

Project Title: Charting Freshwater Mussel Ranges and Community Characteristics as They Existed Prior to Historic-Period Human Impacts in Arkansas

Project Summary:

We propose to synthesize data on freshwater mussel shells from archaeological sites throughout Arkansas, to provide range maps and information on the relative abundance of species as they existed prior to the extensive alteration of waterways. Data from the “gray literature” of cultural resource management contract reports will be obtained via review of reports and state site files, and previously unanalyzed shell collections will be identified via consultation with the State Historic Preservation Officer, the Arkansas Archeological Survey, state universities, and other contacts. Existing data will be reviewed and compiled, with suspect identifications being checked via inspection whenever possible. Previously unanalyzed assemblages will be evaluated for sample adequacy and bias via rarefaction curves and other methods. This project will result in data tabulated by drainage, range maps, and images of representative specimens to be published in a monograph; and an extensible electronic database to allow for additional data in the future.

Project Leader: Evan Peacock, Professor of Anthropology, Department of Anthropology & Middle Eastern Cultures, and Senior Research Associate, Cobb Institute of Archaeology, Mississippi State University. PO Box AR, Mississippi State, MS 39762; 662-325-1663; peacock@anthro.msstate.edu

Project Partners: John Harris, Welch/Harris, Inc., 10846 Plantation Lake Road, Scott, AR 72142-9458; 501-961-1419; omibob@gmail.com; Robert J. Scott, Research Assistant, Arkansas Archeological Survey, Box 4814 UAPB, 1200 N. University, Pine Bluff, AR, 71601; 870-535-4509; rscottjr@uark.edu

Project Budget:

SWG amount requested: \$50,193

Matching amount provided: \$39,850 (79% match)

Total amount of project: \$94,043

Project Statement:

Need. Freshwater mussels are a major focus of conservation efforts (e.g., Bogan 1993 Neves et al. 1997; Strayer et al. 2004) that could benefit from a long-term perspective (Bogan 1998; NNMCC 1998) given the extent to which waterways were altered prior to systematic surveys. The remains of mussels collected by Native Americans, if considered with proper caveats, provide data related to pre-modern ranges and community structures. Many collections of archaeological shell from Arkansas exist. Some have been analyzed, but the data are buried in technical reports and most have not been vetted by professional biologists. Many collections remain unanalyzed. With checks of existing data and new analysis of collections, a statewide database on original mussel ranges and abundances can be established, providing an important historical baseline for habitat reconstruction and species management efforts.

Purpose and Objectives. Although case-specific comparisons of archaeological with modern assemblages exist, syntheses of archaeological shell data at broader scales are lacking. The proposed work will be only the second state-wide synthesis in North America, the first being in Mississippi, where hundreds of cultural resource management reports were reviewed along with files at the state Archives. Published data (e.g., Peacock and James 2002) were compiled, and visits were made to universities and other repositories to seek out unanalyzed shell. In total, data on 77,257 valves representing 42 sites in 18 counties in four different drainage basins were obtained. Range maps for 69 species were created, with photographs of specimens (Peacock et al. 2011). Many new stream records were established, and major differences between prehistoric and modern ranges were noted (e.g., the once-widespread presence of *Cyprogenia aberti*, *Plethobasus cyphus*, and *Elliptio dilatata* in the Mississippi River Valley).

Our purpose and objective is to synthesize existing data, and to produce new data, on archaeological shell assemblages throughout Arkansas which, when paired with the Mississippi work, will provide the nucleus of what ultimately can become a regional database on original mussel ranges and community structures.

Location. State-wide. Archaeological shell has been reported from streams across the state. A preliminary review of records for Arkansas provides a list of 906 sites on the Arkansas, Black, Boeuf, Buffalo, Cache, Illinois, Kings, Little, Little Missouri, Little Red, Mississippi, Ouachita, Petit Jean, Poteau, Red, Saline, St. Francis, Tyronza, and White rivers and Bartholomew, des Arc, de View, Dorcheat, and Meto bayous, and tributaries of many of these streams, where shell is known to occur. While some Arkansas work has been published (e.g., Parmalee 1959; Gordon 1983; Ray 1994; Weinand et al. 1997; Hilliard 2004; Clark et al. 2008; Peacock 2011; Peacock et al. 2013;), the potential of this data source remains largely untapped.

Approach. Work will include: 1) review of state files and gray literature to compile existing data; 2) review of data to identify suspect identifications; 3) verification/correction of suspect specimens; 4) identification of unanalyzed collections of shell; and 5) original analysis. Data compilation will be done by Peacock and Scott. Suspect identifications will be noted and investigated with help from Harris. Analysis of collections will be done by Peacock, Scott and Harris, with the aid of a Graduate Research Assistant to be supervised by Peacock.

Expected Results and Benefits. Product will a monograph with data on freshwater mussels by drainage, descriptions of sites and collections, assessments of collection bias, range maps, and images of representative specimens; we anticipate publishing this monograph as part of the Arkansas Archeological Survey's research series, although we also anticipate a number of articles that will be submitted to naturalist journals. We also propose the creation of an extensible electronic database to allow for additional data to be added in the future, to which other scholars can contribute. The Arkansas Archeological Survey has agreed to host this database.

Budget:

Peacock

Graduate Research Assistant: 1 for 2 years

Tuition AY 2015 @\$834/month x 9 mo.....	\$7,506
Tuition AY 2016 @\$875/month x 9 mo.....	\$7,875
Stipend@\$1,100/month x 18 months (9 mo./year).....	\$19,800
Fringe benefits @ 0.73% of stipend.....	\$145
Insurance AY 2015@\$89/month x 9	\$801
Insurance AY 2016@\$94/month x 9 mo.....	\$846
Bags and other lab supplies.....	\$2,000
Travel (to obtain collections, round trip to MSU, etc.).....	\$1,000

Scott (paid from MSU)

Travel (to obtain collections, visit repositories, etc.).....	\$819
Per diem during travel.....	\$2,838

Harris (paid from MSU)

Travel (to obtain collections, visit repositories, etc.).....	\$2,000
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Total direct costs.....	\$45,630
Indirect costs: 10% of total direct costs.....	\$4,563
Total request.....	\$50,193

Matching:

Dr. Peacock’s research time @ 10% of 9 month salary

AY 2015.....	\$7,989
AY 2016.....	\$8,229
Fringe benefits @ 36.09% of salary.....	\$5,853
Scott’s research time.....	\$8,579
Difference between MSU 45.5% MTDC indirect cost rate and AG&FC 10% TDC allowable rate \$13,763-\$4,563.....	\$9,200
Total match.....	\$39,850

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Qualifications

Evan Peacock received his BA in Anthropology from Mississippi State University in 1988, his M.Sc. in Environmental Archaeology and Paleoecology from the University of Sheffield, U.K. in 1990, and his Ph.D. in Archaeology from Sheffield in 1999. He is Professor of Anthropology with the Department of Anthropology & Middle Eastern Cultures, and Senior Research Associate with the Cobb Institute of Archaeology, Mississippi State University. Peacock's work with mollusks began with his master's thesis on land snails from interglacial deposits in eastern England and continued with his doctoral thesis on freshwater mussels and prehistoric human impact in the southeastern United States. He collaborates with a number of freshwater biologists and has analyzed archaeological shells from Mississippi, Alabama, Tennessee, Louisiana, and Ohio. Publications on this work have appeared in journals such as *Archaeofauna: International Journal of Zooarchaeology*, *Assemblage*, *Conservation Biology*, *Ecological Applications*, *Journal of Archaeological Science*, *Journal of Field Archaeology*, *Journal of the Mississippi Academy of Sciences*, *Midcontinental Journal of Archaeology*, *Southeastern Naturalist*, and *Southeastern Archaeology*, as chapters in several edited volumes, and as a monograph dedicated to archaeological mussel shell in Mississippi (Peacock et al. 2011).

Robert J. Scott earned a B.A. in Anthropology from Southern Illinois University Carbondale in 2000, an M.A. in Anthropology from the University of Alabama in 2004, and is a doctoral candidate in Anthropology at Southern Illinois University Carbondale. Scott currently works as a Research Assistant for the Arkansas Archeological Survey at the Pine Bluff Research Station and previously worked in the same capacity at the Monticello (2004-2007) and Jonesboro (2010-2013) research stations. He has conducted excavations in Illinois, Alabama, Georgia and Arkansas and has extensive experience in the laboratory analysis of artifacts, vertebrate faunal remains, and mussel shell from archaeological sites. His work with mussel shell in Arkansas has included the analysis of assemblages from sites along streams in the Western Lowlands and eastern Ozarks of northeast Arkansas, Bayou Bartholomew in southeast Arkansas, and the lower Saline River in the Felsenthal region of south Arkansas. His work on archaeological mollusks has been given in numerous papers and technical reports and in refereed journals (e.g., Peacock et al. 2013).

John L. Harris received his B.A. in Biology from Southern Arkansas University in 1975, his M.S. in Biology from Northeast Louisiana University in 1977, and his Ph.D. in Zoology from the University of Tennessee, Knoxville in 1986. He worked for over 30 years in the Environmental Division of the Arkansas Highway and Transportation Department, where he served as Assistant Division Head with responsibilities ranging from water quality monitoring to construction impact assessment, wetland ecosystem analysis, National Environmental Policy Act assessment and Environmental Impact Statement preparation. His long list of technical reports and publications related to freshwater mussels includes articles in *American Malacological Bulletin*, *American Midland Naturalist*, *Ecology and Evolution*, *Fisheries*, *Genetics*, *Journal of the Arkansas Academy of Science*, *Journal of the North American Benthological Society*, *Molecular Ecology Notes*, *Nautilus*, and *Southeastern Naturalist*. In 2007 he won the William J. Clench Memorial Award for study of freshwater mollusks from the Freshwater Mussel Conservation Society. He currently is Adjunct Assistant Professor of Biology and Curator of Fishes and Mollusks at the Museum of Zoology, Arkansas State University.