ZOOARCHAEOLOGY AT CA-TEH-984

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Archaeological excavations at CA-TEH-984 on the Mendocino National Forest have yielded a significant archaeofaunal assemblage. Preliminary analysis indicates an assemblage dominated by deer, although other species are also present. Species composition, skeletal part representation, and butchering characteristics are discussed with respect to their implications for interpreting aboriginal behavior in the area. Results of the zooarchaeological analysis are described in the context of additional data analyzed for the site.

ARCHAEOLOGICAL CONTEXT

Most of the previous archaeological research conducted in the North Coast Ranges and northern Sacramento Valley has focused on low-elevation sites, and has been oriented towards defining chronological sequences and regional cultural patterns (Edwards 1969; Fredrickson 1973, 1974; Meighan 1955; Treganza 1954; White 1984; White and Fredrickson 1992). Unfortunately, few research projects have yielded data on settlement and subsistence practices for middle and upper elevations, so our understanding of prehistoric settlement and subsistence patterns in these zones of the North Coast Ranges is limited (Farber 1980; Huberland 1992; King 1974). Investigations at TEH-984 have contributed data useful to our understanding of middle-elevation zone settlement and subsistence practices, and these data are useful in comparative studies within the region.

CA-TEH-984, commonly referred to as Leroy Camp, is located on the Grindstone Ranger District of the Mendocino National Forest, on the eastern slopes of the North Coast Ranges in western Tehama County, California. It is a mid-elevation site located at 3,100 feet, within the Thomes Creek watershed between the northern Sacramento Valley and the crest of North Coast Ranges. The site is situated on a sheltered, upland grassy bench associated with a spring and a predominantly black-oak overstory, within a mixed-conifer and hardwood forest.

Subsurface excavations at Leroy Camp during the summers of 1999 and 2000 removed 9.5 cubic meters of soil and revealed a deep midden deposit containing a preponderance of faunal remains, coupled with features, debitage, flaked stone tools, flat-ended pestles, *Olivella* shell beads, bone tools, and scant human remains.

CA-TEH-984 is situated within ethnographic Nomlaki territory, in western Tehama County (Goldschmidt 1951). The Nomlaki spoke several Wintun dialects that were closely related to those of the Wintu to the north and the Patwin to the south. The Nomlaki were divided into two major groups: the River Nomlaki, who occupied the Sacramento Valley between Stony and Cottonwood creeks, and the Hill Nomlaki to the west. According to Goldschmidt (1951), the Hill Nomlaki had their winter villages in the foothills at the edge of the valley, and moved up into the mountains in the summer to take advantage of abundant resources. Each village had its own summer exploitation territory in the mountains to which it returned annually.

While interpretations of cultural components within the North Coast Ranges follow frameworks postulated by Fredrickson (1973, 1974), Meighan (1955), Moratto (1984), and White and Fredrickson (1992), it is not the purpose of this article to review the entire sequence of culture change in the North Coast Ranges. Rather, we wish to present preliminary findings from TEH-984, an archaeological assemblage containing a significant amount of faunal remains. Three kinds of chronological data obtained from TEH-984 are being used to reconstruct upper Thomes Creek cultural-temporal manifestations, including obsidian hydration, radiocarbon dating, and time-sensitive artifacts, which all suggest a predominantly late-period occupation at the site.

Although the flaked stone tool assemblage is characterized by an abundance of chert, some obsidian was also recovered. Based on an initial sample of 53 specimens, obsidian source data

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reveal a slight predominance (49%) of the Grasshopper Flat/Lost Iron Well source, whereas Borax Lake obsidian comprises 45% of the assemblage. Obsidian hydration rim analysis of yet another small sample (n = 35) has revealed Grasshopper Flat/Lost Iron Well obsidian sources prevalent in ranges of 1.0 - 3.4 microns, with a mean of 2.6 microns. Borax Lake sources are more prevalent at 3.3 - 4.4 microns with a mean of 3.05 microns. Based on rough correlations elsewhere in the southern North Coast Ranges, these findings are representative of the time period between A.D. 600 and 1350 (White and Fredrickson 1992).

Radiocarbon dating of samples of charred materials taken from hearth features indicate measured radiocarbon ages of 440 +/- 60 years B.P. at 30 cm below surface and 1070 +/- 80 years B.P. at 90 cm. These radiocarbon dates indicate that TEH-984 falls within Fredrickson's Emergent Period (A.D. 500-1800), also locally referred to as the "Shasta Complex" (Meighan 1955) in the northern Sacramento Valley. Signature artifacts from this time period, which are represented in the TEH-984 assemblage, include Gunther Barbed projectile points, *Olivella* shell beads, flat-ended pestles, and bone awls.

While much of the previous work within the region has focused on defining cultural sequences and placing settlement patterns within that context, very few non-artifactual constituents, including archaeofaunal assemblages, were recovered during archaeological investigations, apparently due to poor preservation of organic remains. CA-TEH-984 is unusual in that respect—measured by the excellent preservation of the archaeofaunal assemblage.

ARCHAEOFAUNAL ASSEMBLAGE

Approximately 3,400 bone specimens recovered from the excavations at TEH-984 have been analyzed and are categorized in Table 1. This table compares the number of identified specimens (NISP) and proportions for each taxon identified at TEH-984 with several archaeofaunal assemblages recovered from mid-elevation sites along Mill Creek on the west side of the Sierran Front. We note first that, with one exception, these assemblages are roughly comparable samples in terms of their NISP values, all reflecting analyzed assemblages with 2,500-3,500 specimens. We would also note that, despite the fact that several zooarchaeologists contributed to the analysis of these assemblages, the proportion identifiable to order, family, or genus remains relatively constant for each at approximately three to five percent of the analyzed sample. This suggests that observer bias probably plays a minimal role in the effect on any skeletal-element patterning we might compare between the samples. It also suggests that taphonomic effects were roughly constant for each of these assemblages, at least in the degree to which individual bones could be identified. In other words, there appears to be no differential preservation of identifiable features on bones that were recovered from each assemblage. The potential taphonomic effects on skeletal-part preservation will be addressed below. We recognize that issues of observer bias and identifiability are complex and will require further discussion, but for the time being we will proceed on the assumption that they played a minimal role.

Species diversity is quite low at TEH-984, as well as at the other sites listed in Table 1. Of the identifiable specimens, deer and artiodactyl categories are predominant. No other genus or order is represented in proportions greater than 0.5%. Given this observation, we suggest (as have other authors in the region) that the "large mammal" and "artiodactyl" categories represent deer and not other species of big game. One might argue that this assumption is more tenuous for the TEH-984 assemblage, given the presence of bear and possibly elk in the assemblage. We would simply note that their representative samples are small and statistically inconsequential, given the size of the assemblage. In effect, we maintain that the "deer" assemblage is actually represented by artiodactyl and large mammal remains in addition to those specifically identified as *Odocoileus*. When these numbers are compared with the total identifiable portion of the assemblage, we can see that deer represent the bulk of the archaeofaunal remains at TEH-984 (Figure 1). This pattern is repeated for the other sites in our comparison. The concept of deer-dominated archaeofaunal assemblages in the northern California foothills is not new — other authors have identified this pattern before us. Needless to say, our discussion from this point will focus on the deer remains at TEH-984.

Genus	Common Name	CA-TEH-984		CA-TEH-199		FS05-06-51-40		CA-TEH-563		CA-TEH-684	
		NISP	Percent	NISP	Percent	NISP	Percent	NISP	Percent	NISP	Percent
Odocoileus	Deer	97	2.8%	65	2.4%	2	0.6%	17	0.6%	19	0.6%
Cervus?	Elk	2	0.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Artiodactyl		74	2.2%	6	0.2%	6	1.8%	39	1.3%	50	1.6%
Ursus	Bear	1	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Urocyon	Fox	1	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Mephitis	Skunk	1	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sciurus	Tree Squirrel	4	0.1%	0	0.0%	0	0.0%	7	0.2%	0	0.0%
Spermophilis	Ground Squirrel	18	0.5%	0	0.0%	0	0.0%	0	0.0%	13	0.4%
Thomomys	Gopher	8	0.2%	0	0.0%	0	0.0%	3	0.1%	0	0.0%
Rodentia		0	0.0%	7	0.3%	0	0.0%	1	0.0%	8	0.3%
Sm. Mammal Indet.		23	0.7%	7	0.3%	0	0.0%	4	0.1%	0	0.0%
Med. Mammal Indet.		4	0.1%	212	7.9%	2	0.6%	2	0.1%	2	0.1%
Lg. Mammal Indet.		705	20.7%	499	18.5%	45	13.4%	310	10.2%	828	26.5%
Mammal, size indet.		2473	72.5%	1894	70.3%	281	83.6%	2668	87.4%	2204	70.6%
Aves		1	0.0%	4	0.1%	0	0.0%	0	0.0%	0	0.0%
Total		3412		2694		336		3051		3124	

Table 1. Number of Identified Specimens and Taxon Distribution at Teh-984 and Several Sites along the Sierran Front.

At this stage in the analysis we are concerned predominately with skeletal-part representation at TEH-984 and the implications for aboriginal behavior regarding butchery, transport, tool production, and site function. Quantification, analysis, and interpretation of skeletal-part data is no simple task, as Grayson (1984), Lyman (1994), Binford (1978, 1981), Bunn (1986) and a host of other zooarchaeologists have made abundantly clear ever since 1968, when Perkins and Daley first coined the term "schlepp effect" to denote differential transport of carcass elements by hunters. The significance of skeletal-part data is demonstrated over and over again with ethnarchaeological research that illustrates the varied behavioral contexts in which humans butcher, transport, consum, and then discard game animals. Arguments over the meaning of skeletal-part patterning reach a crescendo with discussions of Plio-Pleistocene hominid sites and the interpretations of these as either centra-place locations exemplifying hunter-gatherer-like foraging behavior,or scavenged assemblages with little hominid involvement. However, a critical evaluation of skeletal-element representation in Californian assemblages is no less warranted,and we would argue that many zooarchaeological analyses lack the empirical evidence required for the behavioral interpretations.

Just over 250 skeletal elements in our study could be identified and categorized as deer. With

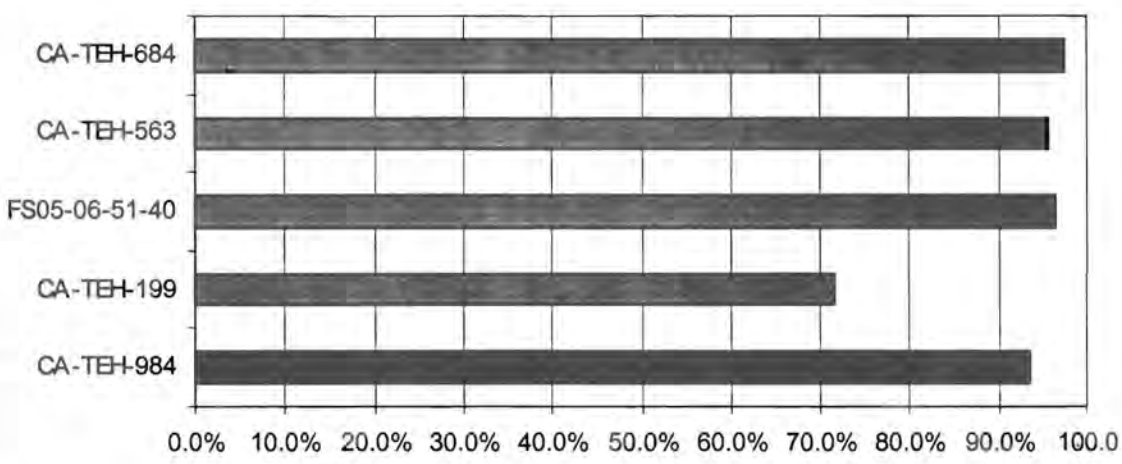

Figure 1. Proportion of Deer in Identifiable Archaeofaunal Assemblage (Deer, Artiodactyl, Large Mammal combined)

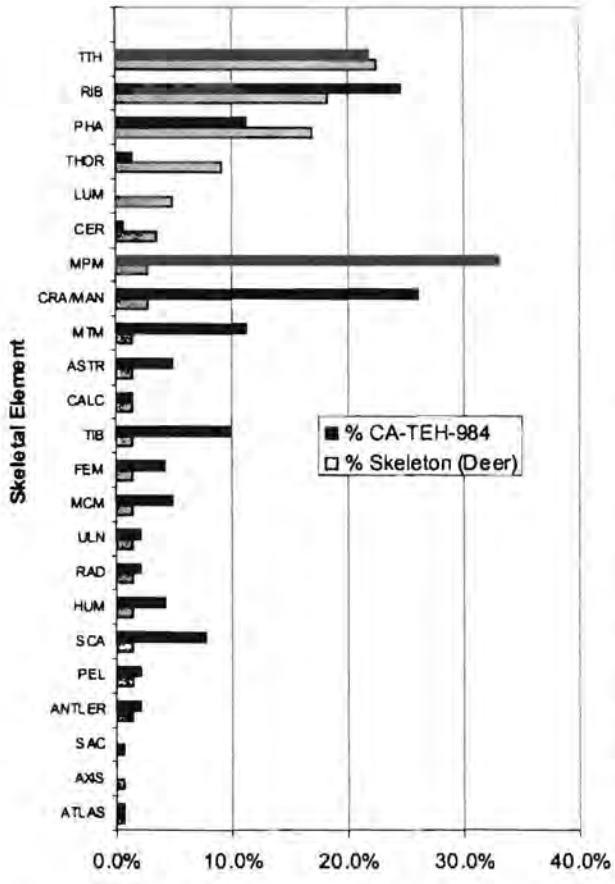

Figure 2. Skeletal Element Proportions Expected for Deer Compared to Specimens Observed at CA-Teh-984.

few exceptions, every major bone comprising a deer skeleton was identified in the TEH-984 assemblage (Figure 2). This graph illustrates the proportion of skeletal elements represented in the TEH-984 deer assemblage as compared to the proportions expected in a complete deer skeleton. At first glance it appears that low-utility axial and distal limb elements dominate the TEH-984 assemblage. Particularly conspicuous in their abundance are metapodials, and crania and mandible fragments; however, ribs, metatarsals, and tibia were also recovered in proportions greater than expected. The question of course is whether this pattern of skeletal-part representation reflects butchery and transport patterns, and tool production on the part of aboriginal hunters, or whether other factors, namely taphonomic, are responsible for the observed pattern. Primary among our concerns was the effect of bone density on the skeletal-part proportions recovered. As Lyman (1994) has noted, low-utility elements are typically comprised of denser bone than their high-utility counterparts, and therefore tend to preserve in greater numbers. Following Lyman's methodology, we determined percent survivorship of each element based on observed and expected frequencies of individual elements in relation to overall estimated minimum numbers of individuals (MNI); in this case, a minimum of four individuals was indicated in several element categories. When percent survivorship was plotted against bone-density values for each element, the following scatterplot emerges (see Figure 3).

A regression line was fitted to the scatterplot, which indicates an r-squared value of approximately 0.46. In effect, there is a positive correlation between bone density and survivorship, but it is not significant enough to warrant the conclusion that bone density alone explains skeletal-element proportions in the assemblage. However, it is also clear that there is enough of a correlation to suggest that differential bone density plays at least some role in forming the assemblage at the site. The problem of interpreting this amorphous region of "not overly significant" positive correlations with bone density has been noted by other zooarchaeologists and a number of solutions proposed, none of which are completely satisfying. Fortunately, cut-mark and burning data offer at least some additional information from which to draw further inferences. The incidence of both burning and cut-marks is relatively low: burning occurs on 14% of the identified specimens, while cut-marks occur on 7%. Higher percentages of both might be expected if on-site processing and consumption were the primary activities. More telling is the general location of cut-marks relative to skeletal element. These occur almost exclusively on low-utility axial elements, particularly at long bone ends and within limb joints, suggesting that disarticulation, and not meat stripping, was the primary goal.

Also of interest is the slightly higher proportion of metapodial fragments, which were commonly used to make bone tools, such as awls, because of their structural strength along the anterior and posterior grooves. Several bone awl fragments were identified in the assemblage, which suggests that the predominance of metapodial fragments is representative of tool

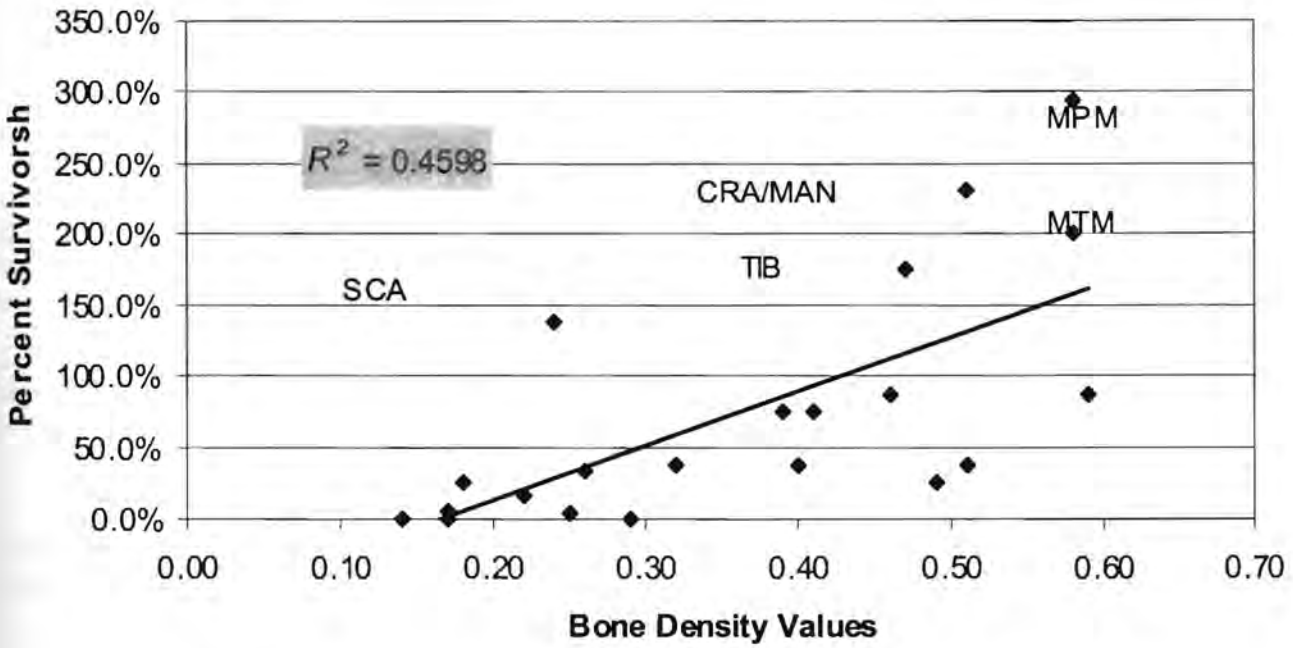

Figure 3. Skeletal Element Survivorship at CA-Teh-984 and Standard Bone Density Values.

production. However, at this point in the analysis, evidence of tool-production stages was not identified. The breakage patterns do not necessarily reflect snapping of metapodials for awls or other tools, but appear to be less systematic. This evidence, coupled with the predominance of fragmented long bones, rather suggests cracking and processing of these elements for marrow extraction.

Conclusions

Of course the question remains: what does this all mean in terms of aboriginal behavior at TEH-984? We have suggested that the data are largely ambiguous with respect to tool production and differential bone transport: although the cut-mark and burn data lend some measure of doubt as to whether meatier limb elements were consumed onsite. The faunal data alone are suggestive but inconclusive. Without statistically rigorous analyses (and we do not propose that our current evaluation of the TEH-984 archaeofaunal assemblage does anything but scratch the surface of its zooarchaeological potential), interpretations based on species and skeletal-part lists are largely irrelevant. When these data are coupled with the preliminary analysis of the entire assemblage, however, the following inferences can be made. The archaeological deposit appears to be oriented towards procurement and processing of faunal resources, although other activities are represented as well. Our research, as well as that of others, refutes King's (1974) hypothesis that post-Borax Lake-pattern base camps would not occur in the uplands of the North Coast Ranges due to increasing trade and sedentism at lower elevations. However, the duration of upland settlements like TEH-984 is unknown. We suggest that the well-preserved, deep midden deposit at TEH-984 is representative of a seasonal settlement and subsistence strategy oriented around cycles of deer migration and acorn maturation in the late fall. Further evidence to support this inference is presented by Thomas (2002). But additional classes of data are not yet analyzed, and these data may or may not fit with any of the current interpretations regarding site function. The primary inference we draw from preliminary analysis of the TEH-984 archaeofaunal assemblage emphasizes the complexity of zooarchaeological analysis. Few large archaeofaunal collections from higher elevations exist in northern California, particularly on National Forest lands; and they deserve critical analysis, discussion, and publication. We hope to have initiated that process with the TEH-984 assemblage.

Notes

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