

Population Characteristics of Paddlefish (*Polyodon spathula*) in the Lower Arkansas River, Arkansas.

Paddlefish will be sampled in the last 50 km of the Arkansas River to evaluate population characteristics. Population characteristics such as abundance, growth, and condition will be documented for all paddlefish caught in gill nets. This information will give biologists a better understanding of the paddlefish population in this section of the river and will assist in determining management needs. The information will be compared to other pools of the river to get an overall understanding of the paddlefish population throughout the Arkansas River.

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Total Project Cost \$ 107,800

State Wildlife Grant Request: \$20,000

Matching Funds and In-Kind Services: \$87,800

Population Characteristics of Paddlefish (*Polyodon spathula*) in the Lower Arkansas River, Arkansas.

Funding and Conservation Priorities: The proposed study will address biological information needed to properly manage paddlefish populations in the lower Arkansas River. Paddlefish are listed as a species of greatest conservation need under the 2008 Wildlife Action Plan as implemented by the Taxa Association Teams/Habitat Teams and Steering committee.

Paddlefish has a calculated priority score of 29, with respective G (worldwide) and S (Arkansas) rankings of G4 – Apparently secure species and S2? – Imperiled in Arkansas (inexact numeric rank). The population trend for paddlefish is listed as *decreasing*. Within the aquatic fish report section of the Arkansas Wildlife Action Plan, the monitoring strategies for paddlefish are: 1) monitor commercial harvest, 2) monitor export of the species through the Convention of International Trade of Endangered Species (CITES), and 3) monitor population distribution and abundance in ongoing large river fauna surveys. Thus, this research would contribute to the monitoring of paddlefish populations and the development of better commercial harvest regulations for this segment of the Arkansas River.

Study Sites: Historically, in Arkansas, paddlefish have been found in the Ozark Highlands, Boston Mountains, Arkansas Valley, Ouachita Mountains, Mississippi Alluvial Plain, and South Central Plains ecoregions. For this study, the Mississippi Alluvial Plain will be the focal ecoregion and the Arkansas River will be the focal ecobasin. Sampling will be conducted on the 50 km section below Wilber D. Mills Lock and Dam No.2 to the mouth of the Arkansas River. This section of the Arkansas River is not maintained for navigation.

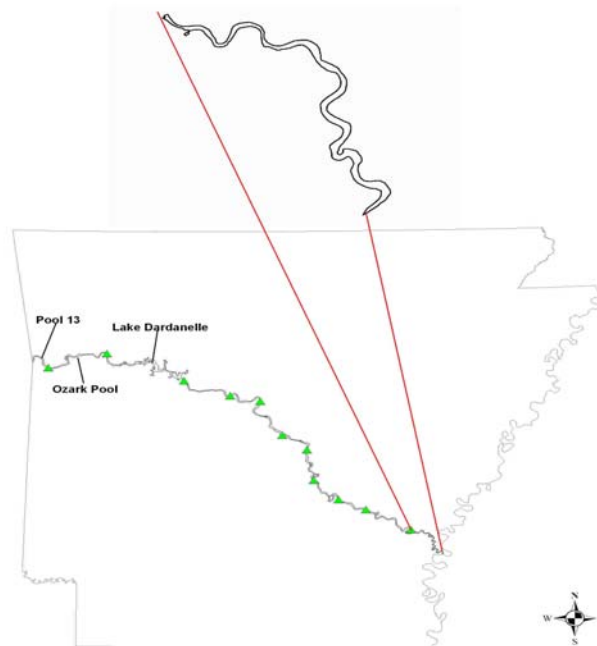


Figure 1: Map of Arkansas River in Arkansas and 50 km sample area. Green triangles represent dams on the river.

Study Goal: The proposed project will help to determine population characteristics of paddlefish in the Arkansas River, especially in the last 50 km section of the river. Paddlefish are abundant throughout the United States but numbers have been diminishing due to exploitation and changes in river morphology such as dam construction and river channelization. Paddlefish are commonly found in the Arkansas, Black, Mississippi, Ouachita, Red, and White Rivers in Arkansas. However, within these systems, little is known about the population characteristics or density of paddlefish.

Paddlefish are considered as a sportfish, nongame, and a commercial fish in Arkansas. Sport fishermen are allowed to harvest two paddlefish of any length per day. With annual increases in the price of roe, commercial fishing and harvest of paddlefish has greatly increased. New regulations, enacted in 2008, require harvestable paddlefish to be 37 inches long in the Dardanelle and Ozark Pool, and 36 inches below Dardanelle Dam to the Mississippi River. In 2009, the 37-inch eye-fork length will also be implemented below Dardanelle Dam to the Mississippi River. The regulation changes are necessary to allow biologists to effectively manage the paddlefish population while allowing sustainable harvest. However, with changes in regulations, populations need to be monitored to ensure the regulations are helping to effectively manage the paddlefish population while allowing harvest. Recently, the Arkansas Game and Fish Commission (AGFC) and Arkansas Tech University (ATU) completed studies that evaluated the population characteristics and movements of paddlefish in three pools of the Arkansas River in Western Arkansas. These three pools were selected because of the high amount of commercial fishing pressure they receive. Seventy-eight percent of the reported commercial paddlefish harvested from 2002 to 2007 in the Arkansas River was from these three pools. However, comprehensive population characteristics data for paddlefish is lacking in the proposed study area. From 2002 to 2007, seven percent of the commercial paddlefish harvest from the Arkansas River occurred in the proposed study area, making it the fourth most heavily harvested section of the river.

The overall goals and objectives of this study are 1) collect a representative sample of paddlefish, 2) gather population data (abundance, growth, and condition) of paddlefish in the lower 50 km section of the Arkansas River, and 3) compare data collected to other studies recently completed on the Arkansas River. Once the data is collected, it can be used to determine if the current regulation is appropriate and if additional regulatory measures are needed to conserve the paddlefish population in this section of the river.

Materials and Methods: Paddlefish will be sampled in the proposed river section from November-March during the 2008-2009 and 2009-2010 study years. The proposed 50 km sampling section will be broken into three 16 km strata. Within each stratum, paddlefish will be sampled using 127 mm (5-inch) and 152 mm (6-inch) bar-mesh monofilament gill nets. Approximately 100-200 meters of each mesh size will be fished for a minimum of two nights (approximately 40 – 48 soak hours). During the sampling seasons, the first 35 fish captured from each stratum will be harvested. Once a total of 210 paddlefish has been collected, other paddlefish will be harvested as needed. All harvested fish will be measured for eye-fork length (EFL) to the nearest millimeter, weighed to the nearest 0.1 kg, sexed, and the left dentary bone will be extracted for age analyses. All gravid females will have the ovaries extracted and the extracted ovaries will be weighed to the nearest gram. Paddlefish captured but not harvested will be measured, marked, and released.

During the non-sampling period, the dentary bones will be sectioned into thin sections using a low speed diamond saw. Using a microscope camera, pictures will be taken of each sectioned dentary. Mean back-calculated length at age will be determined from the sectioned dentary. Other data examined besides growth rates will be catch per unit effort, fecundity, annual mortality and male:female ratio. Most of the analysis will be completed using Fishery Analyses and Simulation tools (FAST)

Study Results and Benefits: The results of this study will provide population characteristics of paddlefish inhabiting the lower section of the Arkansas River. The baseline data will assist managers in developing harvest regulations to insure sustainability for the paddlefish population in this area. Additionally, this study will provide baseline data to begin a monitoring program that examines changes in fish abundance, size structure, and growth rates over time.

The materials and methods proposed for this study are similar to others recently completed by the AGFC and ATU on the upper part of the Arkansas River, Arkansas. Results from this proposed study will be compared to existing paddlefish data from the upper part of the Arkansas River, Arkansas to determine population similarities between these two areas. This will allow a better understanding of the paddlefish populations in the Arkansas River.

Budget and Expenditures

Source Items	Study Years		Grant
	2008-2009	2009-2010	
Salary Items:			
Two AGFC biologists @ \$40 manhour for 1000 hours/year	\$40,000	\$40,000	\$0
Operating Expenses:			
AGFC vehicle (5000 miles @ \$0.43/mile)	\$2,150	\$2,150	\$0
AGFC boat gas	\$1,500	\$1,500	\$0
Capital Expenses:			
Monofilament net and supplies	\$250	\$250	\$3,500
18' aluminum boat	\$0	\$0	\$6,000
90 hp boat motor	\$0	\$0	\$6,000
Boat trailer	\$0	\$0	\$1,600
Digital Microscope with Camera	\$0	\$0	\$2,000
Saw blade	\$0	\$0	\$200
Bench Scale	\$0	\$0	\$400
Miscellaneous Items	\$0	\$0	\$300
Project Totals	\$43,900	\$43,900	\$20,000

Total Project Cost	\$107,800
Matching Funds and In-Kind Services	\$87,800
State Wildlife Grant Request	\$20,000

Qualifications of Individuals and Organizations Involved

Organizations:

Arkansas Game and Fish Commission – The Arkansas Game and Fish Commission’s mission is to wisely manage all the fish and wildlife resources of Arkansas while providing maximum enjoyment for the people.

Research Personnel:

Jeremy Risley – Fisheries Management Biologist

2.5 years as Fisheries Management Biologist

2.5 years as Fisheries Graduate Student

5 summers as part-time technician with AGFC

4 years as an undergraduate majoring in wildlife and fisheries biology

Member of American Fisheries Society

Member of Arkansas Chapter of American Fisheries Society

Diana Andrews – District Fisheries Supervisor

3 years as District Fisheries Supervisor

8 years as Fisheries Management Biologist

4 years as an undergraduate majoring in biology with an emphasis on fisheries

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