

State Wildlife Grant Pre-Proposal – 2/13/15

Project Title:

A Survey of Ichthyofauna in the Tributaries and Main Stem of the Little River in Southwest Arkansas

Project Summary:

The goal of this project is to conduct a distribution and status survey of ichthyofauna in three tributaries and the main stem of the Little River in southwest Arkansas. The three tributaries, the Rolling Fork, Cossatot, and Saline Rivers, flow south from the Ouachita Mountains ecoregion just into the South Central Plains ecoregion before joining the Little River. The Rolling Fork and Cossatot join the Little River before it flows into Millwood Lake. The Saline River joins Millwood Lake independent of the Little River. The Little River then flows briefly below Millwood Lake before joining the Red River. Because of differences in physiography and macrohabitat types, the ichthyofauna of the Little River system is quite diverse. For example, there are approximately 74 species reported in the Saline (Johnson 1978), 62 species reported in the Cossatot River (Cloutman and Olmstead 1974) and 71 species reported in the Rolling Fork River (Corkern 1978). We propose to survey ichthyofauna with several different collecting gears, including kick seines, minnow seines, mini fyke nets, and backpack, barge, and boat shockers as needed. We further propose to use this opportunity to compare the results of transects conducted by underwater video to more conventional transects conducted with some of the above listed sampling gears. The objectives of this study include: (a) an ichthyofauna survey in the main stem of the Little River and the three major tributaries; (b) comparisons of the results of underwater video transects to results from conventional collection methods; (c) comparisons of current ichthyofauna data to historical data to determine temporal trends, and (d) determination of life history characteristics of Bluehead Shiner.

Project Leader:

Steve Lochmann, Professor, Aquaculture and 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 Leaders:

Eric Brinkman, Fisheries Supervisor, District 7, Arkansas Game and Fish Commission, 7004 Hwy. 67 East, Perrytown, AR 71801, eric.brinkman@agfc.ar.gov, (877) 777-5580

Project Partner:

Steve Spicer, Operations Project Manager, Millwood Tri-Lakes Project Office, Little Rock District Corps of Engineers, P.O. Box 867, Little Rock, AR 72203, (501) 340-1455

General Project Budget:

Budget Category	Year 1	Year 2	Year 3	Total
Total Project Request	43264	44705	15085	103054
Total Match	24467	25061	13131	62659
Percent Match	37.8	%		

Project Statement:

a. Need –

The Little River is explicitly identified as a biodiversity center in need of status surveys for aquatic biota in the 2015 State Wildlife Grant – Request for Proposals. There are 19 fish species of greatest conservation need from 8 families listed in the Arkansas Wildlife Action Plan from the Red River ecobasin of the Ouachita Mountains ecoregion, or from the Red River ecobasin of the South Central Plains ecoregion (Table 1). We do not necessarily expect all 19 species to be present in this system. However, we note that one of these species, the Bluehead Shiner *Pteronotropis hubbsi*, is specifically identified in the 2015 State Wildlife Grant - Request for Proposals as a species in need of a distribution and abundance survey and life history study, due to its inclusion in a Mega-Petition to list 404 species as threatened or endangered (Center for Biological Diversity 2010). The need for ichthyofauna work in the Little River and the three tributaries targeted in this proposal seems clear.

b. Purpose and Objectives –

The major outcome of this project will be a current survey of the ichthyofauna of an important southwest Arkansas river and its tributaries. Comprehensive surveys of this system appear to have occurred more than 30 years ago. The results of a current survey will be compared to previous records, theses, and published literature to determine trends in distribution, abundance, and ichthyofauna biodiversity. Particular attention will be given to the Bluehead Shiner. We will examine size and age structure of populations of this species using common aging techniques (scales, spines, or otoliths). We will attempt to determine population characteristics, such as L-W relationship, Von Bertalanffy growth parameters, size at maturity, age at maturity, GSI, and longevity. We also intend to use this opportunity to compare traditional sampling gears to underwater video with respect to their ability to characterize species composition and relative abundance of ichthyofauna among several macrohabitat types and among the main stem and tributaries.

The objectives of this project include:

- Objective 1. During the spring and summer of 2016 and 2017, a comprehensive ichthyofauna survey will be conducted in the Little River and its three major tributaries using sampling gear appropriate for respective macrohabitats;
- Objective 2. During the spring and summer of 2016, we will pair samples with traditional sampling gears (kick seine, minnow seine, mini-fyke net, backpack shocker or barge shocker) with underwater video transects collected with GoPro cameras to compare their respective abilities to provide presence, relative abundance, and diversity data.

- Objective 3. Current distribution and abundance data will be compared with historical data to determine temporal trends of dominant fish species, species of greatest conservation need, and especially the Bluehead Shiner; and
- Objective 4. Subsamples of Bluehead Shiner will be collected to determine life history characteristics.

c. Location-

The Little River, a tributary of the Red River, begins in the Ouachita Mountains ecoregion of southeast Oklahoma, but flows 140 km in the South Central Plains ecoregion of Arkansas before joining the Red River (Figure 1). The Little River flows through Sevier, Little River, and Hempstead counties. Major tributaries of the Little River also flow through parts of Polk and Howard counties. We also note the presence of three reservoirs, DeQueen Lake, Gillham Lake, and Dierks Lake on the Rolling Fork, Cossatot, and Saline Rivers, respectively. The Little River flows into Millwood Lake and then into the Red River. While the Little River begins in the Ouachita Mountains of Oklahoma, the Little River is in the South Central Plains ecoregion as it crosses southwest Arkansas. The Little River is a meandering, somewhat turbid, lowland stream, while its tributaries are clearer, faster-flowing streams with gravel or bedrock bottoms.

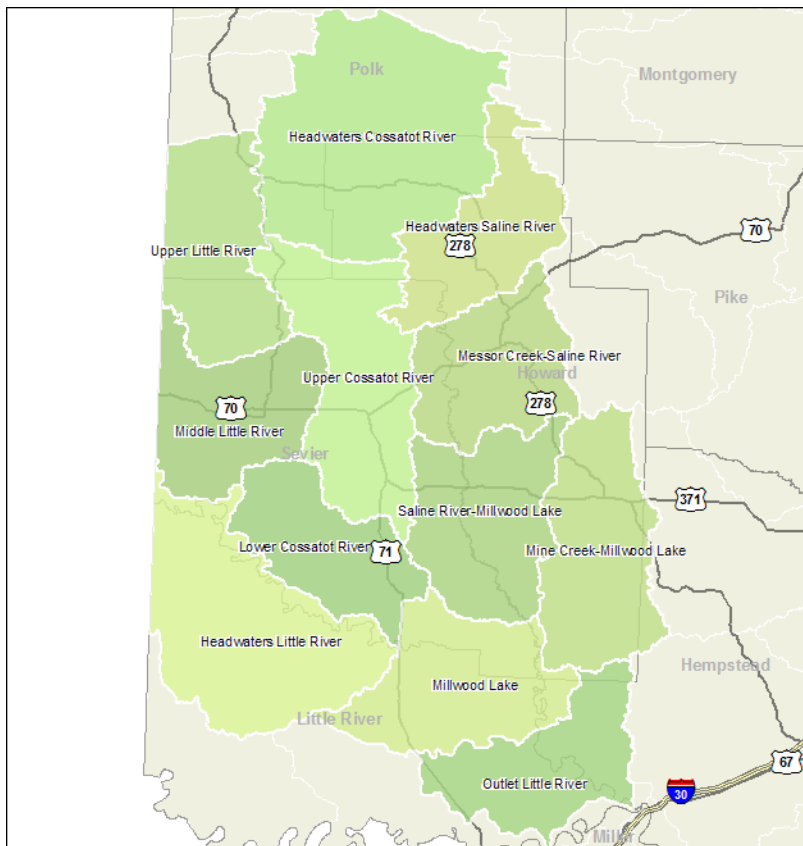


Figure 1. Eight digit HUC of Little River Watershed (11140109)

d. Approach –

The Project Leader, Co-Project Leaders, Project Partner, a graduate student, and an undergraduate student will be responsible for the ichthyofauna surveys. Representative samples of macrohabitats (riffles, runs, pools, backwaters, and emergent vegetation patches) will be identified in the Little River, Rolling Fork River, Cossatot River, and Saline River. A subsample of previously occupied sites (Cloutman and Olmstead 1974; Corkern 1978; Johnson 1978) will be included so that adequate comparisons can be drawn between historical and current data. Sampling gear appropriate for respective macrohabitats will be employed. Two GoPro underwater cameras will be employed during the first sample year (2016) such that presence and abundance data from underwater video and traditional sampling gear can be analyzed for presence and abundance using pair-wise techniques. Sampling techniques will follow the protocols outlined for warmwater fish in wadeable streams and rivers as outlined in Standard Methods for Sampling North American Freshwater Fishes (Bonar et al. 2009). We will also conduct sampling in the four reservoirs of the Arkansas portion of the Little River. Identification of species will occur in the field when possible. 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. Subsamples of Bluehead Shiner will be preserved in the field and returned to the lab for necropsies. Length, weight, age, sex, and maturity state will be determined for these fish so that population characteristics (L-W relationship, Von Bertalanffy growth parameters, size at maturity, age at maturity, GSI, and longevity) can be determined for respective populations of these species.

e. Expected Results and Benefits –

The expected results of this study will include updated status and trend data for ichthyofauna in the Little River and its tributaries. The trend data will inform management, conservation, and land use decisions in the watershed. The current state of ichthyofauna biodiversity in the Little River will also be forthcoming from this study. This study will provide current life history and population characteristics data for a species of greatest conservation need explicitly mentioned in the 2015 State Wildlife Grant – Request for Proposals as needing life history studies. Finally, this study will compare the use of new underwater video techniques for sampling stream fishes to more traditional techniques, potentially breaking ground for revised methods of conducting status and trend surveys in other watersheds and biodiversity centers across Arkansas.

f. Detailed Project 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
Budget category				
c. Travel	4000	4000	1000	9000
d. Equipment (seines, buckets, jars)	2000	2000	0	4000
e. Supplies (preservative, office supplies)	1000	1000	400	2400
Project Cost	39331	40641	13714	93686
Recovered Overhead (10% of Project Cost)	3933	4064	1371	9368
Total Project Request	43264	44705	15085	103054
Match				
a. State Regional Fisheries Supervisor Match (120 h/yr x \$50/h)	6000	6000	6000	18000
b. UAPB Unrecovered Indirect Cost (59.6% of Salaries)	10573	11167	5584	27324
c. UAPB Out of state tuition remission (\$221/credit hour)	3094	3094	1547	7735
d. State Regional Fisheries Assistant Supervisor Match (120 h/yr x \$25/h)	3000	3000	0	6000
e. AGFC Technician (120 h/yr * \$15/h)	1800	1800	0	3600
f. AGFC State Equipment Match	2500	2500	0	5000
Total Match	24467	25061	13131	62659
Percent Match	37.8	%		

Steve Lochmann is a Professor in the Aquaculture and 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.

Eric Brinkman is a District Fisheries Supervisor for the Arkansas Game and Fish Commission in Southwest Arkansas. Mr. Brinkman is directly responsible for managing the fisheries of this region, including the Caddo, Cossatot, Saline, Rolling Fork, and Little rivers. Mr. Brinkman has over 15 years of experience sampling and identifying freshwater fishes in streams, rivers, and reservoirs of the Southeastern U.S.

Literature Cited:

Bonner, S.A., W.A. Hubert, and D.W. Willis, editors. 2009. Standard methods for sampling North American freshwater fishes. American Fisheries Society, Bethesda, Maryland.

Center for Biological Diversity. 2010. Petition to list 404 aquatic, riparian, and wetland species from the southeastern United States as threatened or endangered under the Endangered Species Act.

Cloutman, D.G., and L.L. Olmsted. 1974. A survey of the fishes of the Cossatot River in southwestern Arkansas. *The Southwestern Naturalist* 19:257-266.

Corkern, C. K. 1979. A comprehensive ichthyological survey of the Rolling Fork River, southwest Arkansas. Masters Thesis, Northeast Louisiana University, Monroe, Louisiana, 27 pp.

Johnson, R.M. 1978. Fishes of the Saline River, southwest Arkansas. Masters Thesis, Northeast Louisiana University, Monroe, Louisiana, 96 pp.

Table 1. Fish species of greatest conservation need listed in the Arkansas Wildlife Action Plan existing in the Red River ecobasin of the Ouachita Mountains and South Central Plains ecoregions.

Family	Species	Common Name	Ouachita Mountains	South Central Plains
			Red River ecobasin	Red River ecobasins
Acipenseridae	Acipenser fulvescens	Lake Sturgeon		X
Polyodontidae	Polyodon spathula	Paddlefish		X
Lepisosteidae	Atractosteus spatula	Alligator Gar		X
Hiodontidae	Hiodon alosoides	Goldeye		X
Cyprinidae	Lythrurus snelsoni	Ouachita Shiner	X	
	Notropis atrocaudalis	Blackspot Shiner		X
	Notropis bairdi	Red River Shiner		X
	Notropis maculatus	Taillight Shiner		X
	Notropis ortenburgeri	Kiamichi Shiner	X	
	Pteronotropis hubbsi	Bluehead Shiner		X
Catostomidae	Cycleptus elongatus	Blue Sucker		X
	Erimyzon sucetta	Lake Chubsucker		X
Ictaluridae	Noturus phaeus	Brown Madtom		X

Table 1. cont.

Family	Species	Common Name	Ouachita Mountains	South Central Plains
			- Red River ecobasin	- Red River ecobasins
Percidae	Ammocrypta clara	Western Sand Darter		X
	Crystallaria asprella	Crystal Darter		X
	Etheostoma fusiforme	Swamp Darter		X
	Etheostoma parvipinne	Goldstripe Darter		X
	Percina pantherina	Leopard Darter	X	
	Percina phoxocephala	Slenderhead Darter		X

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

February 9, 2015

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

SUBJECT: LITTLE RIVER ICHTHYOFAUNAL SWG PROJECT

Dr. Lochmann:

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 (360 hours throughout the 3-year project), my assistant's time (240 hours), and the District 7 technicians' time (240 hours, as available) have been included as in-kind, non-federal match on this project.

I look forward to collaborating on this project.

Sincerely,

A handwritten signature in blue ink that reads 'Eric Brinkman'.

Eric Brinkman
District Fisheries Supervisor

Copies: Fisheries File

2 Natural Resources Drive • Little Rock, AR 72205 • www.agfc.com
Phone (800) 364-4263 • (501) 223-6300 • Fax (501) 223-6448

The Arkansas Game and Fish Commission's mission is to conserve and enhance Arkansas's fish and wildlife and their habitats while promoting sustainable use, public understanding and support.



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
LITTLE ROCK DISTRICT CORPS OF ENGINEERS
POST OFFICE BOX 867
LITTLE ROCK, ARKANSAS 72203-0867

February 10, 2015

Project: Little River Survey of Ichthyofauna
Attn: Eric Brinkman
Arkansas Game and Fish Commission
District 7
7004 HWY. 67 East
Perrytown, AR 71801

Mr. Brinkman:

This letter serves as documentation of Little Rock District's, Millwood Tri-Lakes support of Little River Survey of Ichthyofauna and its objectives within the boundaries of the Little Rock District.

The Corps has maintained a strong working relationship the Arkansas Game & Fish Commission over the years and will continue to support environmental stewardship efforts within our watersheds. Millwood Tri-Lakes will support this survey and assist in field sampling efforts at the Operation Project Manager's discretion.

If you need further assistance in this matter, please contact Tony Porter, Deputy Operation Project Manager, Millwood Tri-Lakes, at (501) 340-1455.

Sincerely,

STEVE SPICER
Operations Project Manager,
Millwood Tri-Lakes Project Office