

Cattle, Control, and Conservation

For over 100 years cattle have grazed on public lands throughout the West and their impact to vegetation communities and their role as agents of erosion have been well documented.¹ While substantial efforts have been conducted to understand the interchange between cattle grazing, wildlife, and ecosystems, archeologists have long pondered the effects cattle have on archeological sites. A recent federal court ruling (Comb Wash decision) requiring the BLM to intensify its NEPA (National Environmental Protection Act) analysis regarding the issuance of grazing permits has given us the chance to study cattle grazing on archeological sites. In 1998, the Gunnison Colorado Field Office began a new process to evaluate the renewal of grazing permits. The Bureau of Land management, Gunnison Field Office, developed a three-pronged cultural management plan utilizing predictive modeling, archeological inventory, and experimental archeology to better understand, assess, and react to cattle grazing on BLM land. The Gunnison Office has begun a long-term project to both understand how cattle shape the archeological landscape, and identify those undiscovered sites currently being shaped.

The Gunnison field office encompasses over 600,000 acres in a high mountain environment in West Central Colorado and is almost blanketed in archeological sites. A majority of the

sites in this upland environment is relatively shallow lithic scatters highly susceptible to surface disruption. Archeologists at the Gunnison Field office have noticed obvious displacement of artifacts at cattle watering holes, and they wanted to understand how sites frequented by cattle differ from those sites, which are completely ungrazed by cattle. A project was begun to develop a better understanding of livestock grazing along with other natural processes which also shape archeological sites.

The first tool utilized in the attempt to understand the impact of cattle grazing on archeological sites was an intensive literature review. Over 20 years of previous research and inventory were examined for each allotment currently being re-evaluated. All previously recorded sites and projects were transferred onto a GIS generated map, which also included the digitized allotment boundaries. This activity produced a fine GIS map with the allotment boundaries, and all cultural sites located within that area. A separate sheet was kept which recorded the percentage of acres already inventoried and the eligibility of those sites. To these maps were added the assiduously collected monitoring data by our Range and Biological staff indicating areas heavily grazed (heavily grazed was defined as the removal of 60-80 percent of the years current plant production). The heavy grazing data was then sketched on the "base" cultural map in red. The Field Office now had one base map that could illustrate areas heavily impacted by cattle compared to the previously identified archeological resources. This map now allowed the staff to know where the cattle are grazing heavily enough to affect the local vegetation, and which of those areas has or has not been inventoried. Target zones, those areas where cattle have removed the vegetation and increased erosion, but have not been examined for archeological resources, readily revealed themselves after these differing sets of data were brought together on one map.

With only one full-time archeologist and one summer seasonal it was apparent that the Resource Area needed to narrow the search corridor. A plan was devised to use a rough predictive

The lack of plant height and interspacing indicates the over-grazed character of the range outside an enclosure in Gunnison County, Colorado. Photo courtesy the author.



model to understand where significant archeological resources should occur. Data was taken from the largest inventory ever done in the Field Area to construct a GIS/Arcview coverage which, when applied to a USGS topographic map, highlighted all areas where important archeological sites should be found. The coverage was generated using the simplest criteria of slope, aspect, and distance to water. The Field Office now had a set of base maps with lightly shaded regions indicating where we should find sites. These maps were cross-referenced with the first maps to identify those regions that are being adversely effected by cattle and are likely to be the location of archeological sites.

The third approach to understanding the impacts of grazing at the BLM was to scientifically examine cattle trampling on a typical site for the region. The author and Eric Bjornstead, a research assistant from Western State College of Colorado, banded together to create a lithic scatter site composed of 200 manufactured stone flakes. The "site" was placed across a fenced enclosure, which has not been grazed in 20 years, and outside the enclosure into an adjacent heavily grazed extinct water source. The site was chosen for its lack of pre-existing cultural resources, its ability to represent typical grazing conditions across the Field Area, and its location in an area already heavily grazed in the past. With the inception of this experiment the archeologists hoped to understand how one season of cattle grazing affected a typical site in the representative region. Archeologists wanted to see if they could decant the effects cattle have on sites from those of Mother Nature.

The site was seeded in typical lithic scatter pattern with lithic concentrations and scattered isolated flakes. The site was divided into two sections, the grazed section and the ungrazed enclosure section. Each flake was numbered and its location recorded with a laser transit and placed number side down. All types of material found in the Gunnison Basin were incorporated into the study as well as every size category. Six tools were made for both sites including fine unnumbered projectile points. Since projectile points are often chronological indicators for archeologists it was deemed necessary to add them to the study to see how they fared. The site was located on the 43, 486 acre Iola allotment that is grazed for three weeks by 1,200 yearlings.

The site was visited just after grazing ceased and re-recorded using the laser transit, which has a 1 cm margin of error. Only 74 percent of the artifacts were found on the ungrazed site compared to while only 70 percent recovered on the grazed section. The average amount of movement for the ungrazed site was 2.2cm with no greater than a 7cm move. The cattle site saw an average of 13.25cm movement with some flakes displaced more than one meter. The locality offered a sandy loam soil and in only two weeks the researchers observed artifacts almost totally buried. Surprisingly, lichens were observed already established on one flake after only three weeks. All tools and points were found inside the enclosure while three projectile points were missing from the grazed site. Whether the points were taken or merely sunk into the substrata is unknown. No other evidence of looting was identified. The site was left intact for another recording at the end of the summer to allow researchers to study the non-grazing effects and natural site formation processes.

The BLM Gunnison Field Office has taken a proactive stance concerning cattle grazing and continuation of this project will depend on the future availability of funding and manpower. It is hoped that this experiment will help future archeologists understand the scope and nature of cattle disturbance on sites, which have been heavily grazed. Since the BLM is a multi-use land management agency, methods are being devised so that grazing and archeology can coexist. After the goals of this project are realized, identification of significant sites and understanding of the effects of cattle to those sites, the next step will be to develop methods of appropriate mitigation. Archeologists at the BLM Gunnison Field Office have begun a long process of effectively managing cattle grazing in relation to cultural resources in the hopes of preserving sites of importance for many generations to come.

Notes

- ¹ A. Mendel and S. Trimble. "The Cow as a Geomorphic Agent- a Critical Review." *Geomorphology* 13 (1995) 233-353.
- T. Fleischner. "Ecological Costs of Grazing in Western North America." *Conservation Biology*, Vol. 8 No. 3, September 1994.

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