, *Percina uranidea* (Jordan and Gilbert), in the Saline River, Arkansas, correlated with freshwater snail abundance and diversity.

PROJECT SUMMARY:

This project will address the issue of declining Stargazing Darter populations in the Saline River. Previous efforts by Rigsby (2009) funded by AGFC and USFWS, were unable to detect the presence of the Stargazing Darter in the Saline River, a historically occupied habitat. We will explore the current population status of the Stargazing Darter in the Saline River and at reference sites in other rivers in Arkansas, while simultaneously investigating the abundance and diversity of the Stargazing Darter’s primary forage, aquatic snails. This will give valuable distributional and population data for Stargazing Darters and also provide additional information about aquatic snails in the Saline River and at reference sites.

Project Leader: Dr. Forrest Payne, Instructor, University of Arkansas at Little Rock

Researcher: Justin Stroman, Graduate Student, University of Arkansas at Little Rock

Project Partners: Brian Wagner, Nongame Aquatics Biologist, Arkansas Game & Fish Commission
Jeff Quinn, Streams Biologist, Arkansas Game & Fish Commission
Kelly Irwin, Herpetologist, Arkansas Game & Fish Commission
Bill Posey, Malacologist, Arkansas Game & Fish Commission
Jason Throneberry, Aquatic Specialist, Arkansas Natural Heritage Commission

Project Budget:

	50% match scenario	35% match scenario
SWG Grant Funds Requested:	\$44,774	\$55,774
Match Provided:	\$44,056	\$31,056
Total Project:	\$88,830	\$86,830

Need:

Priority Actions Addressed: (per Arkansas Wildlife Action Plan Steering Committee)

- Fish – *Stargazing Darter* – “Determine factors affecting decline, including potential declines of snails.” Recent surveys indicate that this species has been extirpated from the Saline River and maybe declining in the Ouachita River drainage.

The Stargazing Darter, *Percina uranidea*, is a fish facing rapid habitat loss and population declines throughout its range. The species has been extirpated in the Wabash River system of Illinois and Indiana (Simon 2006), and is considered rare in Missouri (Pflieger 1997). In Arkansas the species has two subpopulations, one in the Ouachita and Saline Rivers, and another in the Current, Eleven Point, Spring, Strawberry, and Black river basins. The southern population, specifically the Saline River, is of most concern, with the species not collected there since 2001, despite extensive recent efforts (Rigsby 2009).

Mollusks are among the most critically imperiled groups in North America, with extirpations and extinctions of many snails and mussels (Lydeard et al. 2004). As the primary forage item of the subgenus *Imostoma*, to which the Stargazing Darter belongs, is snails, it has been hypothesized that snail declines may play a role in this fish’s decline.

Location:

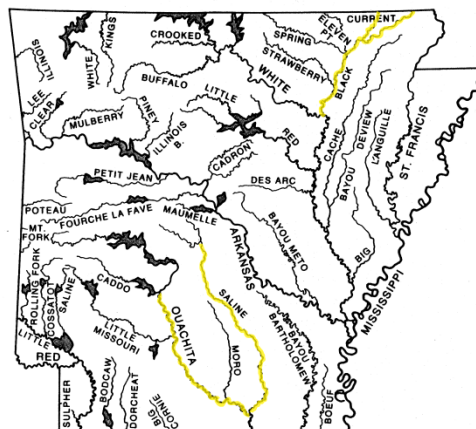
Ecoregions – Ouachita Mountains, South Central Gulf Coastal Plains, Mississippi Alluvial Plain, Ozark Mountains.

Counties – Sampling sites may occur, depending on access and river conditions, in the following counties:

Saline River – Saline, Dallas, Cleveland, Bradley, Drew, Ashley.

Ouachita River – Clark, Ouachita, Union, Hot Spring, Calhoun, Bradley.

Black River basin(including Current River in AR) – Randolph, Lawrence, Clay,



Objectives:

1. Update the population status of the Stargazing Darter in Arkansas, specifically addressing the apparent decline of the Saline River population
2. Obtain abundance information about the primary forage of Stargazing Darters, which are aquatic snails, and how their abundance in the Saline river system compares to the abundance where more stable populations of Stargazing Darters exists (e.g., the Black River drainage.)
3. Correlate snail abundance to darter abundance.

Approach:

Trawling for darters - A Missouri trawl will be employed as the primary method of sampling for stargazing darters. This method been demonstrated to be an effective method for detecting the presence of Stargazing Darters (Herzog 2005, Rigsby 2009). The Saline and Ouachita Rivers, as well as a comparison river in North Arkansas with a relatively abundant population, will be sampled. The Saline River will be divided into 3 segments, upper, middle, and lower, and these will be subdivided randomly into two reaches per segment. Sampling reaches will be standardized at 100m when feasible. These reaches will be trawled, with trawl run lengths being documented for abundance estimate calculations. Trawled segment lengths will be documented using a GPS. Mean water velocity at 60% depth will be recorded at the start and end points of each trawl run. Depth, conductivity, pH, dissolved oxygen, and temperature will also be recorded at the start and end of each trawl run. If Stargazing Darters are detected, a voucher specimen will be taken at each site and deposited in the reference collection of AGFC's Nongame Aquatics Program or an appropriate ichthyological collection. Collection data will be recorded into the state fish database made available to the Arkansas Natural Heritages Commission.

Sampling snails - The reaches, which were trawled for darters, will also be sampled for snail density and richness. Twenty five random samples will be taken at each trawl segment, using a benthic macroinvertebrate sampler. Snails will be preserved in 70% ethanol, and sent to Dr. David Hayes, Ph.D, Assistant Professor of Aquatic Invertebrate Zoology at Eastern Kentucky University for positive identification.

Expected Results and Deliverables:

1. Updated distribution and status of the Stargazing Darter in the Saline River.
2. Information on aquatic snail diversity and abundance, a poorly documented group of organisms in the state.
3. Correlation analysis of snail and Stargazing Darter populations.

Literature Cited

Herzog, D. P., V. A Barko, J. S. Scheibe, H. A. Hrabik and D. E. Ostendorf. 2005 Efficacy of a Benthic Trawl for Sampling Small-Bodied Fishes in Large River Systems, North American Journal of Fisheries Management 25: 594-603

Lydeard, C., Cowie, R.H., Ponder, W.F., Bogan, A.E., Bouchet, P., Clark, S., Cummings, K.S., Frest, T.J., Gargominy, O., Herbert, D.G., Hershler, R., Perez, K., Roth, B., Seddon, M., Strong, E.E. & Thompson, F.G. 2004. The global decline of nonmarine mollusks. BioScience 54(4): 321-330.

Pflieger, W. L. 1997. The Fishes of Missouri. Missouri Department of Conservation. Jefferson City, MO. 372 pp.

Rigsby, J. M. 2009. Status and genetics of the Stargazing Darter, *Percina uranidea*, in Arkansas. Masters Thesis, Arkansas State University, Russellville. 191 pp.

Simon, 2006. Biodiversity of Fishes in the Wabash River: Status, Indicators, and Threats. Proceedings of the Indiana Academy of Science 115(2):136-148

Budget:

Budget Item	<u>50% match scenario</u>		<u>35% match scenario</u>	
	Request	Match	Request	Match
Assistantship (UALR)	\$20,200		\$20,200.00	
Tuition (UALR)	\$11,000		\$11,000.00	
Staff Time (AGFC)		\$15,746		\$15,746
Staff Time (ANHC)		\$1,894		\$1,894
Professor Time (UALR)	\$6,202	\$4,512	\$6,202	\$4,512
Supplies	\$2,060		\$2,060	
Travel (UALR)	\$1,574		\$1,574	
Travel (AGFC)		\$2,516		\$2,516
Travel (ANHC)		\$388		\$388
F&A		\$19,000	\$14,738	\$6,000
Totals:	\$44,774	\$44,056	\$55,774	\$31,056
Project Cost:	\$88,830		\$86,830	

Qualifications:

Dr. Forrest Payne is an instructor in the Biology Department at the University of Arkansas at Little Rock. Dr. Payne received a BA from Hendrix College, a MS from the University of Arkansas at Fayetteville, and a PhD from the University of Wyoming. He has been teaching biology and aquatic related courses for the last nine years. Prior to taking the instructor position at UALR, Dr. Payne has held positions with the Department of Water and Natural Resources in South Dakota, as an environmental consultant with FTN Associates in Little Rock, Arkansas and as an environmental scientist/environmental, health and safety manager with ALCOA. His research interests include phytoplankton and zooplankton dynamics, water quality, and energy flow in aquatic systems.

Brian Wagner is the Nongame Aquatics Biologist with the Arkansas Game and Fish Commission. He has a Master's Degree in Fisheries from Virginia Tech, and has been involved in aquatic conservation and research with the Commission for 23 years. For the past 14 years, he has been the Commission's Nongame Aquatics Biologist. Brian coordinates the Commission's Nongame Aquatics Program and has specific oversight of nongame fish and crayfish efforts. He is a Certified Fisheries Scientist and has authored or co-authored peer-reviewed publications on sport fish, nongame fish, crayfish, reptiles, and amphibians. Brian led the State Wildlife Grants Crayfish Taxa Team, and was also active on the Fish, Cave, and Invertebrate Taxa Teams.

Kelly Irwin is the Herpetologist with the Arkansas Game and Fish Commission. He has a Master's Degree in Wildlife and Fisheries Science from Texas A&M. Kelly has served as the 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 of the state, having led conservation efforts and monitoring studies of numerous state endemic species, most recently the now federally endangered Ozark Hellbender.

Bill Posey is the Malacologist for the Arkansas Game and Fish Commission. Bill has an extensive understanding of the Saline River system, having been involved in numerous mussel and snail surveys in the Saline River and throughout the state.

Jeff Quinn is the statewide Stream Fisheries Biologist with the Arkansas Game and Fish Commission, and has worked in that position since 1998. He has a Master's Degree (Zoology) from the University of Arkansas. Jeff has authored or coauthored eight peer-reviewed publications on nongame, commercial, and sport fisheries. Jeff leads the Fish Taxa Team for revisions of the Arkansas Wildlife Action Plan and the State Wildlife grants program. Jeff is a Certified Fisheries Professional by the American Fisheries Society.

Jason Throneberry is a fisheries biologist/ecologist and is the aquatic specialist for the Arkansas natural Heritage Commission. Jason received a B.S. in Fisheries and Wildlife Biology from Arkansas Tech University and a M.S. in Biology from Tennessee Technological University. In his current position, he is responsible for and conducts surveys for Arkansas's aquatic species of concern, including federally protected species, throughout the state. Jason is also responsible for mapping and updating element occurrence records for species of concern, and assigning state conservation ranks for aquatic organisms.