

## THE GHOST OF PROCUREMENT PAST AND THE HUMBUG BASALT: XRF IDENTIFICATION ALONG WITH SPATIAL AND TEMPORAL DISTRIBUTION IN PORTIONS OF BUTTE, LASSEN, PLUMAS, AND TEHAMA COUNTIES, NORTHERN CALIFORNIA

JAMIE MOORE

*Presented in this paper are results from recent efforts by Lassen National Forest to chemically identify the Humbug Basalt group located in Butte and Plumas counties. The basalt was found to have a unique trace-element signature based on strontium and zirconium levels. Some 206 basalt artifacts from 52 sites, and seven isolated artifacts, were also submitted for XRF analysis. These sites and isolates are located in northern Butte, southeast Lassen, western Plumas, and eastern Tehama counties. This study revealed the temporal and spatial spread of Humbug basalt use and identified two other known basalt sources and 18 unknown sources.*

### INTRODUCTION

In 2004, Lassen National Forest began a study to understand several large prehistoric basalt procurement areas located within its boundary. It was decided to focus on a cluster of eight large sites located near Humbug Summit within Butte and Plumas counties. Examination proceeded along two avenues, that of defining the basalt geochemically and also through excavation to discover how the sites were utilized. One of the procurement locations was excavated and written up by Elena Nilsson in 1986, and two more were excavated in 2004 and written up by URS. It was decided that six of the eight procurement locations would be sampled to define the chemical signature of the basalt. These samples were analyzed by Northwest Research Obsidian Studies Laboratory in Corvallis, Oregon (Skinner 2005; Skinner and Thatcher 2005, 2006). One hundred and fifty-five samples were obtained from the procurement locations to establish the chemical signature of the Humbug Basalts. Then, to examine temporal and spatial use of these basalts, 206 prehistoric artifacts were submitted for XRF source analysis: 199 artifacts from 52 sites, and seven isolated artifacts. These sites and isolates were located in Butte, Lassen, Plumas, and Tehama counties.

The procurement localities are situated on two geological units that have been described as Late Pliocene basaltic andesite and Pleistocene glacial till (United States Geological Survey n.d.). All of these sites are located along drainages where water erosion exposed basalt cobbles and boulders. Erosion at each site exposed more than just basalt material; rocks of andesite, rhyolite, and a volcanic breccia were observed at each location. The basalt ranged from high-quality, fine-grained material to highly weathered vesicular material with a lot of what appeared to be iron leaching onto the cortex. In some locations the basalt seemed to have planar flow structure creating cleavage planes in the rocks. Only the higher-quality basalts were collected for XRF analysis, since the prehistoric artifacts at these quarries appear to have been made only from the higher-quality material.

### ANALYSIS

XRF analysis of the basalt showed that there are at least six chemically identifiable groups at the procurement localities; this was based on trace amounts of strontium and zirconium. These basalt sources were identified as Humbug varieties A through F. It appears that only two of these sources, Humbug A and B, were used to produce tools. This is evinced by the fact that these two varieties composed the highest grade of tool stone at the procurement localities; most other varieties were of such poor quality that they crumbled when struck by a hammerstone. Also only Humbug A and B appear among the archaeological artifacts that were tested. Both Humbug varieties A and B are currently deemed sufficiently chemically unique to distinguish them from other regional basalt sources (Skinner and Thatcher 2005). Both varieties appear to be found at all the Humbug procurement localities, so that no one of these eight sites possesses a unique trace element signature to differentiate it from the other locations.

It should also be noted that recent excavations along the upper reaches of Butte Creek near Jonesville found that gravel bars along the creek were being lightly used as locations for basalt procurement. The basalt in these gravel bars was all the size of small cobbles. XRF analysis of a sample of this material showed that it was all from the Humbug A and B varieties.

Archaeological excavation and evaluation were performed at three sites: FS #05-06-51-558, -570, and -578. These studies showed that raw material exposed due to erosion was collected and then reduced using freehand percussion techniques. Cores were selected either from fist size cobbles or from tabular blocks. The basalt was assayed for quality by the removal of one or two flakes. Hammerstones used for lithic reduction were either basalt cobbles procured on the site or imported quartzite cobbles. Tabular stone that was of good quality was shaped into bifacial cores that were

further reduced into early-stage bifaces. Basalt cobbles of good quality were reduced into multi-platform cores; large flakes produced from these cores were then used to produce early-stage bifaces. After creation of an early-stage biface, it was transported offsite for further reduction elsewhere (Bevill et al. 2005; Nilsson 1986).

As noted, 206 prehistoric artifacts were analyzed, consisting primarily of projectile points from 52 sites located within the Almanor Ranger District. The projectile points were placed into three temporal periods, based on Makato Kowta's work in Plumas and Butte counties (1988) and Jerry Johnson's (n.d.) and Greg Greenway's (1982) work in the southern Cascades. Thus in this paper the Early Archaic denotes the period from 6000 BC to 3000 B.C. (ca. 8000-5000 B.P.), the Middle Archaic from 3000 B.C. to 500 A.D. (ca. 5000-1500 B.P.), and the Late Archaic and Emergent periods as post-A.D. 500 (after ca. 1500 B.P.).

The two Humbug varieties made up 54 percent of the basalt artifacts analyzed, with projectile points dating use of this basalt between the Early Archaic and the Emergent Period. Primary use appears to have been during the Middle and Late Archaic. Humbug variety A was more common and widespread than variety B. Points that were used as chronological markers were Northern Side-notched for the Early Archaic; Kingsley Expanding-stem along with Elko- and Martis-series forms for the Middle Archaic; and Rose Spring-series points, Gunther Barbed, Desert Side-notched, Sierra Side-notched, and Southern Cascade Serrated for the Late Archaic and Emergent periods.

Based on frequency of projectile point types, use of the Humbug basalts during the Middle Archaic was double that of the Late Archaic and Emergent periods, while Early Archaic use was minimal (although evidence for Early Archaic use in this area is minimal to start with). Examination of the spatial spread of Humbug A in the Middle Archaic indicates that 71 percent of the projectile points from this period come from east of the Deer Creek watershed. This trend is reversed during the Late Archaic, where 71 percent of the later points are from west of the Deer Creek watershed (Figures 1 and 2). Humbug variety B follows the same pattern, with 73 percent of points from the Middle Archaic coming from east of the Deer Creek watershed, while during the Late Archaic through Emergent period 73 percent came from west of Deer Creek (Figures 3 and 4).

Two other known basalt sources were encountered in this study, Gold Lake and Siegfried Canyon Ridge. Gold Lake basalt was relatively abundant, accounting for 8 percent of the basalt used in the area. The Gold Lake source is located about 40 mi. to the southeast. Gold Lake appears to have been used primarily during the Middle Archaic, with light use during the Late Archaic/Emergent Period. Gold Lake points consisted of Elko and Martis types for the Middle Archaic

and Eastgate/Rose Spring Expanding stems and Gunthers after 1500 B.P. During the Middle Archaic 78 percent of Gold Lake basalt use occurred east of the Deer Creek drainage. After 1500 B.P., use seems to have retreated slightly to the east. Siegfried Canyon basalt made up only 1 percent of the basalt artifacts tested. The Siegfried Canyon source is located around 56 mi. to the east. The Middle Archaic and Late Archaic were both represented in the sample, but not enough artifacts were identified from this source to perform temporal and spatial analyses.

Along with the known basalt sources, XRF results suggest that there were up to an additional 18 unknown basalt sources. These were tentatively identified based on their strontium and zirconium ratios. Although most of these basalt groups only contained a few artifacts, two of them - Unknown Basalt A and Unknown Basalt D - had enough artifacts for tentative temporal and spatial analyses. Unknown Basalt A made up 13 percent of the prehistoric artifacts analyzed, with projectile points suggesting equal use during the Middle Archaic through the Emergent period. The Middle Archaic points consisted of Kingsley Expanding-stem, along with Elko- and Martis-series points; 73 percent of these were found to the west of the Deer Creek watershed. During the Late Archaic and Emergent periods all use of Unknown A was to the west of the Deer Creek drainage (Figures 5 and 6). Unknown Basalt D appears to have also been used during the Middle Archaic through the Emergent periods, with primary use (80 percent) post A.D. 500. Two points, one Elko and the other Martis, represent Middle Archaic use of this source. One was found east and the other west of Deer Creek. During the Late Archaic and Emergent periods, 88 percent of the artifacts were used west of the Deer Creek Watershed (Figures 7 and 8).

## CONCLUSION

Although this study was limited to slightly over 200 prehistoric artifacts, it is believed that it was sufficient to indicate some broad patterns of lithic procurement during prehistory. Clearly basalt use for lithic tools in the study area was dominated by the Humbug basalts. Also the presence of Gold Lake and Siegfried Canyon basalts indicates basalt procurement in the Humbug Summit area may be similar to the east-west direction that has been observed to the south near Lake Tahoe (Day et al. 1996).

Locally there appears to have been a switch in raw material use from the Middle Archaic to the Late Archaic. Basalt use as raw material for formal tools appears to have peaked during the Middle Archaic to the east of the Deer Creek watershed. During the Late Archaic and through the Emergent period, basalt continued to be used but was primarily used within and to the west of the Deer Creek watershed. This matches patterns seen in obsidian in the

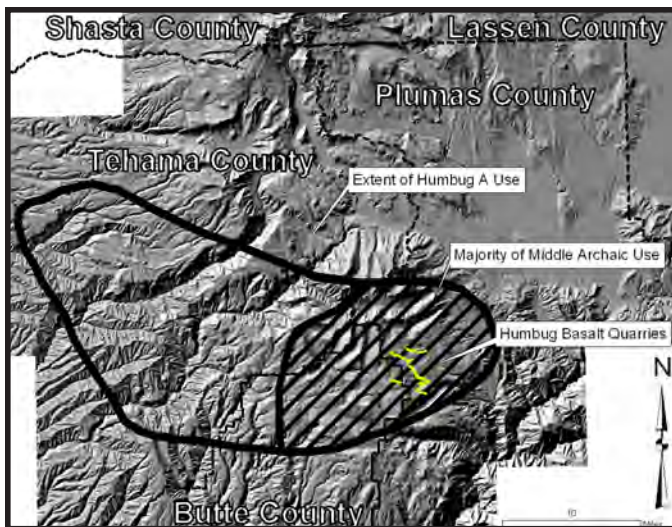


Figure 1. Humbug A distribution during the Middle Archaic.

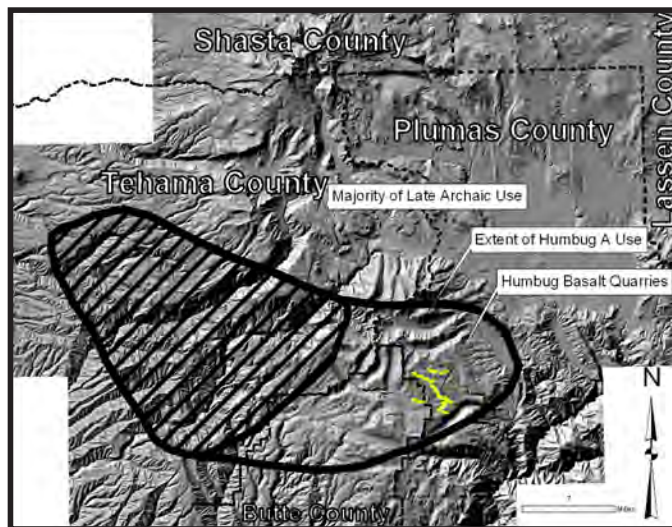


Figure 2. Humbug A distribution during the Late Archaic.

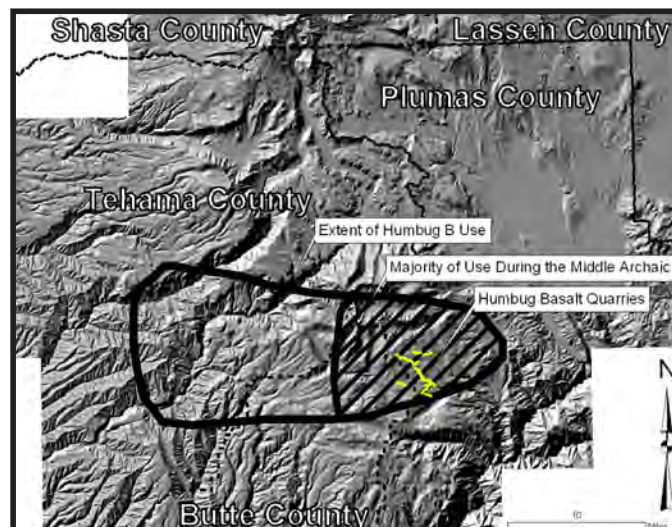


Figure 3. Humbug B distribution during the Middle Archaic.

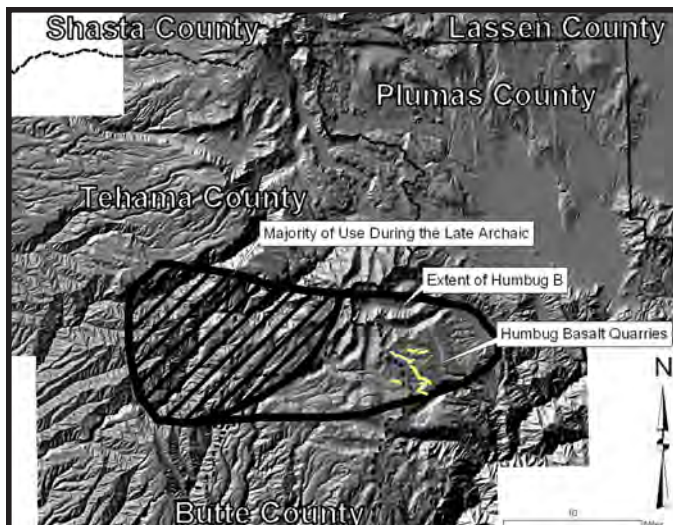


Figure 4. Humbug B distribution during the Late Archaic.

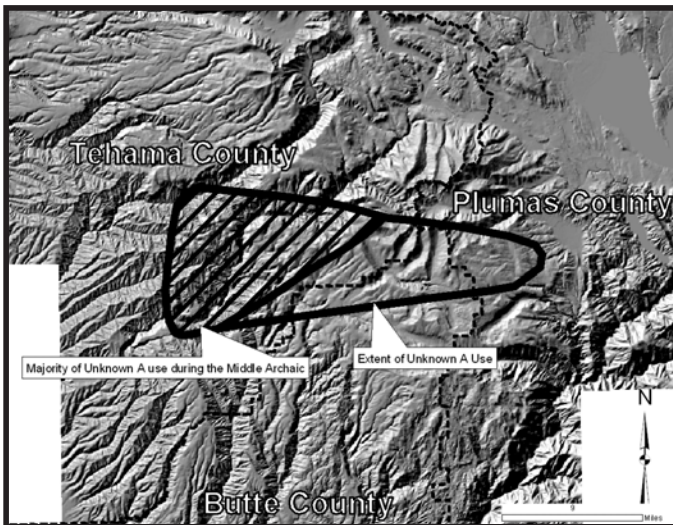


Figure 5. Unknown A distribution during the Middle Archaic.

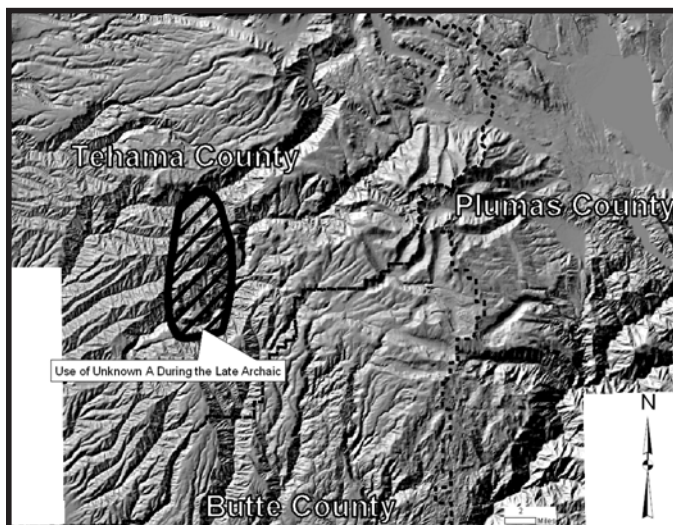


Figure 6. Unknown A distribution during the Late Archaic.

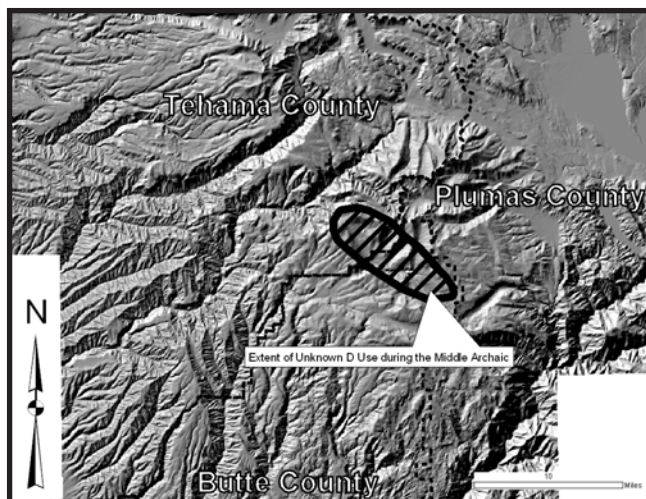


Figure 7. Unknown D distribution during the Middle Archaic.

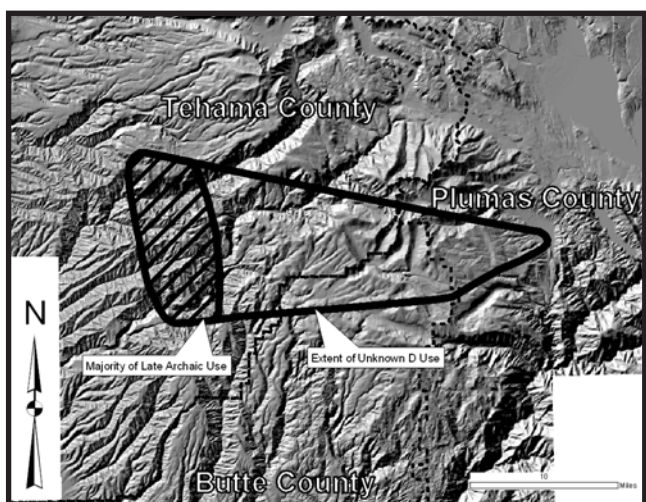


Figure 8. Unknown D distribution during the Late Archaic.

study area. Archaeological excavations in Humbug Valley indicate that Middle Archaic assemblages were dominated by basalt but that during the Late Archaic use switched to Kelley Mountain obsidian (Nilsson et al. 1996; Prather and Dugas 1998). In the Deer, Mill, and Antelope creek drainages, basalt and Kelly Mountain obsidian were the primary lithic materials during the Middle Archaic, although during the Late Archaic basalt levels dropped and Kelly Mountain became a minor material in lithic production, being replaced by Tuscan obsidian (Dugas et al. 2001; Greenway and Nilsson 1986). It is interesting to note that the dividing line of Deer Creek watershed, which has been discussed, closely matches the ethnographic line between the Yahli and the Maidu recorded by Dixon in 1905. It has been suggested that the Yahli and Yana groups were in the South Cascade

Mountains for thousands of years (Johnson 2002: 99). The changes in raw material during the Late Archaic may then be related to changes in territory controlled the Yahli and Yana groups. To better address such questions, more work needs to be completed, such as identifying the 18 unknown sources found in this study. Future research should also focus on expanding basalt XRF to other sites to help test the initial patterns observed in this study. Hopefully this paper will encourage more research into basalt procurement and use in the Southern Cascade Range.

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