

State Wildlife Grant Pre-Proposal – 2/03/15

Project Title:

Aquatic Biota in the Strawberry River, Arkansas in Relation to Instream and Riparian Habitat Characteristics.

Project Summary:

The goal of this project is to fill a data gap regarding the distribution and status of fish species of greatest conservation need (SGCN) in the Strawberry River. This project would re-characterize the entire fish community, which has not been done since the work of Robison and Beadle (1974). We propose to use the U.S. Environmental Protection Agency's Rapid Bioassessment Protocols (Barbour et al. 1999) and the Dauwalter (2002) Index of Biotic Integrity to relate instream and riparian habitat to fish community structure in the Strawberry River. The objectives of the current study include (a) assessing instream habitat and physicochemical water parameters; (b) assessing watershed and riparian habitat characteristics; (c) assessing Strawberry River fish communities, with particular attention to SGCN, using backpack and barge electrofishing protocols, and (d) relating fish community structure metrics (IBI, diversity, richness) to habitat characteristics using multivariate ordination techniques.

Project Leader:

Dr. Steve Lochmann, Professor, Aquaculture/Fisheries Department, University of Arkansas at Pine Bluff, 1200 N. Univ. Dr., Mail Slot 4912, Pine Bluff, AR 71601, lochmanns@uapb.edu, (870) 575-8165

Co-Project Leader:

Brett Timmons, District 3 Fisheries Supervisor, Fisheries Division, Arkansas Game and Fish Commission, 600-B East Lawson Road, Jonesboro, AR 72401, Brett.Timmons@agfc.ar.gov, (877) 972-5438

Project Partners:

Jason Throneberry, Aquatic Ecologist, Arkansas Natural Heritage Commission, 323 Center Street, Suite 1500, Little Rock, AR 72201, Jason@arkansasheritage.org, (501) 324-9619

Steve Filipek, Fish Biologist, Arkansas Wildlife Federation, 9108 North Rodney Parham Road Suite 101, Little Rock, AR 72227, arkwf@sbcglobal.net, (501) 414-2845

Tim Snell, Associate State Director for Water Resources, The Nature Conservancy, Arkansas Field Office, 38 West Trenton, Suite 201, Fayetteville, AR 72701, tsnell@tnc.org, (479) 973-9110

Project Budget Summary:

Budget category	Year 1	Year 2	Year 3	Total
Total Project Request	41614	43055	15745	100414
Total Match	22959	23422	14687	61068
Percent Match	37.8	%		

Project Statement:

a. Need –

This project addresses a data gap outlined in the “Fish” section of the 2015 State Wildlife Grant Request For Proposals (RFP). Specifically, the RFP points out a need for “distribution and status surveys of aquatic biota” in several Arkansas river basins, including the Strawberry River. The Arkansas Wildlife Action Plan lists 17 species of greatest conservation need (Species Reports, Fish, pgs 411-560) found in the Ozark Highlands ecoregion and in the Ozark Highlands – White River ecobasin (Table 1). The Arkansas Wildlife Action Plan does not list the Slenderhead Darter *Percina phoxocephala* as being found in the Ozark Highlands – White River ecobasin, but we included it in this compilation for reasons outlined below. We compared this list to Robison and Beadles (1974), Robison and Buchanan (1988), and a 2003 Arkansas Department of Environmental Quality (DEQ) Study of the Strawberry River system. Thirteen of the eighteen species from Table 1 are identified as having been collected from the Strawberry River. The 2003 DEQ study specifically lists finding the Slenderhead Darter in the Strawberry. Hence, a comprehensive fish faunal survey of the Strawberry River could potentially provide distribution and status information for thirteen species of greatest conservation need and characterize the current fish assemblage within a river identified by the State Wildlife Grant Program as a “biodiversity center.”

b. Purpose and Objectives –

The purpose of this project is to collect distribution and abundance information on thirteen species of greatest conservation need (see Table 1) specifically identified in the Arkansas Wildlife Action Plan. Relative abundance and distribution data will be used to determine the status of those species in the highly diverse Strawberry River drainage. This project would complement the Principal Investigator’s work on the Strawberry River specifically targeting Strawberry Darter *Etheostoma fragi* with minnow and kick seines. The collection and linkage of habitat data to the fish community data would help identify the characteristics of the watershed most responsible for contributing to its diverse nature.

The objectives of this project are to:

- Objective 1. Assess instream habitat and physicochemical water parameters at main channel and tributary sites of the Strawberry River,

- Objective 2. Assess watershed and riparian habitat characteristics at the sites identified in Objective 1,
- Objective 3. Assess fish communities, with particular attention to SGCN, using backpack and barge electrofishing protocols at the sites identified in Objective 1, and
- Objective 4. Relate fish community structure indices and metrics (IBI, diversity, richness) to habitat characteristics using multivariate ordination techniques.

c. Location-

The location for this study will be the Strawberry River Watershed (Figure 1). Sample sites include those listed in Robison and Beadles (1974) and DEQ (2003). These sites are located in Izard, Fulton, Sharp, and Lawrence counties in north central Arkansas. Sampling will take place in the main channel and tributaries, and in all major habitat types (riffle, run, shallow pool, and deep pool).

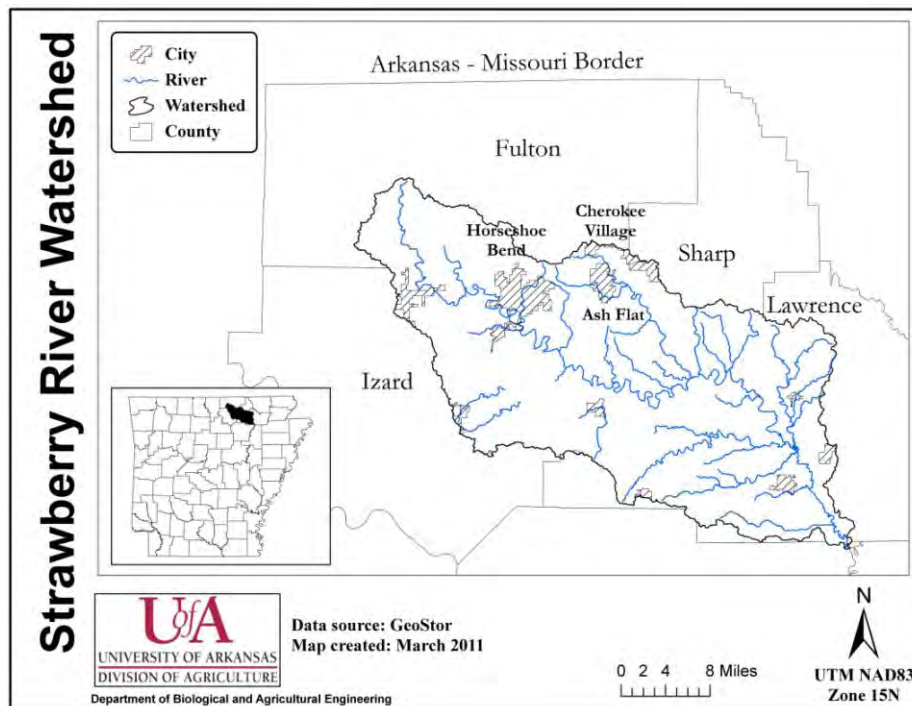


Figure 1. Strawberry River Watershed in north central Arkansas.

d. Approach –

The Project Leader, Co-Project Leader, a graduate student, a technician, and Project Partners will follow the U.S. Environmental Protection Agency’s Rapid Bioassessment Protocols For Use in Streams and Wadeable Rivers (Barbour et al. 1999). We will utilize four portions of the EPA’s protocols. At each station, we will record station identifier information including geospatial referencing, weather information, and watershed features. We will conduct instream habitat characterizations (i.e. stream characteristics, instream features, aquatic vegetation, substrate, sediment) and basic water quality assessments (temperature, conductance, dissolved oxygen, pH,

turbidity). We will assess riparian habitat such as riparian zone width, channel alteration, sinuosity, bank stability, and vegetative protection. We will conduct backpack or barge electrofishing to sample ichthyofauna. Sample lengths will vary depending upon stream channel width with a target of sampling a reach approximately 40 times the width and including two riffles, pools, and runs. Sampling will be single pass with block nets, using a team of at least two individuals for backpack shocking and three individuals for barge shocking. Fish will be held in livewells or buckets prior to field identification. Identifications will be to the species level. Specimens that cannot be identified in the field and voucher specimens will be preserved in 10% buffered formalin and identified later in a laboratory. Specimens returned to UAPB will be housed in the UAPB Ichthyology Teaching Collection. The relationships between instream habitat, water quality, riparian habitat and fish communities will be explored using multivariate ordination techniques, likely including principal components analysis, non-metric multidimensional scaling, and detrended correspondence analysis.

e. Expected Results and Benefits –

The expected results of this study will include distribution and status information for at least 13 species of greatest conservation need (see Table 1) from a pristine, diverse Arkansas stream. The Strawberry River has been identified as a biodiversity hotspot in the state. In addition to helping the state meet the monitoring and survey goals of the Wildlife Action Plan, these data can be used to exemplify the biodiversity of the Strawberry River and used to make management decisions regarding land use, habitat protection, and other natural resource conservation decisions about the Strawberry.

f. Detailed Budget –

Budget category	Year 1	Year 2	Year 3	Total
a. Salaries & Benefits				
Graduate Research Assistant	17800	18800	9400	46000
Technician (summer salary)	6880	6880	0	13760
Benefits	7651	7961	2914	18526
Total Salary and Benefits	32331	33641	12314	78286
c. Travel				
	3000	3000	1000	7000
d. Equipment (shocker maintenance, WQ monitors)				
	2000	2000	0	4000
e. Supplies (preservative, office supplies)				
	500	500	1000	2000
Project Cost	37831	39141	14314	91286
Recovered Indirect Cost (10% of Project Cost)	3783	3914	1431	9129
Total Project Request	41614	43055	15745	100414
Match				
a. District 3 Fisheries Supervisor (50 h/yr x \$50/h)				
	2500	2500	2500	7500
b. Unrecovered Indirect Cost (59.4% of S&W minus Recovered Indirect Cost)				
	10877	11340	4152	26369
c. Out of state tuition remission (\$221/credit hour)				
	3094	3094	1547	7735
d. ANH Project Partner (50 h/yr x \$50/h)				
	2500	2500	2500	7500
e. AWF Project Partner (40 h/yr x \$50/h)				
	2000	2000	2000	6000
f. TNC Project Partner (25 h/yr x \$50/h)				
	1250	1250	1250	3750
g. TNC Travel Costs (395 miles/yr x \$0.38/mile)				
	150	150	150	450
g. TNC Facilities (42 nights/yr x \$14/night)				
	588	588	588	1764
Total Match	22959	23422	14687	61068
Percent Match	37.82	%		

Steve Lochmann is a Professor in the Aquaculture/Fisheries Department at the University of Arkansas at Pine Bluff. Dr. Lochmann teaches Ichthyology and is responsible for the UAPB teaching collection. Dr. Lochmann has been conducting fisheries research for more than 25 years. He has collected larval and adult fish in marine, estuarine and freshwater habitats. He has worked with darters for more than five years, including captive spawning of Yellowcheek Darter (*E. moorei*), culture of larval and juvenile Yellowcheek Darter, and has been part of one effort to restock Yellowcheek Darter into a portion of the Middle Fork of the Little Red River from which it was extirpated. Dr. Lochmann has a permit from the USFWS to work with Threatened and Endangered Species. He has supervised the research of more than a dozen master's students during his 20 years at the University of Arkansas at Pine Bluff.

Brett Timmons is the North East Arkansas District Fisheries Supervisor for Arkansas Game and Fish Commission. His responsibilities include managing all water bodies in NE Arkansas in the counties of Clay, Craighead, Greene, Fulton, Jackson, Lawrence, Mississippi, Poinsett, Randolph, and Sharp. Brett received a B.S in Zoology from Southern Illinois University Carbondale in 2008. Brett received a M.S. in Fisheries from the University of Arkansas Pine Bluff in 2012 under the tutelage of Dr. Steve Lochmann. Brett has been conducting fisheries research for 8 years. Brett was involved with the captive spawning project on Yellowcheek Darter (*E. moorei*), culture of larval and juvenile Yellowcheek Darter, and was part of one effort to restock Yellowcheek Darter into a portion of the Middle Fork of the Little Red River.

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. Jason conducted his thesis research on re-introduction success of the federally threatened yellowfin madtom (*Noturus flavipinnins*) and the federally endangered smoky madtom (*Noturus baileyi*). In his current position, he is responsible for and conducts research upon 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, assigning state conservation ranks for aquatic organisms, and collection of water quality parameters from Natural Areas that may be affected by oil and gas exploration and extraction within the Fayetteville Shale Gas Play.

Steve Filipek is currently a Fish Biologist with the Arkansas Wildlife Federation. He recently retired from his position as Asst. Fisheries Chief for Programs with the Arkansas Game and Fish Commission. Steve worked for the AGFC for 36 years. As Asst. Chief, Steve managed nine full time biologists and three part time technicians. He served as its Arkansas Stream Team Coordinator, a relatively new position/program that he developed with the Arkansas Game and Fish Commission, funded by the 1/8 of \$0.01 sales tax. Before that position, Steve was the Statewide Fisheries Research Biologist for AGFC, a position he held from 1986-97. Prior to that, he worked as a District Fisheries Biologist, Asst. District Biologist, and Fish Culturist for the AGFC. He was also a Research Technician for the Washington Dept. of Fisheries, a seasonal

research aide for the California Dept. of Fish and Game, and a lab technician for the Colorado Div. of Wildlife. Steve has a B.S. in Fishery Biology from Colorado State University.

Tim Snell is Associate State Director of Water Resources for The Nature Conservancy of Arkansas responsible for working with partners to develop water resource strategies to provide the water that people and businesses need to thrive and prosper while maintaining Arkansas' aquatic habitats. Tim is a graduate of Louisiana State University School of Forestry and Wildlife. He has experience in fisheries, land management, wildlife management, agriculture and sustainable forestry. Tim currently serves as board member for the Illinois River Watershed Partnership and the Northwest Arkansas Land Trust. Prior to working with the Conservancy, Tim was Director of Natural Resource Conservation at the Kerr Center for Sustainable Agriculture in Oklahoma, President of the Rural Opportunity Fund (a revolving loan fund for farmers and agricultural businesses), Vice President and Chair of the Loan Committee of Forge (Financing Rural Growth and Economy - a revolving loan fund for farmers and agricultural businesses), and a Board Member for Ozarks Small Farm Viability Project. Tim is a Life Scout, Order of the Arrow Leader in Boy Scouts of America, hunter, fisherman, and gardener.

Table 1. Fish species of greatest conservation need listed in the Arkansas Wildlife Action Plan and existing in the Ozark Highlands ecoregion and in the Ozark Highlands – White River ecobasin.

Family	Species	Common Name	Robison & Beadles (1974)	Robison & Buchanan (1988)	DEQ (2003)
Petromyzontidae	Lampetra aepyptera	Least Brook Lamprey	X	X	
	Lampetra appendix	American Brook Lamprey			
Cyprinidae	Cyprinella camura	Bluntnose Shiner			
	Cyprinella spiloptera	Spotfin Shiner		X	
	Erimystax harryi	Ozark Chub			X
	Notropis ozarcanus	Ozark Shiner	X	X	X
	Notropis sabinae	Sabine Shiner	X	X	X
		Moxostoma anisurum	Silver Redhorse		
Catostomidae	Moxostoma macrolepidotum	Shorthead Redhorse			X
	Amblyopsis rosae	Ozark Cavefish			
Amblyopsidae	Typhlichthys subterraneus	Southern Cavefish			
Percidae	Ammocrypta clara	Western Sand Darter		X	
	Crystallaria asprella	Crystal Darter		X	X
	Etheostoma fragi	Strawberry Darter	X	X	X
	Etheostoma uniporum	Current Darter			
	Percina nasuta	Longnose Darter	X		
	Percina phoxocephala ¹	Slenderhead Darter			X
	Percina uranidae	Stargazing Darter		X	

¹Not listed as found in the Ozark Highlands ecoregion and in the Ozark Highlands – White River ecobasin by the Arkansas Wildlife Action Plan.

Mike Knoedl
Director
Jeff Crow
Chief of Staff and
Deputy Director



Andrew Bass
Assistant Deputy Director
Ricky Chastain
Assistant Deputy Director

Arkansas Game and Fish Commission

December 19, 2014

Dr. Steve Lochman Aquaculture/Fisheries Department
University of Arkansas at Pine Bluff
1200 N. Univ. Dr., Mail Slot 4912
Pine Bluff, AR 71601

SUBJECT: STRAWBERRY RIVER ICHTHYOFAUNAL SWG PROJECT

Dr. Lochman:

I am writing to confirm the commitment of Arkansas Game and Fish Commission's Fisheries Division as a project partner on this proposal. I am willing to assist with field sampling and review results of this study as described in the proposal. I intend to be a partner in this project, committing staff time, travel expenses, transportation, and equipment use to execute this important study. I acknowledge that the value of my time (50 hours per year average for the 3-year project duration) has been included as in-kind, non-federal match on this project.

I look forward to collaborating on this project.

Sincerely,

A handwritten signature in cursive script that reads 'Brett A. Timmons'.

Brett Timmons
District Fisheries Supervisor

Copies: Fisheries File



THE DEPARTMENT OF ARKANSAS
HERITAGE

Mike Beebe
Governor

Martha Miller
Director

Arkansas Arts Council

Arkansas Historic
Preservation Program

Delta Cultural Center

Mosaic Templars
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Arkansas Natural Heritage
Commission

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arkansas@naturalheritage.com

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January 7, 2015

Dr. Steve Lochman
Aquaculture / Fisheries Department
University of Arkansas at Pine Bluff
1200 North University Drive, Mail Slot 4912
Pine Bluff, AR 71601

SUBJECT: STRAWBERRY RIVER ICHTHYOFAUNAL SWG PROJECT

Dr. Lochman:

I am writing to confirm the commitment of the Arkansas Natural Heritage Commission as a project partner on this proposal. I am willing to assist with field sampling and review of the results of this study as described in the proposal. I intend to be a partner in this project, committing staff time, travel expenses, transportation, and equipment use to fulfill the study and grant requirements. I would like to be recognized in any publications that are written as a result of this project. I acknowledge that the value of my time (50 hours per year average for the 3-year project duration at a rate of \$50/hr) has been included as in-kind, non-federal match on this project.

I look forward to collaboration on this project.

Sincerely,

Jason Throneberry
Aquatic Ecologist
Arkansas Natural Heritage Commission



**Dr. Steve Lochman
University of Arkansas Pine Bluff**

Dear Dr. Lochman:

As I understand you and your students in cooperation with fisheries biologists with the Arkansas Game and Fish Commission are going to be conducting research on the Strawberry River in NE Arkansas. I've conducted considerable work on the Strawberry River during my recent 36 years as a fisheries management biologist, statewide fisheries research biologist, stream team coordinator and Assistant Chief over Fisheries Programs. I've conducted both ichthyological surveys as well as aquatic habitat surveys on the river and in doing so, found many areas to access the river for scientific study.

Therefore, I am willing to conduct 40 hours of work each year over a three year period as needed to help identify representative areas of the river for access and sampling. This cumulative 120 hours of work over three years is worth \$50.00 / hour in time, travel and transportation. I have included a biographical sketch for your review as well as a partial list of presentations, publications, and professional participation in scientific societies.

I request that you contact me on arrival of this correspondence. Your work on the Strawberry River with the diverse fish community that exists there is of great scientific importance.

Sincerely,

**Steve Filipek
Outreach Director
Arkansas Wildlife Federation**

January 22, 2015

Dr. Steve Lochman Aquaculture/Fisheries Department
University of Arkansas at Pine Bluff
1200 N. Univ. Dr., Mail Slot 4912
Pine Bluff, AR 71601

SUBJECT: STRAWBERRY RIVER ICHTHYOFAUNAL SWG PROJECT

Dr. Lochman:

I am writing to confirm the commitment of The Nature Conservancy's Arkansas Field Office as a project partner on this proposal. I am willing to assist with provision of on-site logistics, access and camping spaces for the study team during the study period as described in the proposal. I intend to be a partner in this project, committing staff time, travel expenses and transportation to execute this important study. I acknowledge that the value of my time (25 hours per year average for the 3-year project duration) has been included as in-kind, non-federal match on this project.

I look forward to collaborating on this project.

Sincerely,



Tim Snell

Associate State Director of Water Resources

Copies: TNCARFO Grant specialist, TNC ARFO Conservation Director