Assessing Alpine Artifact Abundance and Depositional History of the Greybull Ecosystem, Wyoming

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Geomorphology and archaeology are richly interconnected on many levels, one such aspect is the interaction of depositional processes and artifact burial. In 2006, Colorado State University conducted test excavations in the greater Yellowstone ecosystem in the Absaroka mountain range, Wyoming. Test units were laid down to evaluate below-surface artifact density, and how the frequency of these artifacts relates to geomorphological processes. Research evaluates deposition of sub-surface artifacts between two test units. The location of the two test units (T and U) were along a slump that fed down to a sag pond. Higher along the slump was the T-unit, while U was further down and closer to the sag pond. Due to erosion and depositional forces, the T-unit contains a higher artifact frequency because of the relation to its location on the landscape and sag pond. Methods used for data collection included; use of an EDM to lay down the test units and piece-plot artifacts and samples, excavation of two-one by two meter units, and collection of sub-surface artifacts. This research is important because it shows geomorphic forces, that effect artifact movement beginning in at least the Early Holocene.

Introduction
When conducting fieldwork, archaeologists have encountered problems with artifact deposition (Rick 1976, Kornfeld et al. 2001). Post-depositional changes are often the result of geomorphological phenomena including erosion, displacement of artifacts due to wind, or simple gravitational pull on downslope movement (Rick 1976). As a first step in comprehending these processes, artifact frequency must be analyzed to understand depositional history. Though shallow sites have many similarities (Surovell et al. 2005) each must be treated separately to understand its own unique history and site 48PA2874 is no exception.

Background
Site 48PA2874 is situated in a high-altitude, montane environment in the greater Yellowstone ecosystem, Northwestern Wyoming. Specifically, the site surrounds a sag pond with slump hills that are particularly steeper on the east and south side of the ephemeral pond. The two test excavation units were used to find below-surface artifact frequency and sub-surface post-depositional deposition. The lithics found in each unit were recorded to help evaluate geological processes affecting archaeological artifacts.

Methods
Elevations of unit surfaces were collected prior to excavation with an EDM (Figure 1). Surface artifacts were piece-plotted and collected in each unit (Figure 2). The excavations were conducted in the two, one-meter square units. Units were then divided into two units that were one-meter square each. Each meter was excavated in fifty-centimeter units to a depth of five centimeters for each level (Figure 3). All artifacts larger than one centimeter found in situ were mapped using the EDM (using WGS84 UTM coordinates). Ending elevation measurements were taken in the middle of each fifty-centimeter square unit after a level was completed. Sediment from each fifty-centimeter square unit was dry-sifted through 1/8" wire screen (Figure 4). Artifacts found while screening were collected, bagged, and labeled for later washing and coding in the lab.

Results
The T-unit had a higher frequency of artifacts compared to the U-unit. Each unit is summarized separately below.

T-26
- Had a total of 349 artifacts between units T26-6 and T26-7
- Both had the most artifacts in level 3, accounting for 41% of all lithics found in the entire T26 excavation unit.
- No lithics were found in either T26-6 or T26-7 in level 8.

U-27
- Had a total of only 45 artifacts in both U27-16 and U27-17
- Level 10 had the highest frequency of lithics with 11, and in neither level 2 nor 9 had artifacts in both U27-16 and U27-17.

Conclusion
The results presented are in concurrence with the initial hypothesis, which states that because of its location on the landscape in relation to the sag-pond, and due to post-depositional forces the T unit had a higher frequency of artifacts compared to the U unit. Though other phenomena such as gravity could be implied for this lithic patterning, erosion is the main cause of post-depositional artifact displacement at site 48PA2874. This is not indicated only by artifact abundance but sediment and overall rock size compared between the T and U units (Gingerich, 2006). This research doesn’t only have implications for high-altitude sites, but any site in which archaeologists must grapple with excavations being conducted on a hill or slump surface where erosion forces change post-depositional patterning.

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References
Surovell, T., et al. 2005 Shallow Site Archaeology: Artifact Dispersal, Stratigraphy and Radiocarbon Dating at the Barger Gulch Locality B (Graph 1).- Had a total of 349 artifacts between units T26-6 and T26-7
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