ARTIFACTUAL ANALYSES FROM CA-LAK-1053: A PREHISTORIC SITE IN THE MENDOCINO NATIONAL FOREST, CALIFORNIA

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This study examines data from a 2015 UC Davis Archaeological Field School survey of site CA-LAK-1053 in the Mendocino National Forest. Artifacts analyzed include lithic debitage, fire-affected rock, formal groundstone tools, and diagnostic projectile points. Obsidian hydration and X-ray fluorescence were conducted to assess site chronology and to source obsidian artifacts. Temporally diagnostic chert projectile points were fit into a regional chronology to compare with obsidian hydration results. Our investigation provides important information regarding chronology, site function, and modern erosional impacts that threaten this unique prehistoric site.

This study provides context for a unique prehistoric habitation site located at the confluence of two creeks in Skeleton Glade, Mendocino National Forest, California. Site CA-LAK-1053 (Figure 1) was originally documented in a cursory surface survey in 1975 by Les White for the Louisiana-Pacific Lumber Company, during which two house pits and an obsidian graver were uncovered. During our survey, there was no evidence of said house pits, and the obsidian graver was not located, although a schist graver was uncovered. This follow up survey and subsequent analysis of lithic debitage, fire-affected rock (FAR), formal groundstone tools, and diagnostic projectile points provide a more refined picture of human behavior at this site.

In addition to standard relative dating techniques based on projectile point morphology, obsidian hydration and X-ray fluorescence (XRF) analyses were used to refine site chronology and link obsidian artifacts with known quarries, respectively. The presence of formal mortar and pestle millingstone technologies indicates that Native Americans may have used this site as a temporary camp, possibly on their seasonal round. This investigation provides important information regarding the chronology, site function, and the effects of modern erosional impacts that threaten this unique and important prehistoric resource.

THE SITE

Site CA-LAK-1053 sits at an elevation of 2,600 feet in an area of the Snow Mountain Wilderness known as Skeleton Glade just east of the convergence of Nye and Skeleton Creeks. The confluence surrounds the site's northeastern and southern terminuses and undoubtedly contributes to the myriad of erosional processes at play there. This highly endangered site is subject to the same types of erosion typical of the Middle Eel River Basin area, which has been described as the fastest eroding basin of its size in North America (Dugas et al. 2014; Wagner and Rowe 1977) due to highly susceptible soil, forest fires, flooding, harsh rainy seasons, and human activity including overgrazing, logging and road cutting.

Soil Composition and Erosion

The immediate area surrounding LAK-1053 is composed of three different soil complexes; the Maymen-Etsel-Snook complex, the Neuns-Sanhedrin-Deadwood complex, and the Shortyork Variant-Yorkville-Squawrock association (USDA 2013). All are characteristically found on steep slopes and are formed from weathered sandstone and shale while holding levels of vulnerability to erosion ranging from moderately high to very high (Howard and Bowman 1991; USDA 2013; Wagner and Rowe 1977). This high-level erosion hazard is in part due to the excessive drainage of water typical in the majority of these soils and the resulting medium to high to very high rate of surface runoff (Howard and Bowman 1991;

Figure 1. Site overview facing south.

USDA 2013). The approximate rate of runoff typical of the three soil complexes ranges from 1 to 2 tons per acre per year (Howard and Bowman 1991; USDA 2013; Wagner and Rowe 1977). Since much of the site's soil is characteristically inhospitable to forms of vegetation other than grass, it is possible that the surface runoff rates in those areas solely vegetated by grass may be higher due to a lack of protection provided by thicker, more concentrated, or heavier roots (Gyssels et. al. 2005).

The most damaging effects of erosion to occur at LAK-1053 happened over either a number landslide events or via the slow, imperceptible creep of soil losing the battle against gravity. It is likely that flooding and fire caused much of the damage as well. Erosion caused by extreme flooding events like the floods of 1964 caused the erasure of features like house pits throughout Mendocino and Lake Counties (Dugas et al. 2014). Furthermore, wildfires are somewhat of an eventuality and can serve to weaken the stability of soil and lead to more severe land sliding. These natural processes coupled with human activities will continue to contribute to erosion at LAK-1053 until the site has all but disappeared.

ETHNOGRAPHIC DATA

Yuki territory spread through much of the Mendocino National Forest (MNF), including Round Valley and parts of the Eel River basin (Thornton 1986). During their "four-season" cycle, the Yuki would optimize hunting and gathering of seasonal resources. In the spring, they collected fresh greens, moved to higher ground to hunt deer and elk, as well as gathered berries and seeds; in the summer, the salmon runs took place; in the fall, they gathered acorns, hunted, and fished to prepare for a scarce winter, where they would rely on stored food when rain kept them from hunting (Moratto 1984). Based on the amount of archaeological sites found in what would have been Yuki territory, it is estimated that they had a very dense population–over 12,000 individuals at the peak, though it is estimated that there are less than 100 today (Thornton 1986).

PREVIOUS ARCHAEOLOGICAL ANALYSES

Mike Dugas (2014) conducted multiple surveys in the area to re-record sites previously mapped by Edwards (1966) to get an idea of erosional impacts in the MNF. Dugas found that many of the housepits that were previously recorded by Edwards were badly damaged or missing completely, displaying the harsh erosional environment. Previous archaeological surveys conducted by Les White (1960-1972) in the surrounding area had many sites categorized as "Hide-away" or Late Seasonal Camps. Hide-away camps were classified by their lack of old artifacts such as bone and flake scatters. In all reports, he mentions erosional impacts that possibly cause housepits to disappear. White classified LAK-1053 as a Hide-away site as well, citing multiple housepits, stone tools, and flake scatters (White 1960).

METHODS

All artifacts observed at the site were documented and mapped using standard field procedures while diagnostic projectile points, obsidian biface thinning flakes, and formal flaked-stone and groundstone tools were collected for further analysis. Several obsidian biface thinning flakes and one obsidian biface were also collected (Table 1). Additionally, a 1-x-1-meter unit was laid over a dense concentration of midden soils and fire-affected rock (FAR), and all FAR within this unit were quantified in order to gain further evidence of habitation.

Three obsidian samples were subjected to XRF geochemical analysis that was conducted in-house at the UC Davis Archaeometry Lab. Multiple samples were analyzed for geochemical signatures using a Bruker S1 portable XRF (PFRX) machine. The samples were subjected to three-minute-long non-destructive volleys of x-rays in order to measure compositional levels of the trace elements Mn, Fe, Sr, Y, Zr, Nb, and Ru in parts per million (ppm). Subsequently, the resulting data were compared to samples from known obsidian sources through Excel programs Macro and Gauss.

A single obsidian artifact was additionally sampled using standard obsidian hydration methods. Origer's Obsidian Lab (OOL) in Rohnert Park, California, conducted the analysis. 1-mm-thick samples were extracted using a rotary saw and were then reduced by manual grinding until appropriately thick and translucent to light. The prepared samples were then joined to glass micro-slides and placed under a microscope for visual analysis. On each sample, hydration bands were counted and measured in six areas to produce one mean band thickness.

All bifaces were weighed (in grams), measured (in millimeters using standard digital calipers), and flake scar patterns were examined for distinctive features as per methods outlined by Inizan et al. (1999). Using Justice (2002) for reference, we classified the two chert diagnostic artifacts as Rattlesnake Corner-notched points (mapped as Projectile Points #1 and #2, see Figures 2 and 3), situating them within a temporal range of 800-200 B.P.

Several groundstone artifacts were analyzed for features indicative of various stages of production, use, and post-depositional degradation. Analyses conducted on all groundstone tools were based on criteria outlined by Adams (2014).

RESULTS

Results from obsidian hydration and projectile-point typology suggested multiple periods of habitation at this site, while XRF as well as groundstone and lithic analyses gave details pertaining to human activities that may have occurred. XRF data linked the obsidian artifacts to Borax Lake. Obsidian hydration band measurements ranged from 3.6 to 3.8 microns. A calendar age of 1097 B.P. was determined by comparing the mean hydration band thickness to known hydration rates for local obsidian sources and source information from the PFRX tests. Chronological attributes based on point typology provide further context for a previously documented archaeological site in the oak woodlands (elevation 2550 feet) of the Mendocino National Forest.

Table 1. Artifacts recovered from LAK-1053.

Artifact Type	*Material*	*Length (mm)*	*Width (mm)*	*Thickness (mm)*	*Weight (g)*
Rattlesnake Cornernotch (Projectile Point #1)	Chert	13.7	12.2	2.3	0.47
Rattlesnake Cornernotch (Projectile Point #2)	Chert	27.1	17.8	4.3	1.69
Obsidian Biface (Obsidian Biface #1)	Obsidian	24.7	21.2	7.7	3.68
Pestle (Groundstone #5)	Stone	139.2	44.5	30.7	> 300.00
Pestle Fragment (Groundstone #1)	Stone	76.7	45.6	12.8	> 300.00

Figure 2. Small Rattlesnake Cornernotch, chert (Projectile Point #1).

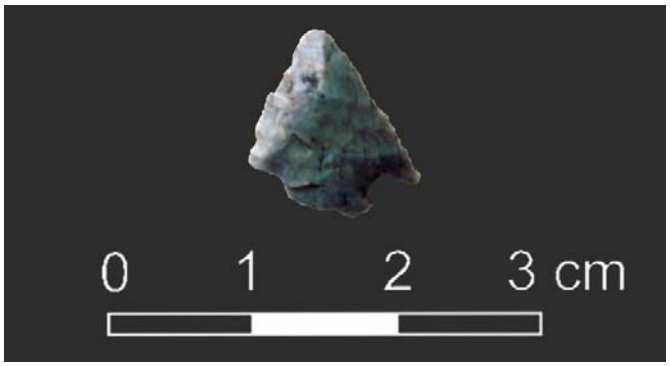

Figure 3. Large Rattlesnake Cornernotch, chert (Projectile Point #2).

Analyses of two formal pestle fragments recovered indicate several stages of groundstone production, use, and post-depositional breakage are represented. Grinding and pecking were observed superimposed on negatives left over from rough shaping of the initial pestle blanks–features indicative of techniques regularly employed in groundstone manufacture. Additionally, the larger pestle fragment (made on sandy mud-stone) shows excessive thermal effects at the base, indicating that the pestle was used as a

cooking stone. The smaller pestle fragment (made on a soft meta-volcanic) also exhibits a post-depositional break through the center, indicating the fracture occurred after the artifact was discarded.

Lithic analysis of flaked stone tools indicates initial manufacture through the use of hard and soft hammer percussion thinning, indicated by the length of flake negatives and depth of contra-bulbs on the surface of analyzed stone tools. Smaller and shallower removals along tool margins indicate final shaping was completed through pressure flaking. Typological studies on two Rattlesnake Corner-notched points situate diagnostic projectile points within a range of 800 B.P. to 200 B.P.

DISCUSSION

As previously stated, test results suggest multiple habitations throughout time. Obsidian hydration and XRF place an occupation at 1097 B.P., and typological analyses place another between 800 B.P. and European contact. Analysis of FAR and pestles suggest food processing and cooking also occurred, and the presence of the two gravers suggests bone or antler tool manufacturing.

Previous documentation of LAK-1053 reported finding two house pits and an obsidian graver on site. In the area of the site previously mapped as "house pits," our team found only sloping and eroding FAR-rich midden soil. The vast majority of formal and diagnostic artifacts recovered from our field surveys of the site were collected from the steep south slope below the midden-rich soils, evidence of the vulnerability of this site to erosion.

Rattlesnake corner notch projectile point types chronologically overlap with the introduction and use of bow and arrow technology in California. These points, found in association with midden soils, formal milling equipment such as pestles, as well as high concentrations of FAR suggest that the site may have been a seasonal hunting and gathering camp where inhabitants occasionally engaged processing and pit roasting activities. Future research should be aimed at targeted test excavations of rapidly eroding midden soils and generating a larger obsidian hydration sample base to gain a more refined resolution surrounding site chronology.

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