

## **Life History Study of the Alligator Gar in the Ouachita River, Arkansas**

Summary: Current information indicates that a breeding population of alligator gar may inhabit the lower Ouachita River in Arkansas. Extensive sampling by Layher since 1998 on Arkansas' large rivers has yielded only one juvenile alligator gar which occurred in a tributary of the Ouachita River below Felsenthal Lock and Dam. This proposal addresses the documentation of such a population in the lower Ouachita River.

William G. Layher, Ph.D.  
President  
Layher BioLogics RTEC, Inc.  
7233 Camden Cutoff Road  
Pine Bluff, Arkansas 71603

[layher@earthlink.net](mailto:layher@earthlink.net)

phone/fax: 870-879-4808  
mobile: 870-672-8689

Requested amount: \$50,000  
Match Provided: \$50,000  
(Layher BioLogics)

The alligator gar was quite common in Arkansas and other southeastern states as well as Texas through the first one-half of the twentieth century. Populations were used extensively in Arkansas for sportfishing as well as commercial fishing. Declines in populations became noticeable in the White and St. Francis Rivers of Arkansas by the mid – 1950's. In recent years, most alligator gar captured in Arkansas have been large adult specimens harvested by bow-fishermen. Few specimens have been reported being collected by commercial fishermen or scientific collectors and investigators. Recent surveys of Arkansas' large rivers by Layher et al. produced only four alligator gar despite several years of intensive sampling on the Red, White, Ouachita, Arkansas, and St. Francis Rivers. The status of alligator gar in other states also appears to be one of decline. Reasons for this decline are currently unknown.

This past summer of 2006 yielded one juvenile alligator gar caught in a hoop net in a tributary of the Ouachita River in Arkansas (Layher 2006). This is the only capture that we know of which provides evidence that reproduction may be occurring in Arkansas waters. We propose to sample the Ouachita River below Felsenthal and Callion Lock and Dams quarterly, tagging adult fish, and sampling the lower Saline River and some smaller tributaries with trammel nets and hoop nets over a two year period. It is anticipated that some 100 hoop net-nights and 30 trammel net-nights will be conducted each quarter in the two river sections for a total of 200 hoop net-nights and 60 trammel net-nights per quarter. If allowed some individuals may be sacrificed for biological data gathering.

The Ouachita River is a stream flowing in its lower reaches through the Gulf Coastal Plain. This large river is thought to contain a viable population of alligator gar.

Most books describing fishes of various states or regions indicate little information as known regarding alligator gar reproduction or population status, though several such references elude to decline of inland populations in states which also have coastal populations. Some references refer to the life history of this species as similar to other gars, but offer no literature references or specific data. It is proposed that an extensive literature survey be conducted as well as a comprehensive review of individuals who might possess knowledge of the species in specific states. The status of the alligator in the United States is currently unknown. It is suspected that the alligator may be in peril and perhaps should be designated as either threatened or endangered. The species is listed as a species of concern in a number of states. A comprehensive review of existing literature will be compiled on this species for reference.

### **Objectives**

- 1- Determine population structure by length of alligator gar in the Ouachita River.
- 2- Determine if reproduction is occurring in alligator gar in the Ouachita River.
- 3- Document seasonal distribution of alligator gar in the Ouachita River.
- 4- Identify information in the literature regarding the life history, age and growth, reproduction, habitat use, movements, and status and distribution of alligator gar in North America.

5- Assess knowledge of researchers and fisheries managers throughout the current and former range of alligator gar to establish a current population assessment or status of the species.

6- Compile and summarize all existing sources of information on alligator gar to determine its current status and to summarize known information concerning the species life history and distribution.

7- Recommend whether or not the species might be considered as a candidate species for special status such as threatened or endangered throughout its range.

### **Expected Results**

-Documentation of the occurrence of a breeding population of alligator gar in the Ouachita River will be made or evidence to the contrary will be provided.

-Population structure, movement, relative abundance, distribution by season , and occurrence will be determined.

-Importance of tributaries in the reproductive strategies of the species will be determined.

-Literature will be extensively searched and summarized regarding life history, distribution, and status of the alligator gar.

-The compilation of the literature and questioning of scientists who may have knowledge of the species will allow an assessment of the species current status, thereby allowing for a recommendation concerning whether or not the species should be considered as a potential candidate for listing as threatened or endangered.

-The information gathered will be used by both state and federal agencies to better assess the status of the species within respective jurisdictional waters or project areas, and perhaps result in the identification of management strategies that may benefit the species.

Budget:

### **Wages:**

10 days per river section or 20 days total per quarter

Principal investigator 20 days x 10hr/day x \$23.75/hr x 4 quarters = \$19,000

2 Technicians x \$10/hr = \$16,000

### **Operating Expense:**

Per diem 3 persons x \$20/day x 20 days/quarter x 4 quarters = 4,800 (Layher BioLogics provides 1/3 or \$1,600)

Lodging 3 persons x \$60/day x 20 days/quarter x 4 quarters = 14,400 (Layher BioLogics provides 40% or \$5,804)

Mileage:

Estimated 1,800 miles per quarter at 44.5 cents/mile = \$801.00 x 4 = \$3,204

Boat fuel/oil/repairs estimated at \$3,000.00 (Donated by Layher BioLogics)

Data Entry/Analysis

10 days/quarter x 8 hrs/day x \$25/hr x 4 quarters = \$8,000.00 (Donated by Layher BioLogics)

Travel, Time, Write-up of Extensive Literature Review estimated at \$15,000.00  
(Donated by Layher BioLogics)

**Capital Expense:**

3 trammel nets @ \$500/net = \$1,500

20 hoop nets @ \$400/net = \$8,000

26 anchors @ \$50 each = \$1,300

GPS unit @ \$400

Total \$11,200.00 (equipment provided by Layher BioLogics)

Overhead @ 5.396% = \$5,396.00 ( Donated by Layher BioLogics)

Requested amount = \$50,000.00

Layher BioLogics Match = \$50,000.00

**Time Frame:**

Sampling would begin as soon as funding is available, presumably July 1, 2007. Sampling would be conducted quarterly. Summer, Fall, Winter, and Spring sampling would be conducted. Hence field work would be completed by June 30, 2008.

Data analysis would be completed and a report provided on the project by December 1, 2008. A pamphlet would be developed in publisher to summarize findings and be available for public distribution by AGFC.

During the course of work, local papers and perhaps some TV shows would be contacted to write articles or air study efforts. Additionally the outdoor writer for the Arkansas Democrat-Gazette would be contacted to allow him/her to accompany researchers on field sampling to help inform interested public.

Literature review and contacts for current information on the species would be ongoing but efforts would be expended early in the project as information may be found to facilitate our sampling efforts.

At the end of the project the conclusions of the study would be written in scientific format suitable for publication in a scientific journal with approval of AGFC. We would also be willing to present the study at scientific conferences chosen by the PI or AGFC. This could occur in winter 2008 or later depending on conference dates.

We would provide time and assistance to update the CWCS database with regard to our findings concerning the status of the alligator gar at a time convenient with AGFC staff.

**Layher BioLogics RTEC, Inc.**  
**7233 Camden Cutoff Road**  
**Pine Bluff, AR 71603**

Layher BioLogics RTEC, Inc. is a firm specializing in environmental and natural resource topics. Particular areas of activity include the development of Watershed Restoration Action Strategies, stream restoration, wetland restoration planning, coordination of activities and grant writing for nonprofit organizations, conducting river restoration efforts, research on aquatic species, large river fishery inventories, stream inventories, threatened and endangered species recovery plans, workshops on environmental topics, expert witness testimony, and instream flow analysis. Clients include or have included the U.S. Forest Service, the Environmental Protection Agency, Kansas Department of Wildlife and Parks, Oklahoma Department of Wildlife Conservation, Arkansas Game and Fish Commission, Arkansas Natural Heritage Commission, Arkansas Soil and Water Conservation Commission, among others.

**William G. Layher, Principal Investigator**

**Education:**

Ph.D. in Zoology - July 1983  
Oklahoma State University  
M.S. in environmental biology - December 1976  
Emporia State University  
B.S.E. - May 1972  
Emporia State University  
Major: Biology Minor: Physical Science

**Positions Held:**

U.S. Geological Survey, Research Biologist, 1990-1997  
Kansas Dept. of Wildlife and Parks, Environmental Services  
Section Supervisor and Aquatic Liaison Biologist, 1982-1990  
Research and Teaching Assistant, Oklahoma State University,  
1979-1981  
Biology Instructor, Towanda, KS, 1972-1979

**Adjunct Professorships held:**

Emporia State University, KS  
Pittsburg State University, KS  
Ft. Hays State University, KS  
Auburn University, AL  
Tennessee Tech University, TN  
University of Arkansas-Fayetteville, AR  
Southeast Arkansas Technical College, AR

**Publications:** Published over 60 scientific articles concerning natural resources, fish habitats, riverine ecosystems, water law, threatened and endangered species, and environmental contaminants.

**Presentations:** Presented approximately 100 papers at scientific conferences.

**Awards:** Received numerous awards for research, teaching, service and conservation from Oklahoma Wildlife Federation, Kansas Wildlife Federation, Arkansas Chapter of the American Fisheries Society, Kansas Chapter of the American Fisheries Society, Kansas Fish and Game Commission, U.S. Fish and Wildlife Service and others.

**Member:** Phi Kappa Phi, Phi Delta Kappa, Beta Beta Beta.

**Governmental Committees:** Have served on 29 Governmental Committees.