



UNIVERSITY OF WYOMING

THE FRISON INSTITUTE OF ARCHAEOLOGY AND ANTHROPOLOGY

BULLETIN 26
FALL, 2013

From the Director, Todd Surovell

Beginning this year, I have taken the reigns of directorship of the Institute from former Director, Bob Kelly. The Frison Institute was created 15 years ago with the goal of building a \$1 million dollar endowment to support archaeological research at the University of Wyoming, and we have made great progress toward that goal thanks to the generosity of many donors and strong leadership. As I write, we are on the cusp of reaching the halfway point of that goal with only \$10,000 left to raise. I would like to highlight what we will be able to do with a \$500,000 endowment but also why it is critical that we continue to work toward \$1 million.

A \$500,000 endowment would generate almost \$19,000 per year, and the administrative costs of running the Institute average only around \$5,000 per annum, which includes the cost of an annual speaker, supplies, and the production and mailing of a newsletter. At that level of expense, we would have around \$14,000 per

year to devote to research. To put that number into context, a ten day field project with volunteer labor costs around \$5,000, and with paid student labor, that number very quickly exceeds \$10,000 per ten day session. The cost of a single radiocarbon date is between \$500 and \$600. In the department, we have seven archeology faculty, four adjunct faculty, and nearly 30 graduate students who could benefit from Institute funding. While there is much to celebrate in the growth of our endowment, we still have a lot of room to grow to serve the needs of the department. Although we continue to seek and acquire grants, in this era of budget cutting, it is ever more important that we develop alternative sources of funding. In that light, I am committed to maintaining the strong growth that the Frison Institute has seen in recent years to ensure that we can continue the tradition of archaeological research at the University of Wyoming that George Frison began almost 50 years ago.

CLIMATE CHANGE AND HUMAN POPULATION IN THE BIGHORN BASIN

UW researchers have, for the first time, demonstrated clear relationships between ancient populations and climate change over the past 10,000 years. In a paper published in the *Proceedings of the National Academy of Sciences*, UW archaeologists **Robert Kelly** and **Todd Surovell**, along with UW paleoclimatologist **Bryan Shuman** and former UW doctoral student **Geoff Smith** show a constant and continuous relationship between hunter-gatherer population size and climate change in Wyoming's Bighorn Basin using radiocarbon dates as a measure of human population, high altitude lake levels as a measure of moisture, and pollen data as a measure of temperature. Looking at the data in 50-year increments, they show that periods of population growth are associated with increasing moisture and decreasing temperature, while period of population decline are associated with decreasing moisture and increasing temperature.

We used to think that climate only affected human population during times of extreme climatic change, e.g., during serious, prolonged drought. The UW study suggests that the human response is more or less continuous. This research now permits us to expand outward to determine if population declined in the Bighorn Basin due to death or emigration to neighboring areas, and how changes in population and climate affect hunter-gatherer technology, food choices, and settlement locations.



Alm Shelter, a deeply stratified rockshelter in the Bighorn mountains that was first used at the end of the Ice Age

Institute Funded Research

Union Pacific Mammoth Site

Excavations in the 1960s at the U.P. Mammoth Site unearthed the remains of a Columbian mammoth along with what were interpreted as butchering and processing tools, but the status of the site as a mammoth kill remains controversial. New investigations at the site by alumna **Dr. Mary Prasciunas** focused on identifying and excavating intact remnants of the excavation block, and collecting samples to better understand the various aspects of the site.



Crew working to expose intact remnants of the 1960s excavation block at the U.P. Mammoth Site, August 2013.

Usewear of Paleoindian Artifacts

As part of her dissertation research, PhD student **Heather Rockwell** performed microwear analysis on over 3,000 Paleoindian artifacts from New England and the Canadian Maritimes. These pieces were analyzed in order to get a regional perspective on Paleoindian tool use and its relationship to mobility.



Heather Rockwell performs microwear analysis

Detecting Children in the Archaeological Record

PhD student **Brigid Grund** is attempting to develop methods for reconstructing household demographics of prehistoric populations, with a fo-



Brigid Grund measures soil compaction on an abandoned lodge pad in a Dukha summer camp, Mongolia.

cus on the identification of juveniles. Last summer, she worked with Dukha reindeer herders in northern Mongolia. She examined soil compaction, hearth temperature, household density, and time scheduling in houses with and without children.

Experimental Bone Modification

Because she is interested in developing methods for determining the season of occupation of archaeological sites, PhD student **Allison Grunwald** conducted a series of experiments on cattle long bones to determine the differences between frozen and thawed bone fracture mechanics in response to hammerstone impact. The results showed clear morphological differences in fracture outlines as well as the amount and type of fragmentation that bones exhibit. Results will be compared to archaeological bison bone assemblages.



Typical fracture morphology on a frozen cow femur after hammerstone impact.

Alpine Archaeology Fund

The High Rise Village site sits at upper tree line at just over 11,000 feet in the Wind River Range. Central hearths are found in many of the lodge pads at the site. Although we can date hearth charcoal by radiocarbon, such dates can be very problematic because surface wood remains well preserved in the high alpine environment. If a person in prehistory, for example, collected and burned 1,000 year old wood, and an archaeologist later dated it, it would produce a date that is 1,000 years too old. For this reason, it is important to try to date the occupation at High Rise using alternative methods. Former U.W. MA student **Bryon Schroeder** received Institute funding to use thermoluminescence (TL) dating to date ceramics from the site. TL dating works by measuring the number of electrons that have accumulated in crystalline materials due to interaction with environmental radiation. We are still awaiting the dates to see how they compare with ¹⁴C dates from the site.



A potsherd from the High Rise Village Site

FEATURED PROJECT:

THE UW FIELD SCHOOL AT THE HOLE IN THE WALL RANCH



Buffalo Jumps, Handprints, and Chugwater Sandstone

By Todd A. Surovell

The Middle Fork of the Powder River flows eastward out of the southern Bighorn Mountains into the Red Wall country, a beautiful part of Wyoming marked by steep cliffs of Chugwater sandstone. The Red Wall is an escarpment of rock more than 20 miles long from north to south, which cannot be traversed along much of its extent. One of the places where it can be breached is called “The Hole in the Wall,” a strategic location said to have been frequented by Butch Cassidy and his gang of bandits.

During the summer of 2013, the University of Wyoming Archaeological Field School was invited to work on The Hole in the Wall Ranch by its owners, the Wold family. The ranch contains an abundance of archaeological resources including a buffalo jump and a series of rock art localities with numerous petroglyphs, pictographs, and hand sprays.

The buffalo jump incorporates the jump area, a drop of more than 100 feet over a bedrock scarp, a bonebed, and drivelines of

stone cairns converging in a classic V-formation to the jump point. In addition to excavation of the bonebed, field school students mapped the drivelines and associated features. We were able to produce the first radiocarbon date on the jump, indicating that it was last in use around 500 years ago.

With help from BLM photogrammetrists Tom Noble and Nefra Matthews, we documented a series of rock art panels. UW MA student **Madeline Mackie** is working closely with more than 70 hand sprays. Hand sprays are outlines left when individuals place a hand (usually the left) on a surface and spray pigment around it to leave a shadow. Although hand sprays are known from around the world, these are the only known examples from Wyoming. For her thesis research, Ms. Mackie is trying to determine the age and sex of the individuals who produced the sprays. She is comparing the size and shape of archaeological sprays to a series of experimental examples from individuals of known age and sex. Her preliminary results suggest that some if not most of the hand sprays were created by children.



The Wold buffalo jump. The jump point is in the center of the photo (Photo credit: Danny Walker)



The back of a bison skull with the horn sheath intact beneath a boulder at the base of the jump. (Photo credit: John Laughlin)



Field school students map a cairn in one of the drivelines above the Wold buffalo jump,



Field school students excavating in the bonebed at the Wold buffalo jump. (Photo credit: Danny Walker)



A series of hand sprays at one of the rock art localities on The Hole in the Wall Ranch.



U.W. MA student Madeline Mackie documenting rock art.

Donate \$2,000 & Receive a Clovis Point Replica

Clovis projectile points are the first widely recognized spear points used in North America, dating to roughly 13,000 BP. Archaeologically, they are found from coast to coast and are regularly discovered with the remains of mammoths and mastodons, as at the Colby Site, a Clovis mammoth kill in the Bighorn Basin of Wyoming excavated by George Frison. We have commissioned ten hand-made Clovis point replicas (shown below) from expert flintknapper Allen Denoyer to be given away for the first ten gifts received of \$2,000 or more. The points are made on high quality lithic raw materials, many of which are from Wyoming. Each point is finely etched with the author's initials and year of manufacture, so they cannot be confused with the real thing. The points are technologically identical to those found in some of the earliest Paleoindian sites in North America.



Institute Visitors

Matthew O'Brien (University of New Mexico) returned to the department to complete his dissertation research on pronghorn and food sharing at the Eden-Farson site. Sarah Trabert, a PhD student from the University of Iowa, received a Frison Institute Collections Grant to study Dismal River Aspect ceramics in the University of Wyoming Archaeological Repository and Curation Facility. Ms. Trabert is using these collections to examine a period of major social upheaval on the Great Plains in the 17th and 18th centuries AD.



Sarah Trabert analyzes Dismal River Aspect ceramics in the Wyoming Archaeological Repository

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Institute Fall Lecture

This year's Fall Lecture was given by **Vance Holliday** of the University of Arizona. Dr. Holliday discussed his work at El Fin del Mundo, a Clovis site in Sonora, Mexico where he and his team have found the first evidence of Clovis hunting of gomphotheres in North America. Gomphotheres are an extinct family of proboscideans related to mammoths and mastodons.





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