Missing the Point: Monitoring Disturbance of a Lithic Landscape in the Greater Yellowstone Ecosystem

Chrissina Burke*, Sean Teeter, Zachary Koski, and Lawrence Todd

Abstract:
Adaptive management that includes heritage resources requires effective methods for documenting and monitoring archaeological site conditions. As an initial step in the development of such methods, a program of recording and revisiting archaeological materials in backcountry areas subject to both commercial (grazing leases) and recreational (big game hunting, hiking, and camping) has begun. Fifty-five projectile points ("arrowheads" an artifact type prone to collection and removal, which can severely damage the information potential of an archaeological site) were located in the Greybull river drainage of the Greater Yellowstone Ecosystem. During the 2005 field season an experimental study to relocate those projectile points served as a springboard to observe site disturbances in the area. Results of the study provide baseline data required for longitudinal studies of archaeological site condition, which is essential for understanding global management and research issues in the monitoring of all natural and heritage resources. In this respect recording artifact proximity to local communities, game trails, trees, water, and livestock pastures may exhibit patterns of use, collection, and disturbance. In addition, it is clear that in order to make best use of information on annual variation in surface artifact frequency it is necessary to collect data on non-archaeological attributes such as ground cover, grazing intensity, and erosional action. The methods being developed in this study are applicable to a wide range of resource monitoring investigations and highlights common issues of monitoring conditions of both heritage and other resources. A joint field monitoring program in which the artificial dichotomy between "cultural" and "natural" resources is eliminated and documentation properties of each class of resources are incorporated into an integrated evaluation of landscape status is described.

Introduction:

The Greybull drainage of the Greater Yellowstone Ecosystem lies on the eastern edge of the Shoshone National Forest in the central Absaroka Mountains of north western Wyoming (figure 1). This area has been the location of the Colorado State University archaeological field school for the past 3 years. Non-collection survey has been the means of understanding this region during all field seasons (Burnett 2005). By using non-collection survey the researchers are able to reduce impacts on the archaeological record and develop a potential monitoring effort to understand how artifacts may move through time by landscape means or by public collectors (Burnett 2005, Todd 2003). To understand how the site has changed and how the community may affect the area, relocation of the 55 projectile points recorded in the Jack Creek area (figure 2) in 2003 was undertaken. Relocation inconsistency was assessed based on proximity to the community, cow camp (figure 3), game trails, forests, water, and livestock pastures.

Figure 3: Jack Creek cow camp.

Figure 5: Pedestrian Survey.

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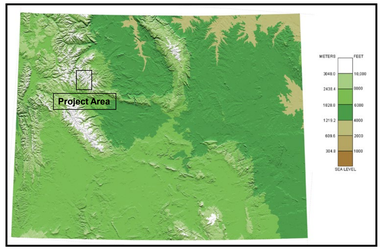

Figure 1: Colorado State University field school research area in NW Wyoming, U.S.A.

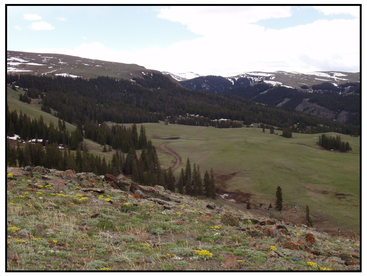

Figure 2: Area of relocation effort: Jack Creek.

Methods:

1. A two-person team logged previously recorded UTM coordinates into a recreational GPS unit (Garmin Rhino 110) (figure 4).
2. Before attempting to relocate a projectile point, the team would refer back to previous records on the given point. These records indicate color, size, material, and type of point.
3. Next the team would follow the GPS directions to locate the points. Once the team was within 1 meter of the point and between 1-5 meters of accuracy they would start a timer and perform a pedestrian survey around the area for 20 minutes (figure 5 and 7).
4. If the team relocated a projectile point they would measure it and make sure it was the same as the previously recorded point and waypoint it again.
5. If it was not a recorded projectile point the teams would waypoint it as a new point and record this in their field books.
6. At the end of 20 minutes if the projectile point was not relocated the team marked this in their field book and moved on to the next point.

Figure 4: Garmin Rhino GPS Unit.

Results:

✓ Of the 55 projectile points recorded in 2003, 26 of them were relocated in 2005. In addition to the 26 relocated, 14 new projectile points were recorded during this monitoring effort.

✓ There was an average 2.27 m of difference between the original easting coordinates and the newly recorded easting coordinates of relocated PP's (figure 6). Additionally, there was an average of 3.00 m difference between the original northing coordinates and the new northing coordinates for the relocated PP's (figure 6).

✓On accident there was an attempt to relocate one particular projectile point twice (40 minutes worth of survey). This projectile point was described as 21 mm in length by 17 mm in width, colors: brown, black, and tan. This projectile points coordinates led the team near a large trail marking cairn (figure 8). Relocation of this projectile point was unsuccessful.

✓ During the relocation effort there were multiple collectors piles found. In one particular instance a collector's pile was discovered close to where the relocation of a projectile point was unsuccessful (figure 9).

✓ The number of projectile points relocated at 500 m intervals radiating from the cow camp was low with in the first 1000 meters as compared to 1500 meters away where there were 16 projectile points of the 26 relocated (Figure 10).

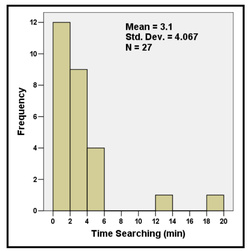

Figure 7: Frequency of time spent searching for projectile points.

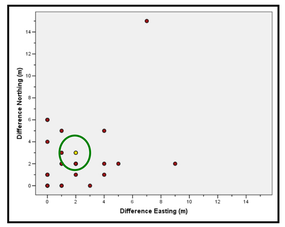

Figure 6: Differences between original easting and northing and relocated easting and northing, yellow indicates the average and the green circle indicates the standard deviation.

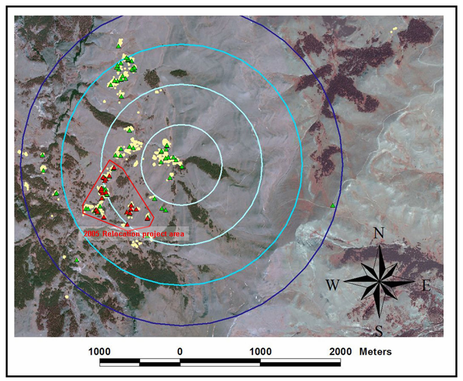

Figure 10: Map showing distribution of projectile points from 2003-2005 seasons in relation to the cow camp. Yellow represents all chipped stone discovered during the 2002-2005 seasons. Green triangles represent all the projectile points from 2002-2005 and red triangles represent all of the relocated projectile points from the 2005 relocation effort. Each ring represents 500 m.

Figure 8: Rock cairn.

Discussion:

There are multiple factors that attribute to relocation inconsistency of artifacts. Proximity of projectile points to game trails, forested areas, and water sources (the Jack Creek) can all affect the stability of artifact relocation. The success of relocation along game trails is low because consistent animal traffic pushes points farther into the sediment deposits, this will cause breakage that may make them unidentifiable, and the general act of being kicked from locale to locale. Near streams, creeks, and rivers artifacts are kicked in accidentally by animals seeking water or during erosion forces like wind, rain, and run off. Once in the water, artifacts travel long distances and are reduced to nothing due fluvial processes. Additionally, forested areas are constantly being covered with needles, leaves, fallen trees, and sediment deposits; therefore, relocation in these areas is unsuccessful. In this particular research study however, relocation inconsistency is directly related to proximity of the projectile points to the cow camp, and community trails. Teams discovered multiple collector piles during the relocation attempts (figure 9). Many of these collector piles are located at the cow camp, which has been used since the beginning of the twentieth century by local ranchers. Another collector pile was discovered while attempting to relocate a specific projectile point. This collector pile turned up only flakes, some of which could have been attributed to the projectile point the team was attempting to relocate. It is assumed that this projectile point was lost to a collector, because it was never relocated. In addition to collectors piles, there were various rock and wood cairns in the area (figure 8). While searching for a fairly large projectile point, a team discovered a large circular rock cairn with some logs lying with it. The UTM coordinates of this projectile point suggested it was near this cairn. It is possible that during the construction of the cairn the point was found and is now residing in some collector's cigar box.

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Conclusions:

This research study is the beginning of a monitoring effort for the next generation of the Colorado State University archaeological field team. In the future it will become possible to better understand the multiple factors that affect artifact location. These future studies will also be useful in predicting where artifacts may be located and may help in the preservation of the archaeological record in terms of geomorphologic forces, community impacts, and site disturbance. In this regard educating the public on archaeological practices will help reduce site looting. Community lectures, visits to local school districts, information fairs, and general respect for the community can decrease the incidence of artifact collection. The importance of artifact context and information like: soil type, elevation, location on the landscape related to forested areas, water sources, and game trails will help archaeologists better understand the Native American, Paleo-Indian, and Archaic peoples use of multiple landscapes including the high elevation locales of Wyoming.

Figure 9: Collector's pile at cow camp.

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*Colorado State University
Department of Anthropology
Fort Collins, Colorado 80523
burkech3@lamar.colostate.edu