

Abstracts

Volume 8, Number 1 (2000) "Freshwater Mussels in the Great Plains: Ecology and Prehistoric Utilization": 150 pages

Introduction to the Symposium

by Kerry Lippincott

These published papers, from a symposium, "Freshwater Mussels in the Great Plains: Ecology and Prehistoric Utilization" presented at the 56th Plains Anthropological Conference in Bismarck, North Dakota, are a direct outgrowth of an earlier symposium and published papers. That earlier symposium, "Gulf of Mexico Marine Shell Ornaments from the Northern and Central Great Plains" was held at the 53rd Plains Anthropological Conference and was published, in part, as a joint effort of the Nebraska Association of Professional Archeologists and the Nebraska State Historical Society (*Central Plains Archeology*, V. 5, N.1). Several participants overlap from both symposia and the theme, an attempt to provide an overview of an under-appreciated resource, is similar. . . .

Mussels, Bison Kills, and Pots: Clarity in the Archeological Record

by Donald J. Blakeslee

This paper is intended to serve as an introduction to the archeological chapters in this volume, particularly that by Ron Dorsey. It argues that while often ignored, archeological mussel shell assemblages possess a combination of attributes that make them particularly susceptible to highly informative modes of analysis. They are, in fact, rather like bison kill site assemblages and should receive the same level of attention.

Archeological Interpretation of Freshwater Mussel Assemblages near the Solomon River, Kansas

by Ron Dorsey

In this paper the author examines and interprets bivalve mussel samples associated with the Solomon River phase of the Central Plains. Approximately 15,000 individual shells from seven sites in the Waconda Lake area (Glen Elder Reservoir) are included in the investigation. The results of minimum number of individuals (MNI), paleohabitat reconstruction, and cross-section analysis of the most common species (*Quadrula pustulosa*) provide insight into the gathering behaviors of early occupants.

Site occupants collected the mussels from the Solomon River or its tributaries throughout the year and used the animals for food. The resulting concentrations suggest two distinct gathering behaviors. Casual collection produced the small samples as dietary supplements, and the

inhabitants harvested the larger concentrations every four or five years for social events or because of stress in the horticultural cycle.

Freshwater Mussels from Nebraska Phase Sites along the Missouri River Drainage in Southwestern Iowa

by K. Kris Hirst

In 1990, James Theler reported on the mollusk assemblages from eight Nebraska phase archeological sites in southwestern Iowa. Theler examined 275 valves and identified 13 species. Since that time, 419 valves from nine additional sites have been examined and seven additional species found in the most recently studied collections. The mollusks represent primarily a source of raw material for shell tools, as shown by the extensive collection of utilized shell from these sites.

A Critical Review of the Unionoid Mollusks Reported for Nebraska by Samuel Aughey (1877)

by Ellet Hoke

Aughey's (1877) paper is analyzed and the history and fate of the related unionoid specimens is detailed. Based on currently known distributions of the species reported and an analysis of surviving specimens, it appears likely that many of the identifications in the paper are incorrect.

Mussels and Marginal Utility

by Thomas P. Myers and Keith Perkins III

Though the Plains region is normally construed as a grassland crossed by rivers, the eastern Plains in particular might be better characterized as rivers separated by grasslands. That is, the rivers are the key ecological component. With huge herds of bison, Plains grasslands between the rivers were far more productive than the forested uplands between the rivers of eastern North America. In this paper the authors suggest that the Nebraska phase is best understood as a riverine culture with its primary orientation to the Missouri River and a secondary orientation to the grasslands. Mussels were probably important as a starvation food.

Situated on a bluff overlooking the Missouri River, the Child's Point site and many other Nebraska phase sites are well situated to exploit a riverine environment where annual floods left extensive silt-covered fields and oxbow lakes. Distinctive toggle-head harpoons demonstrate the degree to which the Nebraska phase did indeed have a riverine orientation. Freshwater mussel shells from the Child's Point site reveal that mussels were also a component of the riverine adaptation. The prehistoric inhabitants of the site collected species typically found in several different habitats including medium to small rivers, creeks, and soft-bottom lakes. Though the

size and species distribution are not dissimilar from current ranges, there seems to have been some selection for smaller examples of *Quadrula quadrula* and *Amblema plicata*.

The relatively small number of shells found at Child's Point might suggest minimal utilization. However, in eastern North America where mussels were an important seasonal food source, mussel processing patterns may not have yielded more mussel shell in archeological sites. Under these circumstances, shells transported to the village are more likely to have been preserved for use as artifacts than simply being by-products of food processing.

Summary of Current Known Distribution and Status of Freshwater Mussels (Unionoida) in South Dakota

by Douglas C. Backlund

The freshwater mussel fauna of South Dakota is poorly known. A statewide comprehensive inventory has never been completed; a number of sources have reported on the freshwater mussel fauna of the state, but these reports are generally limited to specific watersheds or regions. This paper is an attempt to bring these reports together into one source that can be used by archeologists and other scientists as a starting point for research pertaining to historical and current distribution of freshwater mussels in South Dakota. Even as this paper goes to press, more information is becoming available for the Big Sioux and Missouri rivers. Researchers are urged to contact the author for recent developments.

Prehistoric Procurement and Use of Freshwater Mussels Along the Missouri River in the Northern Great Plains

by Robert E. Warren

Bivalve shells from late-prehistoric villages located along the Missouri River in the northern Great Plains reflect distributions of aquatic habitats and human behavioral patterns associated with the procurement and use of freshwater mussels. Biologists disagree about whether mussels lived historically in the Missouri River, clouding the issue of where prehistoric mussel gatherers obtained their shellfish—did they exploit the Missouri or its tributary streams? Archeological shell samples from the Cannonball and Grand-Moreau regions help resolve this question. Sites west of the Missouri are dominated by one species (*Lampsilis siliquoidea*), whereas sites east of the river are dominated by another (*Pyganodon grandis*). This pattern may be related to hydrological differences on either side of the Missouri River caused by Pleistocene glacial alteration of eastern drainages. Although the Missouri was readily accessible to people living on either bank, it clearly was not the main focus of mussel exploitation in this area. People living west of the Missouri evidently exploited the river's large permanent tributary streams, whereas those living east of the river targeted small intermittent streams or backwater sloughs flanking the Missouri's main channel. The multiplicity of aquatic habitats exploited in this area suggests that the Missouri River's mussel fauna was limited in abundance or limited in species diversity, or both. Shells from one of the east-bank villages (Walth Bay site) indicate that people used mussels both

as a food resource and as a raw material for making shell tools. Also, they were selective in their use of certain mussel species for specific purposes.

Freshwater Mussel Management in North Dakota

by Steve Dyke

Alan M. Cvancara collected the basic biological information on North Dakota's freshwater mussels while he was a geology professor at the University of North Dakota. Since his research was completed, new and unforeseen threats have emerged for mussels within the state and have been identified by the North Dakota Game and Fish Department, the agency that is responsible for their conservation. The Department conducted additional surveys in the Red and Sheyenne rivers that have shown decreased mussel densities for commercially valuable species and a significant reduction in younger individuals of all species. Consequently, the Department has prohibited all harvesting of mussels within North Dakota.

Freshwater Shell Tool/Ornament Production and Resource Use in the Middle Missouri Subarea of North Dakota

by Paul R. Picha and Fern E. Swenson

Freshwater mollusks served as stock material in the production of tools and ornaments at Plains Village (A.D. 1100-1870) sites in the Cannonball, Heart, and Knife River drainage basins of North Dakota. Mussel richness as reflected in archeological samples suggests that a common suite of thick-shelled and thin-shelled species was collected. Shell tools and ornaments comprise patterned and expedient forms made by Plains Villagers, including ancestral and later Mandan and Hidatsa peoples. Early village contexts before A.D. 1500 indicate a preference for thick-shelled bivalves, such as *Lasmigona complanata*, *Lampsilis siliquoidea*, and *L. cardium*, for tool and ornament production. *Pyganodon grandis*, a thin-shelled species, is suggested to represent a supplemental food resource during times of periodic subsistence stress after A.D. 1500. Shell qualities of selected molluscan genera affected the production strategies used—percussion, groove-and-splinter, groove-and-snap, perforation, and edge-margin modification—in fabrication.

The Freshwater Mussels (Bivalvia: Unionoida) of Montana

by Michael M. Gangloff and Daniel L. Gustafson

Freshwater mussels in Montana are poorly known. They have received little attention since Junius Henderson's reports of 1924 and 1936. Our own mussel research is limited, but spans the last 18 years. Montana has at least five recent species: *Margaritifera falcata* (Gould, 1850), *Lampsilis siliquoidea* (Barnes, 1823), *Ligumia recta* (Lamarck, 1819), *Lasmigona complanata* (Barnes, 1823), and *Pyganodon grandis* (Say, 1829). *Pyganodon grandis* occurs in lakes and streams, but the remaining species appear to be limited to streams. *Ligumia*

recta and *L. complanata* are new state records and both species may be fairly recent immigrants to Montana. These two species appear to be expanding their ranges as the ranges of their fish hosts expand in Montana. In contrast, the range of the trout-stream species, *Margaritifera falcata*, may be contracting with stream degradation. This species appears to have crossed the continental divide in Montana from west to east with its salmonid host, the westslope cutthroat trout, *Oncorhynchus clarki lewisi*. This is the only native trout in the Missouri River headwaters. Reports of the eastern *M. margaritifera* in Montana are apparently due to the mistaken assumption that a mussel could not cross the continental divide. All Montana mussels are currently protected from commercial harvest by state law.

A Prehistoric Freshwater Mussel Collection from the Schmitt Chert Mine Site (24BW559) near Three Forks, Montana

by Kerry Lippincott and Leslie B. Davis

The Schmitt Chert Mine Site is a Late Middle Prehistoric Period open-pit quarry at the headwaters of the Missouri River that has been mined into Mississippian-age limestone. Students at Montana State University from 1972 through 1989 excavated the site under the direction of Leslie B. Davis. In addition to the collection of lithic, bone, and antler artifacts, freshwater mussel valves and artifacts were recovered. The freshwater mussel data contribute importantly to the archeological record. Specimens were identified and analyzed in terms of total numbers, species, left or right valve, portion of valve, and sex, where possible. The total of 1,186 Number of Identified Specimens (NISP) is based on complete and partial specimens. Two species are present: *Lampsilis siliquoidea*, fatmucket, and *Margaritifera falcata*, western pearlshell. A total of 273 valves of the former were identified compared to 49 of the latter, for a ratio of 5.6 to 1. The Minimum Number of Individuals (MNI) for each species was derived from counts of species and side. There are 134 left and 139 right valves of *Lampsilis siliquoidea* (MNI = 139) and 25 left and 24 right valves of *Margaritifera falcata* (MNI = 25). Some 81 fatmuckets could be identified by sex, based on their shape, of which 44 are male and 37 female. In addition to this biological information, certain archeological distributional data were also derived from the mussel specimens. Mussels were recovered from throughout the horizontal and vertical limits of the site. These mussels are most readily explained as having been collected from the Missouri River east of the site. The discarded valves are the remains of prehistoric miners' meals.

Floating Mussels in the Upper Mississippi River, Minnesota and Their Implications for Dispersal in Paleontology and Archeology

by Alan M. Cvanara

Two species of freshwater mussels, *Lampsilis siliquoidea* (Barnes, 1823) and *L. cardium Rafinesque*, 1820 were observed floating in the upper Mississippi River near Libby, northeastern Minnesota. Fifteen collected shells of *L. siliquoidea* are 54 to 73 mm long (mean=66 mm) and weigh (dry) 5.5 to 20.0 g (mean=14.1 g). A single collected shell of *L. cardium* is 86 mm long and weighs 45.3 g. Mussel flotation was possible because of trapped decomposition gases. Death

by abrupt drop in river level and subsequent loosening and lifting of the mussels by rapid water-level rise may account for the floating event. Post-mortem floating should be considered as an additional dispersal mechanism when evaluating the occurrence of mussels at paleontological and archeological sites.

Remarks Stimulated by the Symposium, Freshwater Mussels in the Great Plains: Ecology and Prehistoric Utilization

by Alan M. Cvangara

First, I thank Kerry A. Lippincott, consulting archeologist from Casper, Wyoming, who organized the symposium and kept prospective participants regularly informed for two years before its happening. I also acknowledge 15 other participants besides myself who have researched mussels in Montana, North Dakota, South Dakota, Nebraska, Kansas, and Iowa. They presented informative, stimulating, and thought-provoking papers.

Second, I wish to comment on three points: the commonality with mussels that zoologists and archeologists share, the relative diversity of mussels in the Missouri River Basin, and a summary of ecological factors that affect the occurrence of mussels. . . .