

ANNUAL PERFORMANCE REPORT

Arkansia wheeleri monitoring in the Kiamichi River

Submitted to:

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By

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ANNUAL PERFORMANCE REPORT

STATE: Oklahoma

PROJECT NO: E-59-1

PROJECT TITLE: *Arkansia wheeleri* monitoring in the Kiamichi River

SEGMENT DATES: July 28, 2003 – June 30, 2004.

A. NEED

Arkansia (syn. *Arcidens*) *wheeleri*, the Ouachita Rock Pocketbook Mussel, is a federally endangered species whose only known remaining viable population occurs within a 128 km stretch of the Kiamichi River in Pushmataha County, Oklahoma. In 1990 we conducted qualitative and semi-quantitative (timed searches) surveys at over 30 sites in this river. In 1991 and 1992, quantitative (excavated quadrats) and semi-quantitative sampling was accomplished. In 1992, 10 proposed long-term population monitoring sites for *Arkansia wheeleri* were established. These sites were chosen to be as evenly distributed as possible along the Kiamichi River above Hugo Reservoir while still being reasonably accessible, and were located such that four sites were above and six sites were below the inflow Jackfork Creek, which was impounded in the 1980s to construct Sardis Reservoir (Figure 1). All *A. wheeleri* that were found at these sites were measured using digital calipers (height, width and length), and individually marked using numbered, laminated plastic fish tags. All specimens were returned to the same location from which they were captured. Additionally, densities, relative abundance and size distributions (which correlate to age) of associated mussel species were recorded.

As part of the recovery of *A. wheeleri*, it is important that the Kiamichi River population be monitored on a long-term basis. In addition, the entire mussel community in the Kiamichi River should be monitored to detect any changes in mussel abundance and size class structure. Along with *A. wheeleri*, the Kiamichi contains other rare mussel species including the recently listed Scaleshell (*Leptodea leptodon*). Observations by researchers in the early 1990s suggest that recruitment of mussels is decreasing in that portion of the Kiamichi River below the inflow from Sardis Reservoir (Vaughn and Pyron 1995). Monitoring these trends in a timely manner could well prevent the need for listing of other mussel species in the Kiamichi River system. Specifically, we will survey the 10 monitoring sites for mussels using standard, published techniques used in previous surveys of the Kiamichi River (Vaughn and Pyron 1995; Vaughn et al. 1997). Surveys will look specifically for previously marked *A. wheeleri* as well as new *A. wheeleri* specimens, and the size dimension of all individuals will be measured to determine growth rates and age-class structure. At each monitoring site, data will be collected regarding the relative abundance and size distributions of the mussel species associated with *A. wheeleri*. The habitat conditions and potential threats to mussels and their habitats will be assessed. Other reaches of the Kiamichi River will be surveyed to determine the location of mussel beds that were missed in the earlier surveys.

B. OBJECTIVES

To determine the abundance, density and population size structure of *Arkansia wheeleri* and associated species at ten established monitoring sites in the Kiamichi River, and to search for other potential mussel beds which support *A. wheeleri*.

C. SUMMARY OF PROGRESS

This report covers activity from July 2003 through 15 September 2004.

After completing the 1990-1992 *A. wheeleri* study in the Kiamichi River (Vaughn et al. 1993), we discovered two new subpopulations, and established these sites as additional monitoring sites (sites 11 and 12; Figure 1; Table 1). In July and August 2003 and August 2004, we semi-quantitatively and quantitatively sampled monitoring sites 1 – 11 using timed searches and quadrat sampling. We did not initiate fieldwork prior to July 1, 2004 because of high water levels in the Kiamichi River. Data on mussel species composition, absolute abundance (mussel abundance standardized as mussels found per hour of sampling effort in a timed search), relative abundance, and density (number of individuals per square meter from quadrat samples) from the monitoring sites are presented in Table 2. In the final report for this project, these results will be compared to results from the early 1990s to see if changes in mussel species composition have occurred. We also measured the size of all sampled mussels. Size distributions of all mussel species at each monitoring site will be calculated and compared to the early 1990s results in the final report.

At each monitoring site, we sampled habitat parameters including depth, flow, water temperature, and substrate composition. These data will be examined for their influence on mussel community structure and the presence or absence of *A. wheeleri* and presented in the final report.

In 2003, we canoed stretches of the upper Kiamichi River in search of undocumented mussel beds and new *A. wheeleri* locations. We located nine additional mussel beds (Figure 1; Table 1). Semi-quantitative data on mussel composition was collected at these sites and will be presented in the final report. No *A. wheeleri* were found at any of these sites.

In 2003 – 2004, *A. wheeleri* were found only at site 11. Two individuals were located in a timed search and their dimensions are given below:

Individual 1: Length - 67.34 mm
Height - 55.12 mm
Width – 37.15 mm

Individual 2: Length - 82 mm
Height - 67 mm
Width - 37 mm

In 2003-2004, *A. wheeleri* were not found at six sites where they were known to occur in the early 1990s, sites 1, 2, 3, 5, 6, and 7, despite extensive survey effort. Several of these sites have experienced major disturbance in the last 10 years, in particular sites 3 and 5. Site 3 is very silted in, probably from bridge construction. The riparian area at site 5 has been cleared and the site is very silted-in compared to 10 years ago. Mussel beds at both of these sites are diminished. Sites 6 and 7 appear very healthy and we don't know why *A. wheeleri* were not found at these locations. However, *A. wheeleri* is rare and can be easily missed. Thus, we intend to resample these sites in summer 2005 to make absolutely sure the species no longer occurs there.

D. FUTURE PLANS

In summer 2005 we will sample monitoring site 12 and canoe mid- and lower stretches of the river in search of new *A. wheeleri* locations. Time allowing, we may also perform additional timed searches at the monitoring sites where *A. wheeleri* were found in the early 1990s but not in 2003-2004 (sites 1, 3, 5, 6, 7; Figure 1; Table 1).

E. LITERATURE CITED

- Vaughn, CC, Pyron, M, Certain, DL (1993) Habitat Use and Reproductive Biology of *Arkansia wheeleri* in the Kiamichi River, Oklahoma -Final Report. Oklahoma Department of Wildlife Conservation.
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- Vaughn CC, Taylor CM, Eberhard KJ (1997) A comparison of the effectiveness of timed searches vs. quadrat sampling in mussel surveys. In: Cummings KS, Buchanan AC, Koch LM (eds) Conservation and Management of Freshwater Mussels II: Initiatives for the Future, pp 157-162

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