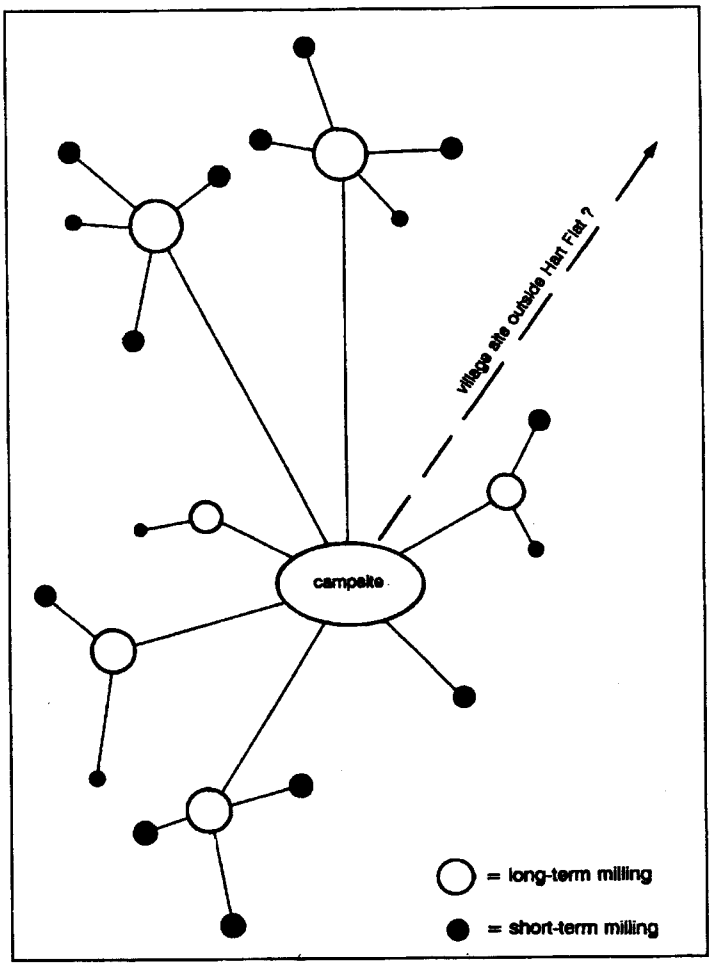
KERN COUNTY

ARCHAEOLOGICAL SOCIETY

JOURNAL



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The Kern County Archaeological Society Journal is published on an occasional basis. The Journal publishes articles and reports on the archaeology and ethnography of Kern County and surrounding areas.

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Cover illustration: General pattern of site distribution at Hart Flat
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KERN COUNTY ARCHAEOLOGICAL SOCIETY JOURNAL

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MESSAGE FROM THE EDITOR

This is the ninth volume of the *Kern County Archaeological Society Journal* (KCASJ) that has been published to date. The goal of the Kern County Archaeological Society (KCAS) has always been to publish an annual journal, although this has not always been possible, as witnessed by the rather long lapse of time between Volumes 8 and 9. The KCASJ is interested in papers on the archaeology or ethnography of the San Joaquin Valley and surrounding areas written by members of the KCAS or others in the community, whether they be professionals, students, or avocationalists. We always strive to include as many articles as possible and encourage authors to submit their papers for consideration. By publishing such material, it is our hope that we may benefit our members by making available the important archaeological and ethnographic work being done in the San Joaquin Valley and environs, as well as educating the public about the significance of such work.

This volume is dedicated to a single project, which consisted of a testing program in the Hart Flat area of Keene Ranch in Kern County, California. Under the direction of Mark Q. Sutton and Robert E. Parr of the Center for Archaeological Research (at that time known as the Cultural Resource Facility) at California State University, Bakersfield (CSUB), the project was conducted in 1991 with the assistance of CSUB students, as well as an outside consultant. Those students have since moved on in their various careers, a fact that is reflected in the affiliation that accompanies each article. Although the project was terminated by the client prior to completion of the field and laboratory analyses due to funding difficulties, the data that were collected up until that time were written up and a report was submitted (see Parr 1991 in the first article). This volume, which is a somewhat revised version of that earlier report, represents the final report of our investigations at Hart Flat. In addition, the Yokuts bibliography that typically accompanies each KCASJ volume has been revised and expanded here for the benefit of our readers.

I thank Rebecca S. Orfila, Robert E. Parr, and Mark Q. Sutton for their valuable assistance in preparing this issue of the KCASJ. I also thank the authors whose articles appear in this issue.

Jill K. Gardner
Editor, *Kern County Archaeological Society Journal*, Vol. 9 (2005)

The Archaeology of Hart Flat, Keene Ranch, Kern County, California

Robert E. Parr, Center for Archaeological Research, Dept. of Sociology and Anthropology, California State University, Bakersfield.

INTRODUCTION

In 1990, a crew from California State University, Bakersfield (CSUB), under the direction of the author, conducted a program of archaeological testing and evaluation at Keene Ranch in Kern County, California, as part of a cultural resources evaluation for the Oakridge American Company. The purpose of this archaeological study was to evaluate the significance of the numerous archaeological sites, both prehistoric and historical, that had been recorded within the boundaries of the proposed project, as well as to satisfy California Environmental Quality Act (CEQA) requirements concerning identification and protection of cultural resources on lands proposed for development.

The Keene Ranch property is geographically divided into three main areas. From north to south, these were Hart Flat, Crofton Fan, and Keller Valley. The entire property encompasses approximately 13,000 acres of land in the northern Tehachapi Mountains of Kern County. This report considered only those sites located in Hart Flat. The Keene Ranch project offered an opportunity to expand significantly the data base for an area from which few archaeological data are available and is therefore poorly understood. Questions addressed by the work at Keene Ranch included those regarding settlement and subsistence patterns, trade, dating, ethnicity, seasonality, and site function, among others.

NATURAL SETTING

Location

The Keene Ranch project consists of roughly 13,000 acres of land located south of and adjacent to Tehachapi Pass in the northern Tehachapi Mountains of southern Kern County (Fig. 1). Elevations in the project area range from about 2,540 ft. at a point just north of Hart Flat to 5,809 ft. at the summit of an unnamed peak in the southwest corner of the property. Drainage is generally northward toward Tehachapi Creek, except in the southernmost area of the project where creeks flow south toward Cummings and Brite valleys. Hart Flat consists of approximately 1,200 acres of land in the extreme northern portion of the project. This area includes Hart Flat proper, as well as adjacent foothills (Fig. 2).

An unnamed ephemeral creek flows from the canyon at the extreme southern end of Hart Flat along the foot of the mountains to the east and crosses beneath Highway 58 just west of the Hart Flat exit before continuing north and joining Tehachapi Creek. For the purpose of clarity, this drainage channel is herein referred to as Hart Creek.

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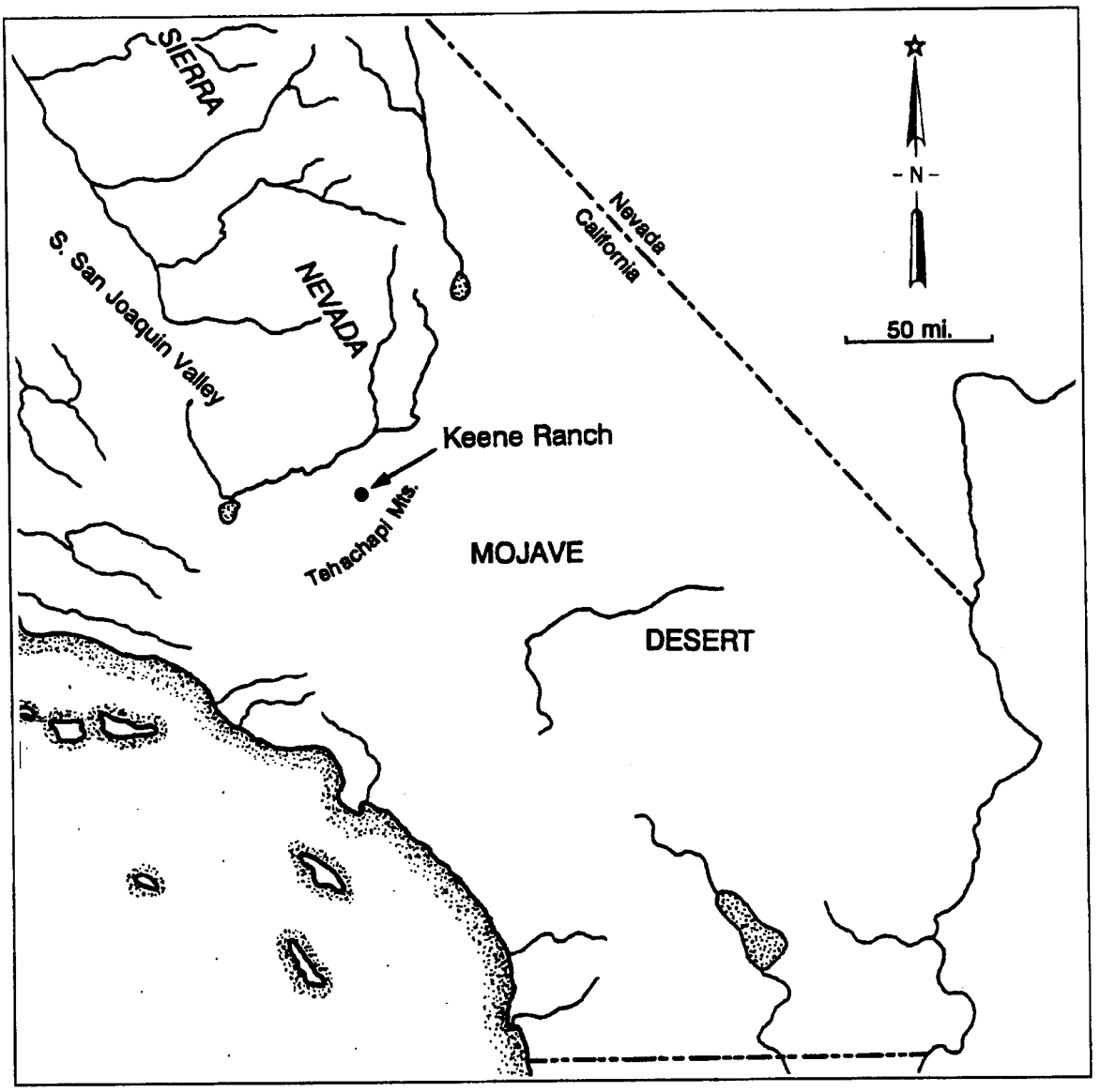

Fig. 1. Location of the Keene Ranch project.

Geology

The Tehachapi Mountains are a northeast trending mountain range bordered by the Sierra Nevada to the north, the San Emigdio Mountains to the southwest, the Mojave Desert to the south and east, and the southern San Joaquin Valley to the west. They constitute the southernmost division of the Sierra Nevada geologic province (Troxel and Morton 1962). The dividing line between the southern Sierra Nevada and the Tehachapi Mountains is considered to be between Jawbone and Caliente canyons (Troxel and Morton 1962). The range is composed of granite that has eroded from the Cretaceous Sierra Nevada batholith, along with some recent marine metasedimentary rock. It was uplifted as a consequence of compression between the Garlock Fault to the south and east and the White Wolf Fault to the northwest. Typically, the Tehachapi Mountains are characterized by steep slopes, fairly deep canyons, and rounded summits with well-developed soil cover.

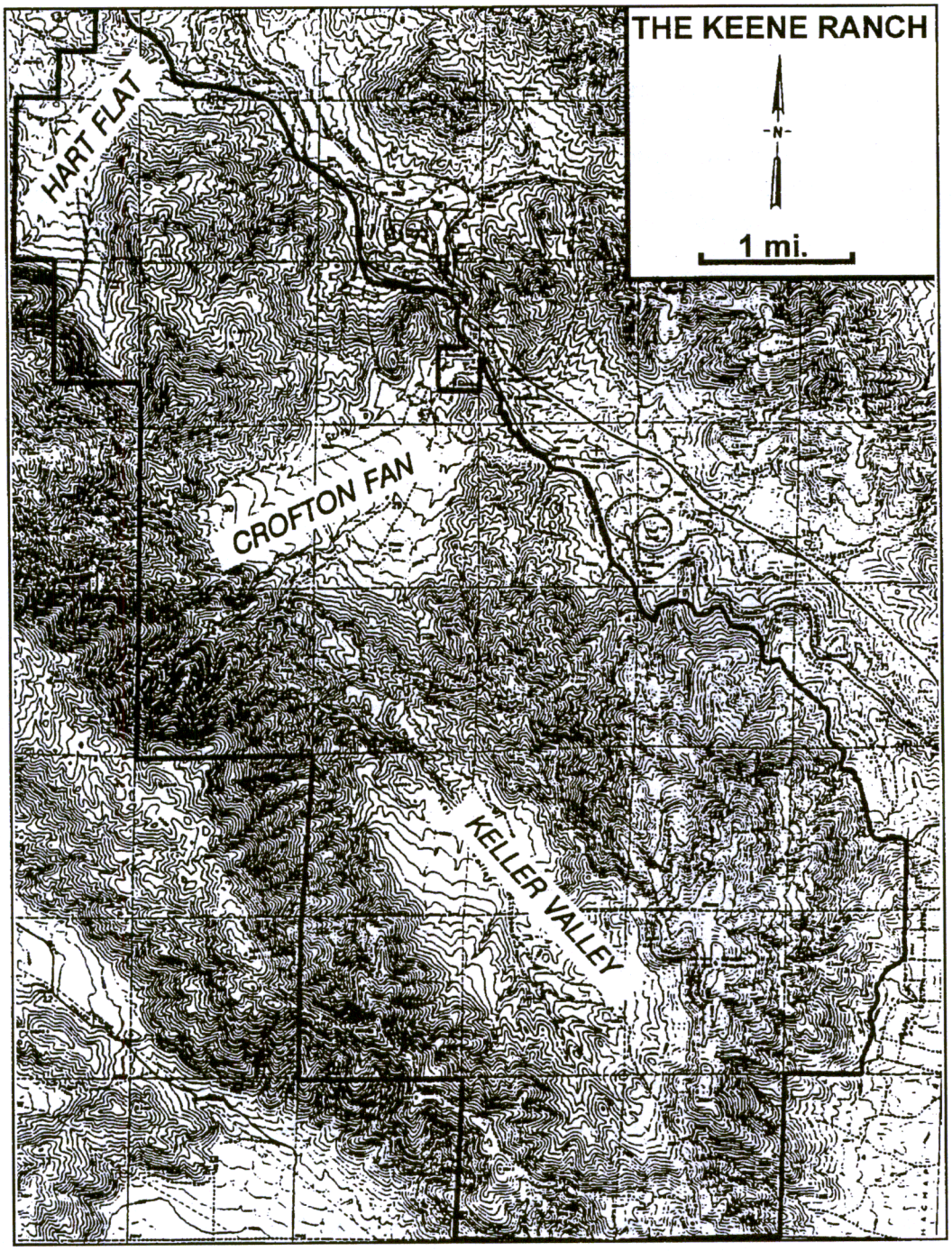

Fig. 2. Map of Keene Ranch showing locations of Hart Flat, Crofton Fan, and Keller Valley. Adapted from the USGS Keene, CA, 7.5' series topographic quadrangle.

Hart Flat is a small, northward-sloping alluvial valley located in the northern Tehachapi Mountains just south of Tehachapi Pass. It is about 1.9 mi. long (north-south) and roughly 0.6 mi. wide at its widest point. It is located ca. 1.5 mi. west of the community of Keene. The soil of Hart Flat is mainly composed of Steuber sandy loam and Steuber stony, sandy loam (Anonymous 1981:47-48). Both types of soil are the result of alluvial action and are weathered from the surrounding granitic rocks.

Climate

The climate of the area is characterized as Transitional (Bailey 1966). This climactic type is distinguished by cool winters with daily mean temperatures averaging less than 50° F., and fairly dry, warm summertime conditions, with daily average temperatures of over 65° F. The annual average precipitation in the area is approximately 10.3 in., based on records from Tehachapi about 13 km. to the southeast. About a fifth of this total amount occurs as snow in winter (United States Weather Bureau 1964:Table 7).

BIOLOGICAL SETTING

A rich diversity of plants and animals inhabits the study area. A general description of the local biotic community is provided below.

Botanical Resources

The botanical community of Hart Flat consists primarily of Douglas Oak Woodland (Twisselmann 1967). Common plants include Douglas or blue oak (*Quercus Douglasii*), scrub oak (*Q. dumosa*), canyon live oak (*Q.* cf. *chrysolepis*), coast live oak (*Q. agrifolia*), bull pine (*Pinus sabiniana*), buckeye (*Aesculus californica*), gooseberry (*Ribes* cf. *Roezlii*), rabbitbrush (*Chrysothamnus* cf. *nauseosus*), milkweed (*Asclepias* cf. *californica*), oak mistletoe (*Phoradendron flavescens*), and jimsonweed (*Datura* cf. *wrightii*), among others. Streambed plant associations occur along the major drainages of the project area. Species observed in these areas include Fremont cottonwood (*Populus Fremontii*), California sycamore (*Platanus racemosa*), willow (*Salix* spp.), nettle (*Urtica* cf. *holosericea*), wild rose (*Rosa* sp.), and cattail (*Typha* cf. *domingensis*).

Many of the above-named plants were of economic importance to the aboriginal inhabitants of the area, and were used for food, medicine, manufacturing material, and other purposes. Some had ritual or mythological significance (Zigmond 1981).

Faunal Resources

A variety of animal life is found in the region, ranging from large mammals to insects. As with the botanical resources, many of these species were important to the native peoples of the area for food, manufacturing materials, and ritual purposes.

Mammals. Probably the most common mammals in the general vicinity are rodents. Several species observed included kangaroo rats (*Dipodomys* spp.) and ground squirrels (*Spermophilus* spp.). Larger mammals noted included coyote (*Canis latrans*), deer (*Odocoileus hemionus*), cottontail rabbits (*Sylvilagus audubonii*), and black-tailed hares (jackrabbit [*Lepus californicus*]) (Jameson and Peeters 1988).

Fox (*Vulpes* spp.), raccoon (*Procyon lotor*), black bear (*Ursus americanus*), mountain lion (*Felis concolor*), and bobcats (*Felis rufus*) are known to inhabit the area. The grizzly bear (*Ursus arctos*), now extinct in California, formerly was numerous in the region.

Reptiles and Amphibians. Numerous species of lizard reside in the area, including western fence lizard (*Sceloporus occidentalis*), desert night lizard (*Xantusia vigilis*), alligator lizard (*Elgaria multicarinata*), Gilbert's skink (*Eumeces gilberti*), western whiptail (*Cnemidophorus tigris*), western skink (*Eumeces skiltonianus*), side-blotched lizard (*Uta stansburiana*), and coast horned lizard (*Phrynosoma coronatum*). Snake species common to the region include rattlesnake (*Crotalus* cf. *viridis*), king snake (*Lampropeltis getulus*), gopher snake (*Pituophis melanoleucus*), garter snake (*Thamnophis couchii*), racer (*Coluber constrictor*), black-headed snake (*Tantilla* spp.), and night snake (*Hypsiglenna torquata*) (Stebbins 1966).

Amphibians known to occur in the vicinity include Pacific tree frog (*Hyla regilla*), western toad (*Bufo boreas*), Tehachapi slender salamander (*Batrachoseps stebbinsi*), and yellow-blotched salamander (*Ensatina eschscholtzii croceater*).

Avifauna. A large assortment of birds inhabits the area, including numerous passerine species. Raptors include hawks (cf. *Buteo*) and eagles (cf. *Haliaeetus* sp.). Ravens (*Corvus corax*), a general predator and scavenger, also are present. Quail (*Callipepla* spp.), an important food source, have been observed. Other species include roadrunners (*Geococcyx californianus*), and owls (various genera) (Robbins et al. 1983).

Invertebrates. Numerous invertebrates, mostly insects, are present in the area. Many insects were used as food by the Indians (Sutton 1988), although there are no specific references known for the Tehachapi area.

CULTURAL SETTING

Pleistocene Chronology

So little archaeological work has been done in the northern Tehachapi Mountains and extreme southern Sierra Nevada that few data on the regional prehistory are available. General summaries of southern Sierra Nevada-Tehachapi Mountains prehistory are available in Schiffman and Garfinkel (1981) and Moratto (1984:331-334). The following is a generalized account of the prehistory of the area.

Paleoindian Period (ca. 12,000 to 10,000 B.P.). A variety of terms has been used to classify known and postulated early human occupations in the arid west. These include Lithic Stage (Willey and Phillips 1958), Paleoindian Period (e.g., Davis 1978; Chartkoff and Chartkoff 1984), Early Systems Period (e.g., Stickel and Weinman-Roberts 1980), and Early Humans (e.g., Davis et al. 1980). Warren and Crabtree (1986:184) began their chronology with the terminal Pleistocene, placing fluted point material into the beginning of their Lake Mojave Period. At this point in our understanding of the record, the term Paleoindian is frequently used to refer to material belonging to the Fluted Point Tradition or earlier, including those belonging to a "Pre-projectile Point Period" (see Moratto 1984).

The earliest agreed-upon archaeological culture in the New World is Clovis, typified by a particular type of fluted projectile point. The general view is that there are no projectile point forms antecedent to Clovis in the New World and that any New World archaeological remains dating before Clovis must belong to a Pre-projectile Point Period (see Krieger [1964] and Willey [1966] for reviews of the arguments

for an "early" human occupation of the New World). Nevertheless, arguments for a Clovis antecedent have been presented by several researchers (e.g., Davis 1978; Dillehay 1997).

There has been a variety of claims for archaeological sites in the Mojave Desert dating to the Pre-projectile Point Period. No such remains are known for the Tehachapi Mountains. Immediately following the proposed Pre-projectile Point Period (a period that could possibly include Clovis antecedents) is the Fluted Point Tradition, which consists of Clovis and other possible (i.e., unidentified) fluted points (no Folsom points are known from California [Moratto 1984:87]). These remains are generally viewed as representing a Big Game Hunting Tradition exploiting Pleistocene megafauna (e.g., Willey 1966; Davis 1978; Chartkoff and Chartkoff 1984; Moratto 1984).

There are few data suggesting a Paleoindian occupation of the Tehachapis. Isolated Clovis projectile points were reported from the Tehachapi Mountains (Glennan 1971) and the southern Sierra Nevada (Zimmerman et al. 1989) suggesting early use of the region, but such an occupation remains to be demonstrated.

Holocene Chronology

The following periods are generally defined by marker artifacts, primarily projectile points, that are thought to be temporally sensitive. These projectile points represent three major weapons systems; thrusting spears, atlatls, and the bow and arrow. It is clear that thrusting spears remained in the cultural inventory of native peoples until historical times, thus perhaps diminishing their utility as temporal markers.

It has been argued (Flenniken and Wilke 1989; Wilke and Flenniken 1991) that atlatl dart projectile points (e.g., Pinto and Elko series) have only general temporal significance. The argument asserts that because of rejuvenation of broken points, archaeologically recognized "styles" could change, and so confuse the temporal placement of the points. Thus, it has been proposed that atlatl dart points should not be considered temporally sensitive within dart point times. This proposition has been contested (Bettinger et al. 1991) and continues to be a critical issue in California and Great Basin archaeology.

With this potential problem in mind, the following traditional view of Holocene chronological periods is presented to provide some background in which to place the materials from Keene Ranch. This chronology is taken from McGuire and Garfinkel (1980) and Moratto (1984).

Lamont Phase (ca. 6,000 to 3,200 yrs. B.P.). This phase is characterized by the presence of Pinto series projectile points (see Warren and Crabtree 1986) and the use of basalt for the manufacture of flaked stone tools. It is believed that during this time, hunting parties would take occasional trips to upland areas from residential bases. The harvesting of pinyon nuts may also have been a common practice, becoming more intensified during the subsequent Canebrake Phase (see below). There are no confirmed Lamont Phase sites known for this area, although a few Pinto points have been identified in the Tehachapi area to the south (Moratto 1984:333).

Canebrake Phase (ca. 3,200 to 1,400 yrs. B.P.). Archaeological remains dating from the Canebrake Phase are relatively uncommon from the southern Sierra Nevada. Artifacts characteristic of this time period

include millingstones and a variety of projectile points, such as Sierra Concave-Base, Elko, and Humboldt Concave-Base forms. The intensive use of pinyon nuts is evident by the presence of pinyon base camps and temporary stations for the processing of this resource. The exploitation of other resources, such as bulbs and seeds, is also evident. It is not clear if sites from this period are rare or under-represented in the known archaeological record (Moratto 1984:333).

Sawtooth Phase (ca. 1,400 to 700 yrs. B.P.). The Sawtooth Phase represents a greater use of upland areas, as noted by an increase in pinyon camps and the expanded use of obsidian (Moratto 1984:333). Sites dating from this period are fairly common. Rose Spring and Eastgate projectile points appear to reflect the introduction (or at least the expansion) of the bow and arrow, replacing dart points used with the atlatl (spear thrower) (see Yohe and Sutton 2000). Other artifacts associated with this period are manos and millingstones, bedrock mortars, cobble pestles, and disk beads made of steatite and serpentine.

Chimney Phase (ca. 700 yrs. B.P. to Historic Contact). Sites dating to the Chimney Phase, marked by Desert series (Desert Side-notched, Cottonwood Triangular) projectile points, are relatively common. Other artifacts from this phase include Owens Valley Brown Ware, *Olivella* and stone disk beads, and glass beads. A few sites from this period have been excavated but most of those data remain unpublished. The generalized late archaeological remains reflect a hunting and gathering economic system similar to that used during ethnographic times, although the ethnicity of the populations residing at these sites remains unclear. It seems that most of the recognized archaeological remains from the southern Sierra Nevada date from this late period.

ETHNOGRAPHY

The project area is within a region that was claimed ethnographically by the Kawaiisu (Kroeber 1925; Zigmond 1986). The Kawaiisu occupied the southern Sierra Nevada south of the Kern River and into the northern Tehachapi Mountains just south of Tehachapi Pass (Fig. 3). They also claimed portions of the western Mojave Desert, although it seems that these areas were used only on an ephemeral basis (at least during the ethnographic period) and that the mountains were the primary occupation areas. Kroeber (1925) estimated the original population at about 500.

The Yokuts lived to the west of the Kawaiisu, in the San Joaquin Valley. The Kawaiisu often went into the valley to trade and interact, although relations were not always friendly. The Tübatulabal lived to the north and spoke a Uto-Aztecan language (Tübatulabalic). They apparently diverged from the Kawaiisu (a Numic group) approximately 3,000 to 4,000 years ago (Lamb 1958; Fowler 1972). The Panamint, also a Numic group, lived in the desert to the east. The Kitanemuk lived to the south.

The social organization of the Kawaiisu was centered around the family group (Zigmond 1986). There was apparently no larger political grouping. Status was achieved, rather than ascribed; one could not inherit property, as it was burned upon the death of an individual.

The Kawaiisu economy was one of hunting and gathering. No agriculture was practiced, although there is evidence of the pruning of tobacco plants to improve the yield and of the burning of wild seed fields to improve the plant yields for the following year (Zigmond 1941). Acorns were a major staple (Zigmond 1986), but many other plants were used as well. Zigmond (1981) identified over 250 taxa of plants used by the Kawaiisu. Of that number, 120 were used for food, 100 for medicine, 40 for ritual

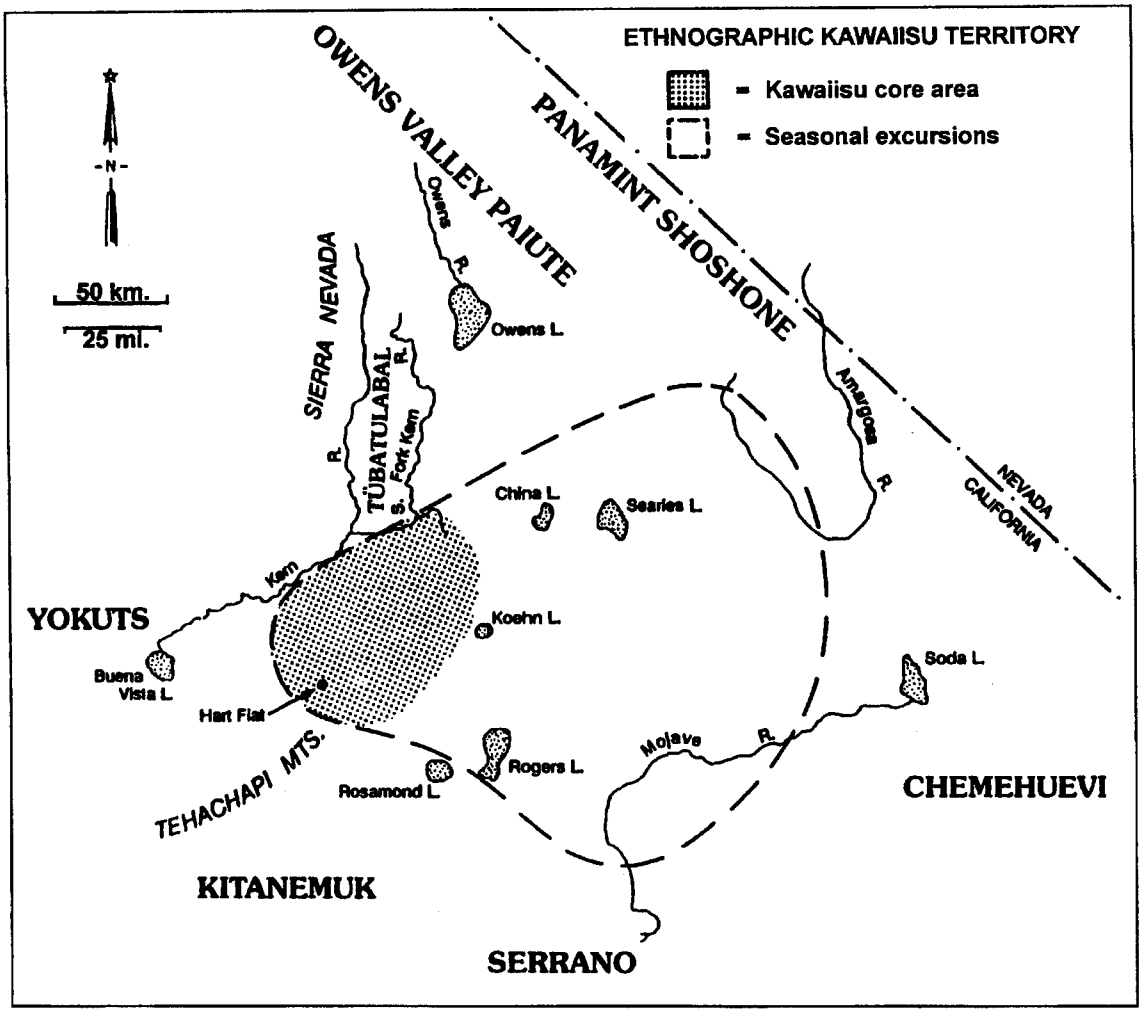

Fig. 3. Map of Kawaiisu territory (map adapted from Zigmond 1978, 1981).

activity, and 90 for miscellaneous purposes. Most of these plants were gathered in the mountains and, less frequently, from the desert (Zigmond 1986). Numerous animals were hunted, including deer, chuckwalla, and bighorn sheep. Pronghorn and rabbits were hunted communally (Zigmond 1986).

Although relatively little is known of Kawaiisu material culture, it is considered to have been varied and intricate. The basketry complex was discussed by Zigmond (1978) and included burden baskets, seedbeaters, winnowers (both concave and flat), trays, and hoppers. Both coiled and twined baskets were common, as was a unique weaving style, unknown anywhere else, used to make a distinctive basket called wičikadɨ (Zigmond 1986:401). Sinew-backed bows of juniper and two- and three-piece arrows were used in hunting. Kawaiisu architecture consisted of circular tule and bark-covered winter houses, flat-roofed shade houses, and circular brush windbreaks for temporary encampments. Earth-covered sweathouses were erected close to water sources. Ceramics are relatively uncommon in the archaeological record, particularly in Late Prehistoric Period sites, and probably never were of great importance. Perhaps most relevant to the present study is the observation by Zigmond (1978:400) of the principal stone items for food preparation among the Kawaiisu. These were bedrock mortars, pestles, portable metates, manos, and obsidian knives. Of lesser importance were bedrock metates and portable mortars.

BRIEF HISTORY OF THE TEHACHAPI MOUNTAINS REGION

Although occasional early crossings of the Tehachapi Mountains were accomplished by historical figures such as Father Francisco Garcés and Jedediah Strong Smith, sustained Euroamerican occupation of the region began with the discovery of gold in the early 1850s (e.g., Coues 1900; Barras 1976). In 1776, Garcés traversed the Tehachapi and Oak Creek passes in his exploration of inland California, stopping at Willow Springs near Mojave on his return to Mexico from the San Joaquin Valley (Ingles 1982). It is generally believed that Jedediah Strong Smith was the first American to enter what is now Kern County (Gavin and Leverett 1987:12). His journeys in the region began in 1827, followed in 1830 by Christopher "Kit" Carson and by Joseph Reddeford Walker in 1833 (for whom Walker's Pass is named). Then in 1844, John C. Frémont traveled into the desert from the valley, possibly by way of Oak Creek Pass as Garcés had before him. Oak Creek Pass was the only route through the eastern Tehachapi Mountains until the construction of the railroad through the Tehachapis (Ingles 1982:50-53).

Subsequent to the mid-1850s, important communities were founded, including Havilah, the original county seat of Kern County. Mining and ranching were the primary impetus for Euroamerican settlement of the area. A number of mining districts was established, along with several small towns. Mining had declined significantly by 1870, and by 1880 most of the mines were abandoned, as were most of the towns. The county seat was moved from Havilah to Bakersfield in 1874. Most of the historical use of the area since 1880 has centered on ranching and farming, although mining continued to be an important enterprise. Most recently, however, considerable residential development has begun and there is a renewed interest in mining.

OVERVIEW OF ARCHAEOLOGICAL RESEARCH IN THE TEHACHAPI MOUNTAINS REGION

Although large areas of the northern Tehachapi Mountains have been inventoried for cultural resources, and several archaeological projects involving excavation have been conducted in the general vicinity, remarkably few reports have been published. Most of the archaeological work done in the area has been in conjunction with specific development projects. Such projects routinely do not address concerns beyond the immediate need to satisfy governmental regulations, and seldom result in any significant contribution to the archaeological literature.

Sand Canyon

A complex of archaeological sites on Phillips Ranch in Sand Canyon, at the eastern end of Tehachapi Valley, has been the nucleus of archaeological inquiry in the northern Tehachapi Mountains for nearly 50 years. Phillips Ranch sites were the focus of a number of investigations beginning with survey and excavations carried out by the Archaeological Survey Association of Southern California (Price 1954). Sutton (1981, 1982) described examples of rock art from Phillips Ranch and Teddy Bear Cave (also known as Creation Cave, the traditional site of the Kawaiisu world creation [CA-KER-508]), and related them to Kawaiisu mythology. Field classes from Antelope Valley College (AVC) excavated at Phillips Ranch, but no reports have been generated. The Nettle Springs site (CA-KER-230), which seems to be the main archaeological manifestation on Phillips Ranch, is a large complex featuring bedrock mortars, rock

rings, rock art, and a dark midden deposit. Excavations were conducted there by the Archaeological Survey Association in 1956 and by AVC in 1970.

The ethnographic Kawaiisu village of *Ma'a'puts* (CA-KER-339) near the mouth of Sand Canyon was the object of excavation by the University of California, Los Angeles, in 1970. Again, no report was prepared. Most recently, an archaeological study was undertaken by Pruett (1987) in Sand Canyon. A complex of sites near the mouth of the canyon (including *Ma'a'puts*, Nettle Springs, and others) was investigated with the purpose of determining if the length of Kawaiisu occupation in the southern Sierra Nevada-northern Tehachapi Mountains, as suggested by linguistic data, could be corroborated by the archaeological record. Data from the excavation of several sites in Sand Canyon and analysis of archaeological collections from prior, unpublished excavations were used in the study. It was concluded that a period of intense occupation for the Sand Canyon area extending into the past beyond about A.D. 1000 could not be confirmed on the basis of the data from the sites studied (Pruett 1987:48).

McCarthy Ranch

The McCarthy Ranch site (CA-KER-478) is a large prehistoric village site located on Clear Creek, south of Caliente. It is presumed to be a Kawaiisu winter village. Excavations were carried out at the site by Bakersfield College and the Kern County Archaeological Society (KCAS) in 1975. Further work was conducted by CSUB in 1978 and again by the KCAS in 1982 (Riles 1984). The site covers an area of about five acres and contains a subsurface cultural deposit at least 90 cm. deep.

Excavations at the McCarthy Ranch site produced Desert and Rose Spring series points, assorted flaked stone artifacts of chalcedony, obsidian, rhyolite, and basalt, ground stone artifacts of granite and steatite, plain brownware pottery, bone awls, and shell and stone beads. Numerous bedrock mortars are present. The archaeological collections from the 1978 and 1982 projects at CA-KER-478 were analyzed by Garcia and McNinch (1992).

Oak Creek

The Oak Creek Canyon site (CA-KER-1998) is a Late Prehistoric Period occupation site largely buried beneath a sand dune on Oak Creek in the eastern foothills of the Tehachapi Mountains west of Mojave. It consists of a large midden deposit at least one meter deep and of undetermined areal extent, along with associated milling features. Test excavations were conducted on the site by CSUB in 1987 and 1988 (Sutton and Everson 1992). Few artifacts were recovered, but those that were consisted mainly of ground stone. Two Desert series points and an *Olivella* shell bead (Class K1 per Bennyhoff and Hughes [1987:137]) also were recovered.

Other Studies

In the early 1980s, Roger Robinson of AVC recovered a human burial eroding from a gully on the southern fringe of the Tehachapi Mountains north of the city of Mojave (Robinson 1982). The burial contained 1,122 shell and stone beads, many of which were still articulated, having been strung on cordage and placed around the body.

In 1976, a historical Native American burial, thought to date to the turn of the century, was removed from an undisclosed location in the vicinity of Keene by a group of treasure hunters (Tremblay 1992). In addition, an isolated, fluted projectile point from the Tehachapi Mountain foothills northwest of Willow Springs, as well as a steatite pipe from the vicinity of White Oak Lodge, were reported by Glennan (1971, 1972). In addition, pictographs have been reported from a remote canyon on the west slope of Bear Mountain (Painter 1984). These were interpreted as paintings made by the Yokuts from the San Joaquin Valley.

Previous Archaeological Work on Keene Ranch

In 1979, portions of Keene Ranch were surveyed for cultural resources by Schiffman (1979) as part of a general archaeological overview for the Keene and Broome Ranch properties. Of the area inventoried by Schiffman, only Hart Flat was selected to be intensively surveyed. As such, an attempt was made to inspect the entire Hart Flat area in order to locate all existing archaeological sites (Schiffman 1979:6). All other areas in the 1979 project were surveyed judgmentally; that is, only those localities considered likely to contain archaeological sites were examined. The survey resulted in the discovery and recordation of 53 sites on Keene Ranch, 20 of which are located in Hart Flat. As it turned out, however, Schiffman's survey did not incorporate a large portion of Hart Flat. With the exception of one historical site, all of the Hart Flat sites recorded by Schiffman are milling sites featuring bedrock mortars and/or milling slicks.

In the summer of 1989, a cultural resource inventory was conducted on the entire Keene Ranch property by Drover and Smith (1989) for the Oakridge American Company. A survey of the property resulted in the recordation of 58 previously unrecorded sites. The total number of sites recorded for Hart Flat was 30, including those previously recorded by Schiffman and the newly recorded sites. Of those sites, 29 were prehistoric and one was historical.

Drover and Smith (1989:28) placed each of the sites they observed into one of six categories: food processing site, lithic quarry, campsite, intermediate campsite, village, and historical site. A different site classification scheme proposed here for Hart Flat includes only four site categories: short-term milling, long-term milling, campsite, and historical site. How these categories are defined and related to the Keene Ranch sites is delineated below (see "Discussion" section).

RESEARCH DESIGN

Investigation of the Hart Flat sites offers an opportunity to address a variety of research questions. Some of these questions are quite general, some are site specific, some relate to changing ecological adaptations (addressed in conjunction with other nearby sites), and some pertain to models of regional settlement and subsistence patterns.

General Questions

A number of important research questions pertinent to the Keene Ranch area were addressed as part of this project. What is the timing of the introduction of ceramics into the area, thought to postdate A.D. 1000? What are the styles of projectile points in the area and how do they relate—along with ceramics, shell, and obsidian—to regional interaction spheres such as those proposed for the Mojave Desert (e.g.,

Sutton 1989)? Are data that are important to an understanding of recent linguistic prehistory (i.e., the entry of the Kawaiisu into the region; [see Sutton 1986; Sutton and Hansen 1986; also see Fowler 1972; Zigmond 1986]) present at the sites?

Ethnicity

An important research consideration in archaeology is the question of ethnicity. What ethnic group occupied a particular site and when? Can replacement of one ethnic group by another be recognized in the archaeological record? Can ethnic groups even be distinguished based on material culture in the archaeological record?

Site Specific Questions

Archaeological data frequently provide answers to critical questions regarding numerous aspects of individual sites. Questions that can be addressed with data from individual sites are summarized below.

Site Function. What activities were carried out at the various Hart Flat sites? Were sites utilized for the performance of a specific chore or were multiple tasks carried out?

All of the known prehistoric sites at Hart Flat contain bedrock milling features, usually mortars. The presence of this type of feature routinely has been used as evidence to demonstrate the occurrence of acorn processing, an activity often associated with females. Based on such assumptions, few excavations have taken place to explore any multiplicity of function at these sites or to determine what resources other than acorns may have been processed there.

Diversity of Artifact Assemblage. Intersite and intrasite variation in the diversity and quantity of artifacts can provide insight into site function, length of occupation, dating, seasonality, and possibly ethnicity of the various sites.

Seasonality. Botanical and faunal data from Hart Flat (e.g., seed remains, phytoliths, animal bones) can provide information concerning the time of year that the sites were occupied. If the environment had changed, it is possible that the seasonality of site use also changed.

Dating. Chronometric information is necessary to reconstruct any settlement and subsistence patterns and to detect whether such patterns changed over time. Materials suitable for radiocarbon assays, such as charcoal, bone, and other organics, as well as artifact types and obsidian for hydration studies, can be employed to address the question of temporal assignment of sites.

Trade. Tehachapi Pass lies on a major east-west trading route that was used both in prehistoric and historical times. A long-standing research interest in the region is the nature of trade on this route through time. Specific trade items known to be at the Hart Flat sites include steatite and obsidian.

What are the sources of the obsidian found in the Tehachapi Mountains area and what can this tell us about the trade and distribution of this valuable aboriginal commodity? Hughes (1988) has shown that geochemically distinct obsidian within the Coso Volcanic Field may be discerned using X-ray analysis.

Since prior archaeological investigations in the area have yielded predominantly Coso obsidian, further samples might be used to see which of the four distinct source areas within the Coso Volcanic Field figured most prominently in aboriginal exploitation and trade.

Environmental Questions

What is the nature of the human paleoecology and effective prehistoric environment in the Tehachapi Mountains region? Knowledge of the environmental history of an archaeological site, both biotic and abiotic, is essential for a complete understanding of human and cultural ecology. Human decisions concerning site choice are dependent on a wide variety of interrelated environmental factors, including resource availability, natural shelter, and general topography. As environmental conditions change, so do human adaptive strategies that often are reflected in the composition of archaeological assemblages over time. Regional paleoenvironmental data add to what is known of the environmental history of southern California in general, as well as provide information useful in the study of changing human subsistence through time.

The paleoecological reconstruction of the Tehachapi Mountains area will require the collection of certain biological materials (e.g., carbonized seeds, pollen, phytoliths, faunal remains) during the course of excavations. A climatic shift that resulted in major environmental change in the region has been posited by Sutton and Hansen (1986; also see Sutton 1991). Paleoecological studies as a consequence of this research may provide important information regarding this proposed shift.

Regional Settlement and Subsistence Systems

Few data are available regarding prehistoric settlement and subsistence patterns in the general vicinity of Keene Ranch. Information on topographic situation, exposure, proximity to resources (including water), numbers and kinds of sites, faunal and botanical remains, tool types, and chronometrics can serve to increase our understanding of the poorly understood settlement and subsistence systems that operated in the region in prehistory.

RESEARCH METHODS

Research Philosophy

It is important that every site be evaluated both individually and within a matrix of the other sites. Small, simple sites, although tending to contain a more limited assemblage than larger, more complex sites, are equally important to an understanding of past cultures (e.g., Glassow 1985; Parr and Sutton 1991). In order to obtain sufficient data to address the research questions outlined above, the following methods were used.

Recordation and Mapping

Each site was mapped using compass and tape or transit and stadia rod. Precise maps were made of all features. Metric data for all bedrock mortars, slicks, and bedrock basin metates were recorded. Observations were recorded on the topography, aspect, slope, vegetation, soils, and integrity of each site.

Difficulty was encountered in locating a number of the previously recorded sites (see discussion above) due to inaccuracies in their initial plotting on the site maps. In some cases, sites could not be located where they were originally plotted but were subsequently found at some considerable distance from that stated in the original record. In other instances, "newly recorded" sites were later found to have been previously recorded but were plotted incorrectly. Three sites could not be relocated at all. In addition, four previously unknown sites were discovered and recorded in Hart Flat during the course of the present study. The resultant total number of archaeological sites documented in Hart Flat during the current study was 34 (see below for details).

A special effort was made to plot site locations precisely on the USGS Keene, Calif. 7.5' quadrangle map using topographic clues and/or triangulation. Inaccurate plotting from previous site records was corrected. Where judged necessary, site records were updated and new site records filed with the Southern San Joaquin Valley Historical Resources Information Center at CSUB.

General Field Methods

Surface Collections. Diagnostic and/or formed tools that were observed on the surface were pin-flagged. These then were mapped and collected either by tape triangulation to two data or with the aid of a transit.

Test Excavations. Test excavations were conducted at 15 sites in Hart Flat. Generally, test excavation units were placed as closely as possible to major bedrock milling features or where surface artifacts were observed during this study. In some cases, test units were dug in places where no surface artifacts were observed but where they had been noted by previous researchers. Early in the testing phase of Hart Flat, it became apparent that the lack of surface indicators (e.g., lithic scatters, visible middens) did not equate with a lack of subsurface cultural deposit. It became routine to place a test unit in proximity to any bedrock milling feature.

A primary datum point was established on each site and a surface grid was laid out oriented to magnetic north. Excavation units were 1 x 2 m. in size, oriented north/south or east/west. Levels were excavated in arbitrary 10-cm. increments, mostly in horizontal fashion, although contour levels were employed when judged appropriate (e.g., on moderately sloping ground). The datum for each unit usually was the highest corner. All dislodged soil was passed through 1/8-in. mesh screen. Upon completion of the units, a soil profile was drawn, photographs were taken, and the units were backfilled by hand.

Laboratory Methods

All of the materials recovered from the site were catalogued. Each artifact received a separate number; debitage of the same material, faunal remains, and botanical remains were grouped and received one number per level. Metric attributes (length, width, thickness, and weight) were obtained on each artifact.

Faunal Studies

Recovered faunal remains were analyzed using standard techniques. Results of the faunal analyses are provided below for each site.

Macrobotanical Studies

Only those botanical materials that were burned were saved in the field (i.e., those found in the screens). Such material was catalogued and identified to the nearest taxon (see below).

Obsidian Studies

A total of 18 obsidian samples from various sites was submitted for chemical characterization and hydration analysis to obtain information on trade and chronology. Unfortunately, the project was terminated prior to completion of the field and laboratory analyses, so it was not possible to obtain hydration results, although the results of the source analysis are discussed below.

Lithic Analysis

The debitage from the sites was examined, weighed, and categorized by material. The results of the lithic study for each site are discussed below.

Immunological Studies

A total of 16 samples of solution washed from flaked and ground stone tools was submitted for immunological studies. The purpose of such studies is to identify residual immunological proteins from an artifact in an attempt to identify the organisms processed by the subject tool. The results of the immunological study are discussed below.

Disposition of Collections and Field Notes

All of the artifacts, field notes, maps, and photographs recovered from the Keene Ranch project are stored at the federally approved repository located at CSUB.

ARCHAEOLOGICAL INVESTIGATIONS AT HART FLAT

Of the 34 archaeological sites recorded in Hart Flat, 15 were tested for subsurface cultural remains, one proved to be outside the project boundaries, and three that had been recorded previously could not be relocated. The remaining sites, mostly short-term milling sites judged to be of limited substantiality, were mapped and recorded in detail.

Sites Not Relocated

The following three previously documented sites were not found in the course of fieldwork in Hart Flat. No less than three attempts were made in each case to relocate the sites. Given the errors noted in the plotting of some of the other sites in the area (as much as 0.8 km.), it is suspected that most of the undiscovered sites had been mismapped. In at least one instance, the missing site may have been destroyed or obliterated by a seismic test trench. In any case, they tend to be small sites, and even under the best of conditions may be difficult to locate.

CA-KER-1007. Recorded by Schiffman in 1979, CA-KER-1007 was described as two bedrock mortars on two separate boulders on the east bank of Hart Creek. This site could not be relocated during the CSUB study nor was it located by Drover and Smith (1989).

CA-KER-1010. Site CA-KER-1010 originally was recorded as five bedrock mortars on a single granite boulder (Schiffman 1979). It was reported to be located near the southern end of the project area. The site could not be located by Drover and Smith (1989) or during the CSUB study. Shortly prior to this time, a large seismic test trench had been excavated in the vicinity of the purported site location. The site may have been destroyed or buried as a consequence. Another possibility is that the site was grossly misplotted in the original site record.

CA-KER-2633. This site, first recorded by Drover and Smith (1989), consists of a single, shallow bedrock mortar located on an outcrop high on the eastern or northeastern slope of a prominent mountain peak immediately east of Hart Flat. Efforts to relocate the site at the time of the CSUB study proved futile.

Recordation and Testing

During the current study, all of the sites discussed below were recorded in detail, and some were tested where it was deemed appropriate. With the exception of CA-KER-1014H, all of the sites were prehistoric. Recordation consisted of accurate mapping of each site. This included mapping of site boundaries, mapping and photographing of features, and mapping and collection of surface artifacts. Test excavations were conducted employing the methods described above.

Eleven of the 15 prehistoric sites tested at Hart Flat contained subsurface cultural remains. In nearly every instance in which a subsurface deposit was found, there was no surface evidence—such as a visible midden or lithic scatter—to indicate its presence. Routinely, artifacts were absent, or nearly so, from the upper one or two levels of most test units, became increasingly numerous, then dwindled in the lower levels until sterile soil was encountered. This pattern is believed to be the result of active alluvial action that has occurred, and continues to take place, in Hart Flat since the cultural remains were deposited. The lack of visible surface indicators is significant in terms of future research in this and other areas. It is clear that the lack of archaeological materials on the ground surface is not necessarily indicative of the absence of subsurface remains.

CA-KER-996. This site consists of a single, exfoliated milling slick on a flat granite outcropping at the foot of a hill about 450 m. southwest of the Hart Flat exit of Highway 58. In addition to the milling slick, Schiffman (1979) noted the presence of a "very small obsidian flake" next to the outcrop. No obsidian or other artifactual material was observed at the site during the present study. The site was mapped and recorded.

Interpretation. Site CA-KER-996 is viewed as a very short-term milling site. It probably represents a single milling episode, possibly the result of the activity of a single individual.

CA-KER-997. Schiffman (1979) and Drover and Smith (1989) recorded CA-KER-997 (Fig. 4) as a single bedrock mortar (Locus 1). In the course of the present study, a second locus (Locus 2) was discovered that contained four additional bedrock mortars. Locus 2 is located on a single, low-lying

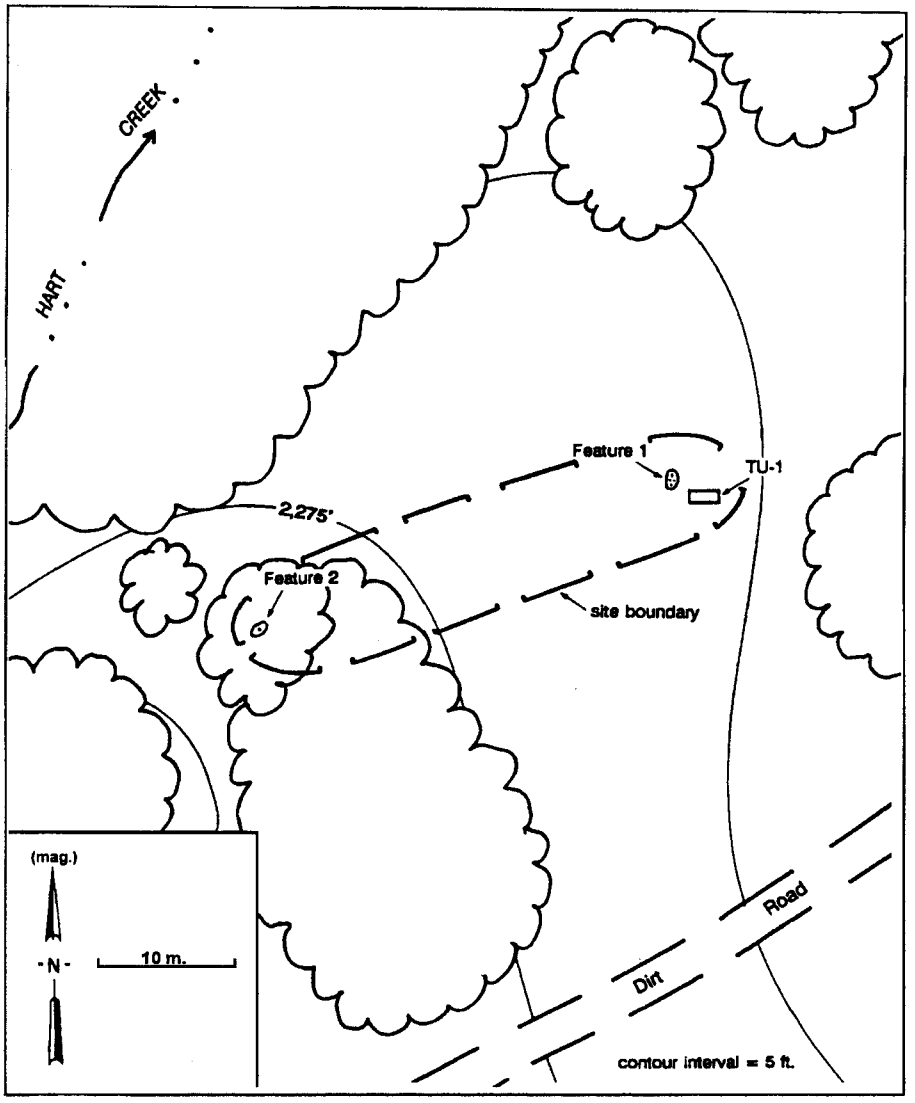

Fig. 4. Site map for CA-KER-997.

granite boulder 33 m. to the east of the single mortar at Locus 1. The site is located on fairly level terrain about 350 m. west-southwest of the Hart Flat overpass of Highway 58. It is situated approximately 50 m. south of Hart Creek.

Test Excavation. One test unit (TU-1) was placed at CA-KER-997 in proximity to the four bedrock mortars at Locus 2. The unit was excavated to a depth of 50 cm. in soil that was medium brown-colored, compacted sandy loam containing numerous rocks and angular gravel. The soil became increasingly clayey beginning at the 20 to 30-cm. level and was dominated by decomposed granite in the final two levels. Small fragments of charcoal occurred in the 0 to 10-cm. level, although no charcoal concentration was apparent. A small amount of bioturbation in the form of rodent burrows was noted in the unit.

Results. The single test unit placed at this site produced a total of 34 small flakes and three bone fragments.

Table 1
DEBITAGE DISTRIBUTION[a] BY LEVEL IN TU-1, CA-KER-997

Level (cm.)	Chalcedony	Obsidian	Quartzite	Totals
0-10	4 (0.44)	--	--	4 (0.44)
10-20	10 (0.92)	3 (0.32)	--	13 (1.24)
20-30	8 (0.72)	2 (0.20)	1 (0.07)	11 (0.99)
30-40	4 (1.03)	1 (0.14)	--	5 (1.17)
40-50	1 (0.04)	--	--	1 (0.04)
Totals	27 (3.15)	6 (0.66)	1 (0.07)	34 (3.88)

[a] Quantity (weight in grams).

Debitage. Lithic materials represented among the debitage include chalcedony (n = 27), obsidian (n = 6), and quartzite (n = 1). The single flake of very fine-grained quartzite from the 20 to 30-cm. level exhibited evidence of heat treatment in the form of pot-lidding. Distribution of debitage by level is shown in Table 1. X-ray fluorescence analysis of one of the obsidian flakes indicated that the source was the Coso Volcanic Field (Jackson 1991).

Faunal Remains. One fragment each of a rodent incisor and a long bone, both partially burned, were recovered from the 0 to 10-cm. level. One unidentified small mammal bone fragment, probably rodent, came from the 40 to 50-cm. level. These remains are likely the result of natural deaths. The burned bones occurred in the uppermost level of the test unit in the presence of a diffuse scatter of small charcoal fragments, probably as the result of a natural wildfire.

Interpretation. This site is viewed as a long-term milling site by virtue of its five bedrock mortars and the presence of a subsurface deposit.

CA-KER-998. Site CA-KER-988 is a single, exfoliated milling slick on a bedrock granite boulder about 90 m. south-southwest of CA-KER-997. Due to the apparent meager substance of this site, no subsurface testing was judged necessary. The site was mapped and recorded.

Interpretation. This site is interpreted as a very short-term milling site. It probably represents a single milling episode by one individual.

CA-KER-999. This site consists of five bedrock mortars and a milling slick on three separate bedrock granite boulders, along with a sparse lithic scatter (Fig. 5). It had originally been recorded as two sites, CA-KER-999 and CA-KER-1000 (Schiffman 1979). However, the two bedrock milling features recorded as separate sites were within 35 m. of each other; thus, due to their proximity and the presence of an intervening lithic scatter, the two were combined and the designation CA-KER-999 was applied.

Site CA-KER-999 is situated on a terrace on the eastern side of Hart Creek about 750 m. west of where the creek crosses under Highway 58. It is positioned at the toe of a north-trending ridge that descends from the mountains to the south. A low-lying bedrock boulder with three mortars, another with two mortars, and a third with a single milling slick constitute the site features. A very sparse lithic scatter,

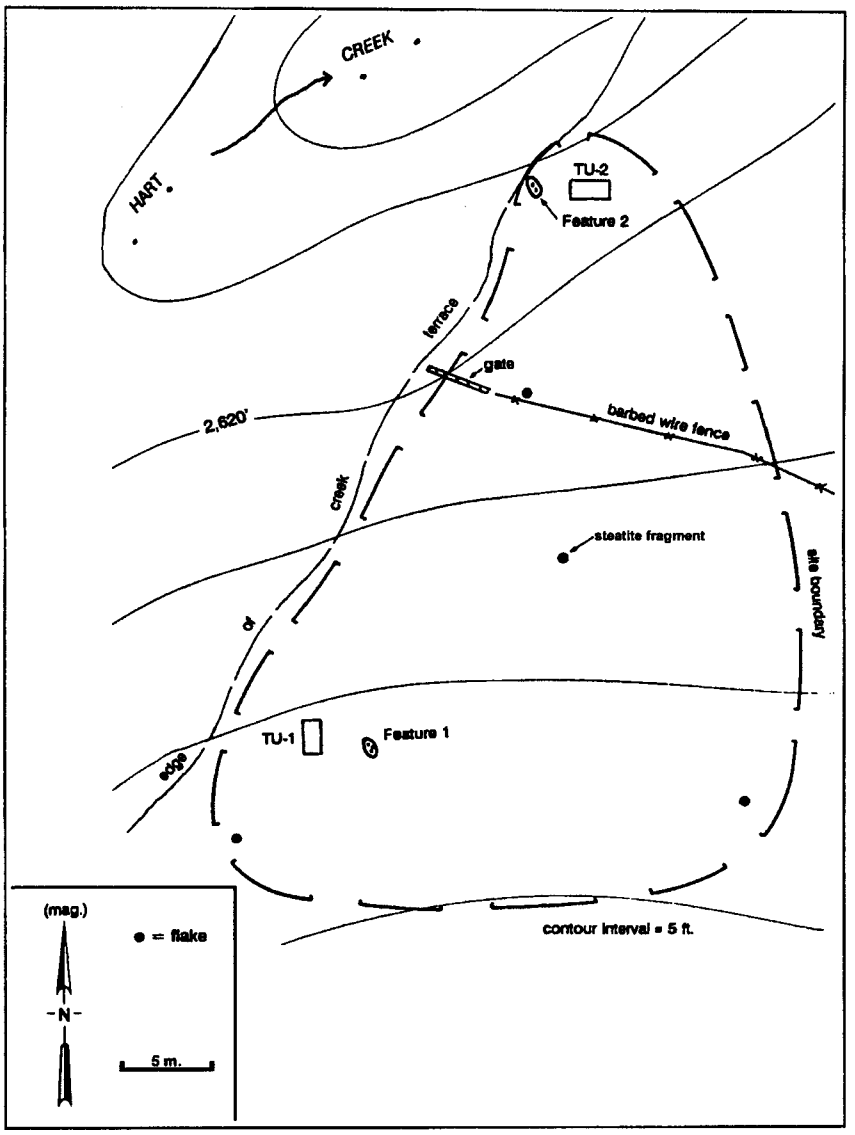

Fig. 5. Site map for CA-KER-999.

consisting of three flakes and a steatite fragment, is evident around the features, extending over an area of approximately 825 m.^{2} Two test units (TU-1 and TU-2) were excavated at site CA-KER-999 in proximity to the bedrock mortar features.

Surface Collection. Four artifacts were mapped and collected from the surface of site CA-KER-999, including three chalcedony flakes and a steatite fragment. One of the flakes (Cat. No. B-004) shows evidence of heat treatment in the form of pot-lidding. The steatite fragment has been modified, exhibiting scratches and small grooves on its surface. These four artifacts constituted the entirety of the observed lithic scatter.

Test Excavations. A test unit (TU-1) was placed close to Feature 1 (see Fig. 5) and dug to a depth of 30 cm. The soil was a hard, compacted silt with subangular gravel made up of decomposed granite. In the

10 to 20-cm. level, the floor of the unit was dominated by decomposed granite with only about one-quarter of the floor consisting of pulverable soil. Small fragments of charcoal were present in the soil beginning at about three cm. below the ground surface and continuing through the 20-cm. level. It was unclear whether the charcoal was cultural in origin. Small root and rodent disturbances were evident.

A second test unit (TU-2) was excavated adjacent to Feature 2 (Fig. 5). The soil was hard, rocky, and compacted. A compacted sandy loam with much decomposed granite gravel gave way to granite bedrock within the first 10 cm. below the surface. Tree roots and a small amount of rodent disturbance were noted. The unit was terminated at 30 cm. due to the predominance of bedrock and the scarcity of cultural remains.

Results. Six flakes, all of chalcedony, were recovered from TU-1. Four flakes (2.56 g.) came from the 0 to 10-cm. level and one each from the 10 to 20-cm. (3.03 g.) and 20 to 30-cm. (0.48 g.) levels. A single fire-affected rock was found in the 20 to 30-cm. level but was not collected. Two burned, small animal bone fragments, probably rodent, were recovered from the 20 to 30-cm. level.

Seven chalcedony flakes (total weight = 11.34 g.), a metal fragment, and one fragment of unidentified small mammal bone were recovered from TU-2.

Interpretation. Site CA-KER-999 is viewed as a long-term milling site. This interpretation is based on the relative substantiality of the bedrock milling features and the presence of subsurface cultural remains.

CA-KER-1001. CA-KER-1001 is located on a bedrock granite outcrop near the base of the steep western terrace of Hart Creek directly across the creek from CA-KER-999. It consists of nine bedrock mortars and a milling slick on a single boulder measuring about 4 x 7 m. (Fig. 6). In addition, a second enigmatic slick occurs on a vertical surface of the boulder. This may have been a spot where animal hides or other materials were processed (A. Greene, personal communication 1990). This site is situated on a fairly precipitous stream bank and is surrounded by boulders. No suitable location in which to place a test unit could be found in the immediate vicinity. No surface artifacts or evidence of midden were observed on or around the site. The site was mapped and recorded.

Interpretation. The fairly large number of features forms the basis of this site being interpreted as a long-term milling site. Although no subsurface cultural deposit could be discerned, it is clear by the number and substantial usage of the bedrock milling features that this is a location where people spent a considerable amount of time.

CA-KER-1002. This site was originally recorded as two separate sites, CA-KER-1002 and CA-KER-1003 (Schiffman 1979). The locality originally recorded as CA-KER-1003 is a granite outcrop containing 15 bedrock mortars, a milling slick, and a small, sparse lithic scatter with obsidian flakes and a ground stone fragment.

Drover and Smith (1989) were unable to relocate the site designated CA-KER-1002 during their inventory. During the current study, the CA-KER-1002 site could not be initially located using only the 1979 site record as a guide. Eventually, a bedrock mortar answering the description of the misplaced site was located approximately 140 m. south of where it originally had been plotted. It was located within 33

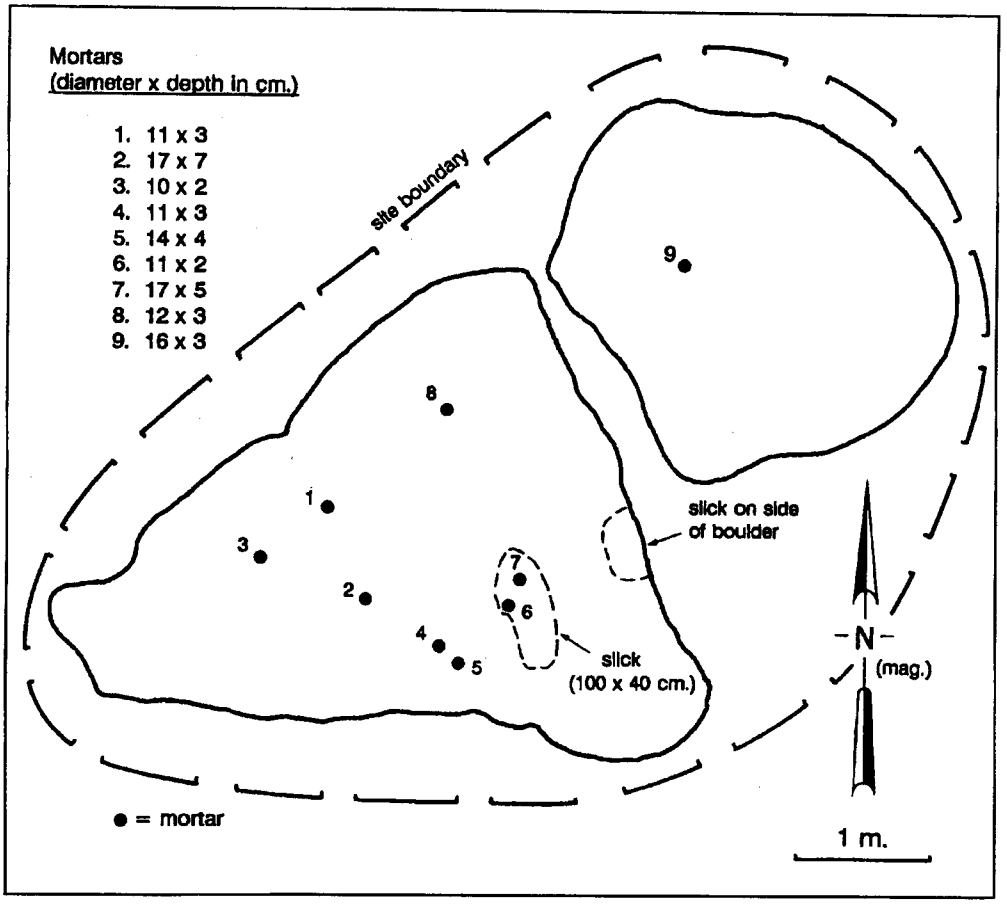

Fig. 6. Site map for CA-KER-1001.

m. of CA-KER-1003, so it was decided to combine the two locales as a single entity. The CA-KER-1003 designation was dropped and the combined site was thereafter referred to as CA-KER-1002.

The combined site CA-KER-1002 consists of 20 bedrock milling features (17 mortars and 3 milling slicks) at four separate loci, and a thin lithic scatter. It is located on a west-facing hillside between Highway 58 and Hart Flat Road, about 270 m. west-northwest of the Hart Flat off-ramp. On its southwestern margin, the site abuts Hart Flat Road and it is likely that the road cut has destroyed a portion of the site. The site covers an area of approximately 2,100 m.^{2}

CA-KER-1002 is one of three sites in Hart Flat found to contain a fairly deep, substantial subsurface deposit. As such, it likely represents a comparatively long period of human occupation or, more probably, repeated occupation over a long period of time. Seven test units were excavated, the deepest of which was 100 cm. deep. The site is described in detail and the results of the excavations are discussed by Ptomey (this volume).

Interpretation. CA-KER-1002 is interpreted as a long-term milling site. This interpretation is based on the large number of sizable milling features and the presence of a considerable and diverse subsurface deposit.

CA-KER-1004. Site CA-KER-1004 is a granite outcrop at the southern foot of a hill between Highway 58 and Hart Flat Road about 440 m. northwest of the Hart Flat off-ramp, and about 170 m. northwest of CA-KER-1002. The initial site record described this location as a small milling station with seven bedrock mortars, a bedrock metate, and a rock cairn (Schiffman 1979). Drover and Smith (1989) noted the milling features and a milling slick, but not the cairn. During the current study, 10 bedrock mortars were recorded (Figs. 7 and 8), three of which were problematic in that they were shallow and exfoliated and it was unclear whether these latter features were badly eroded mortars or naturally occurring depressions in the rock; no milling slick or rock cairn was observed. Of all the milling sites in Hart Flat, this one is the farthest from any of the drainages in the project area, being at a distance of approximately 200 m. from the closest one.

Test Excavations. Two test units were excavated in the vicinity of the milling features (Fig. 7). One unit (TU-1) was dug to a depth of 40 cm. in loosely compacted, sandy loam. Except for a few intrusive late historical items (a machine screw and a bottle cap), along with two seed fragments in the 10 to 20-cm. level and a bottle cap in the 20 to 30-cm. level, the unit was sterile. The seeds consisted of a pine nut husk fragment and a small, unidentified seed. Neither is believed to be cultural in origin. The second unit (TU-2) was excavated in moderately compact, sandy silt containing rocks and gravel. It was dug to a depth of 30 cm. and was completely sterile.

Interpretation. Although no subsurface cultural remains were present, CA-KER-1004 is interpreted as a long-term milling site because of the numerous and substantial bedrock milling features. This site may be an outlier of nearby site CA-KER-1002, where people processed food items but did not occupy it as a habitation or campsite.

CA-KER-1005. Site CA-KER-1005 consists of 14 bedrock mortars and a milling slick on two separate granite boulders on a hillside north of Clear Creek Road. Although shown both in Schiffman's (1979) and in the Drover and Smith's (1989) site records to lie within the Keene Ranch property, it was determined (with the aid of a nearby 1/4 section monument) that this site is located about 45 m. outside the project boundaries. As a result, it was not considered further in this study.

CA-KER-1006. Recorded by Schiffman in 1979, CA-KER-1006 was described as containing 11 shallow bedrock mortars on five separate boulders (Schiffman 1979). Drover and Smith (1989) recorded only two mortars at this site, but mentioned that significant grading had occurred in the site vicinity, apparently causing the destruction of nine mortars. During the current study, several attempts were made to find the site, but it was not discovered until November 1990. At that time, two separate bedrock mortar features were discovered on boulders in a granite outcrop on the north bank of Hart Creek just south of Hart Flat Road.

During examination of these features, it was observed that a nearby large boulder contained eight bedrock mortars and a milling slick on its underside. Clearly, the boulder had been inverted since its use in antiquity. The boulder measures 1.4 x 2.0 x 3.7 m. and is propped firmly between two mature Douglas oaks. It has been in its present position for a considerable length of time, as indicated by a substantial growth of spreading bark where the stone comes into contact with the trees. The grading does not appear to have been near enough to the site to have been responsible for the upending of the rock. No other ground disturbance is visible near the boulder. Apparently, the two oaks growing alongside the rock

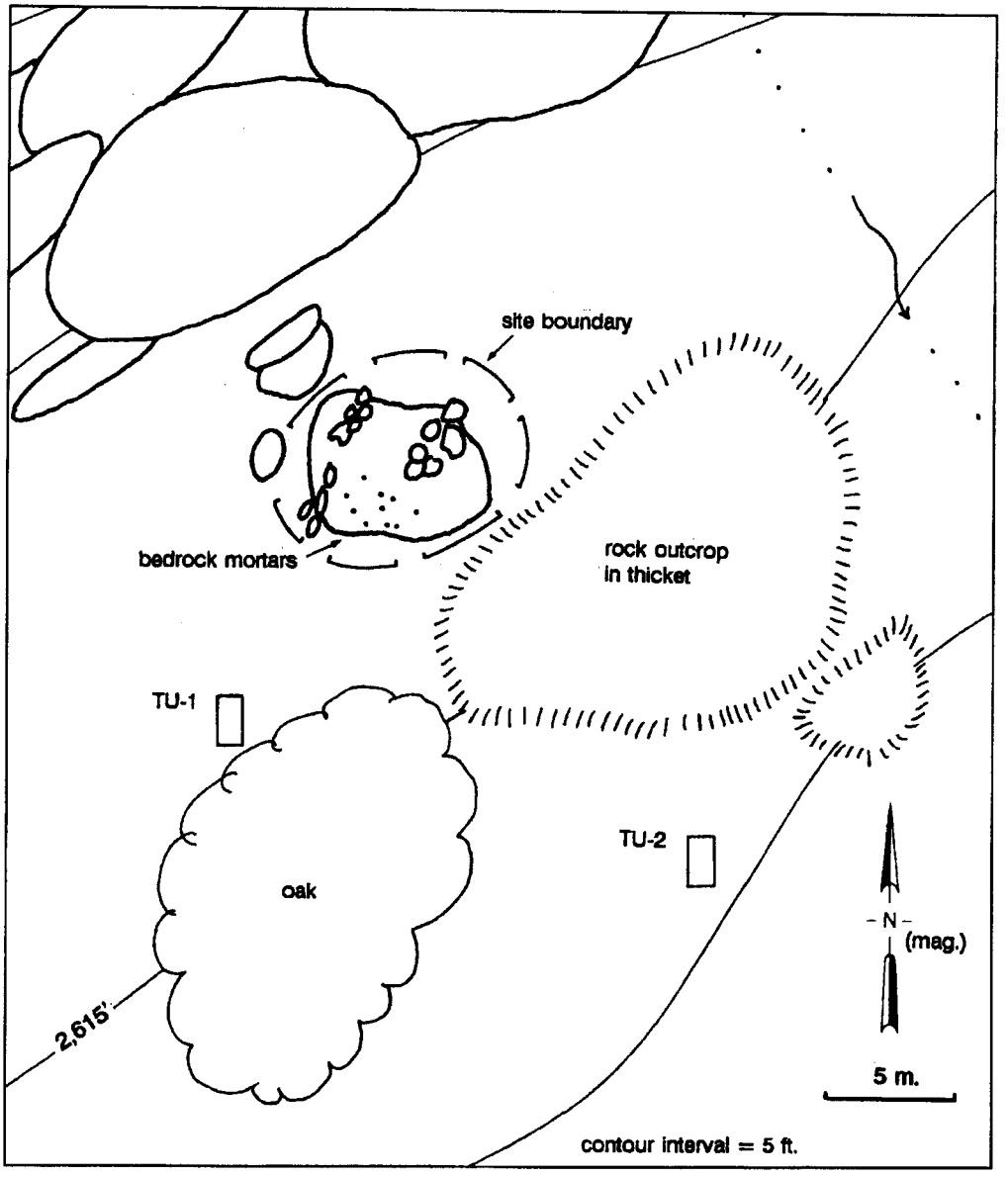

Fig. 7. Site map for CA-KER-1004.

exerted sufficient force over the years to push it into its current posture. There is no mention in the 1979 site record of an inverted milling feature.

Further inspection of the area revealed additional bedrock mortars buried under a layer of decayed vegetation on a nearby boulder. These latter features definitely were the ones recorded by Schiffman 12 years earlier, as indicated by the original site record. In all, the site contains at least 18 bedrock mortars, two bedrock metates, and a single milling slick. Additional features may be concealed beneath the inverted boulder.

A single test unit (TU-1) was excavated at CA-KER-1006, in proximity to the inverted boulder. A description and the results of subsurface testing is presented by McNinch (this volume).

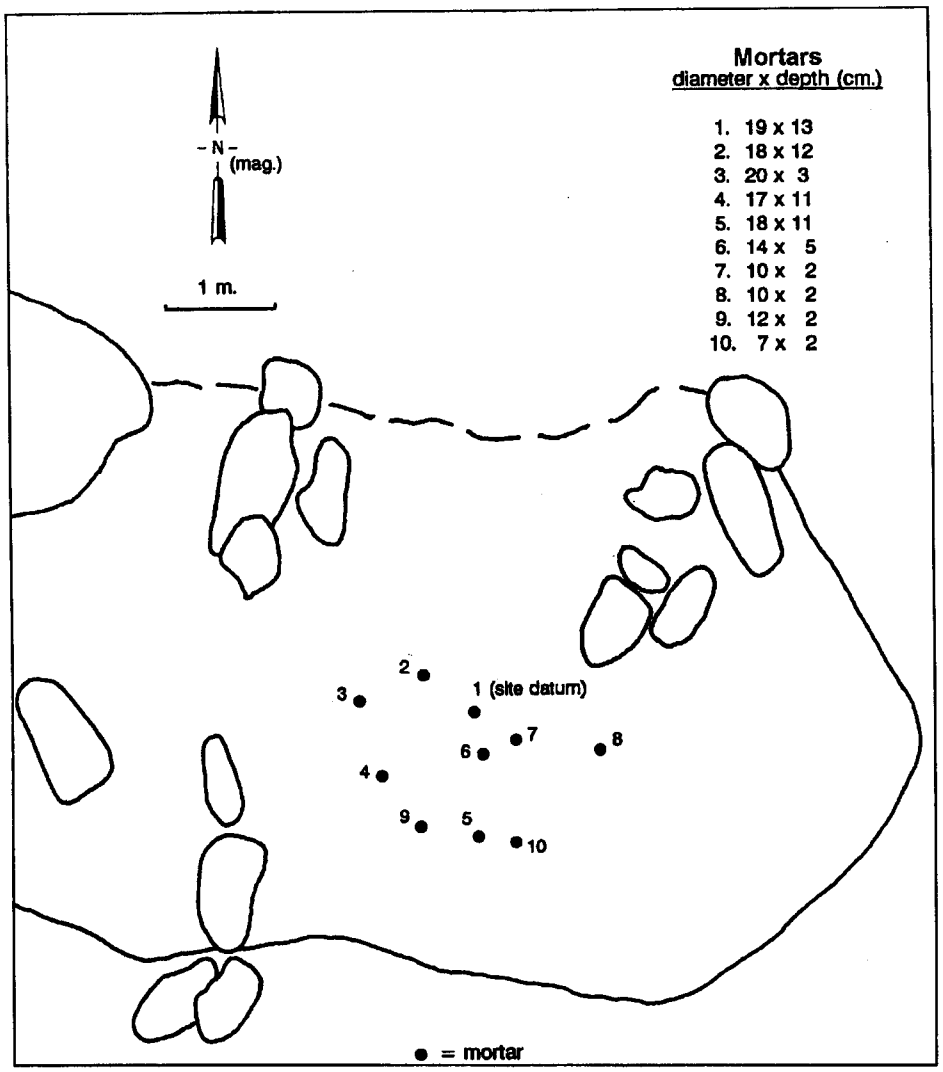

Fig. 8. Bedrock milling features at CA-KER-1004.

Interpretation. CA-KER-1006 is interpreted as a long-term milling site. The basis of this interpretation is the presence of many large milling features and a subsurface cultural deposit.

CA-KER-1008. This site consists of six shallow (2 to 4 cm. deep) bedrock mortars on four widely separated granite boulders (Fig. 9). These features occur in a wooded area of about 20 x 30 m. in extent north of and adjacent to Hart Flat Road 200 m. west of the Hart Flat off-ramp. Due to the apparent sparse and diffuse nature of the site, no subsurface testing was judged necessary. The site was mapped and recorded.

Interpretation. CA-KER-1008 is viewed as a short-term milling site because the milling features are few, small, and dispersed. This site probably is an outlier of nearby site CA-KER-1002.

CA-KER-1009. The site designated CA-KER-1009 occurs on a granite outcrop in the middle of a drainage channel at the bottom of a deep ravine in the southwestern portion of Hart Flat. It consists of four

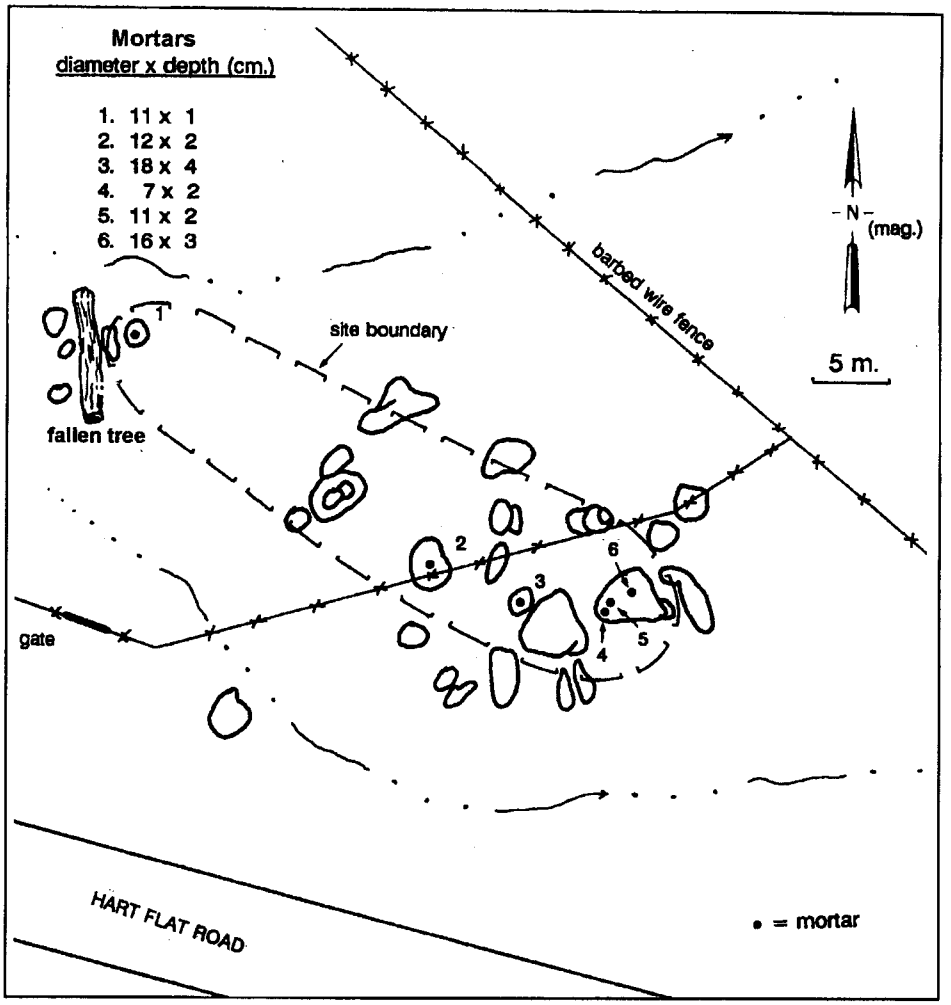

Fig. 9. Site map for CA-KER-1008.

bedrock mortars on two separate granite boulders (Fig. 10). No surface artifacts were observed at the site. Because of the meager nature of the site, and the fact that it is located in a jumble of rocks at the bottom of an active drainage channel, no subsurface testing was judged necessary. The site was mapped and recorded.

Interpretation. Based on the small number of relatively shallow milling features, CA-KER-1009 is interpreted as a short-term milling site.

CA-KER-1011. Site CA-KER-1011 is a bedrock milling site located on an east-facing, wooded hillside west of historical site CA-KER-1014H (see below). It contains three mortars on a single bedrock boulder (Fig. 11).

When initially informed of the location of this site, Kawaiisu elder Andy Greene conjectured that it might be the spot used for milling by a Mrs. Leone, who lived in the vicinity in the 1930s (see CA-KER-1014H below). Upon inspection, however, he concluded that this was not the Leone milling site. He remembered it being on a low-lying boulder further downhill (east or southeast of CA-KER-1011). He

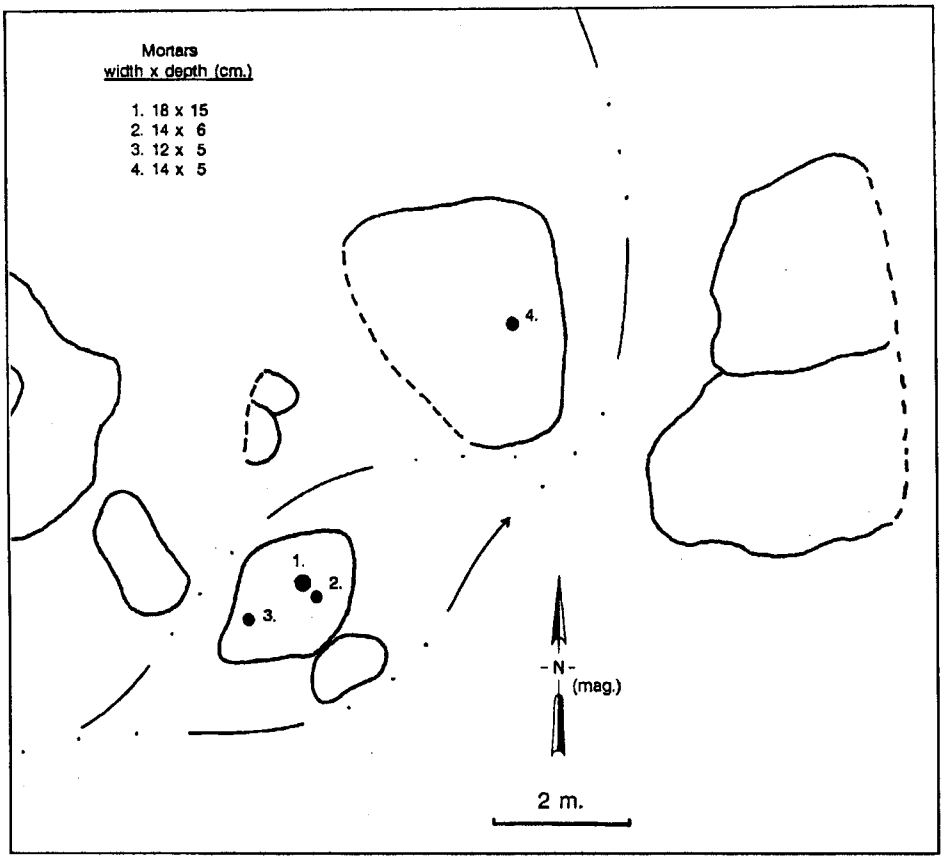

Fig. 10. Site map for CA-KER-1009.

thought that there probably had been an appreciable amount of soil deposition in the locality over the past half century that may have covered over Mrs. Leone's milling site (A. Greene, personal communication 1990).

Test Excavation. A single test unit was excavated in proximity to the milling feature. It was excavated to 40 cm. and was deemed culturally sterile.

Interpretation. Based on the lack of a subsurface cultural deposit and the few and shallow milling features, CA-KER-1011 is interpreted as a short-term milling site.

CA-KER-1012. Site CA-KER-1012 consists of a single, shallow bedrock mortar located at the southern end of Hart Flat. No surface artifacts or evidence of a midden deposit were noted in the vicinity. Due to the apparent meager substance of this site, no subsurface testing was judged necessary. The site was mapped and recorded.

Interpretation. Site CA-KER-1012 is viewed as a short-term milling site. The single milling feature apparently has been minimally used, perhaps only once.

CA-KER-1013. The site designated CA-KER-1013 is located on a low-lying granite outcrop on the eastern slope of a prominent mountain peak directly east of Hart Flat. Although not a part of Hart Flat per

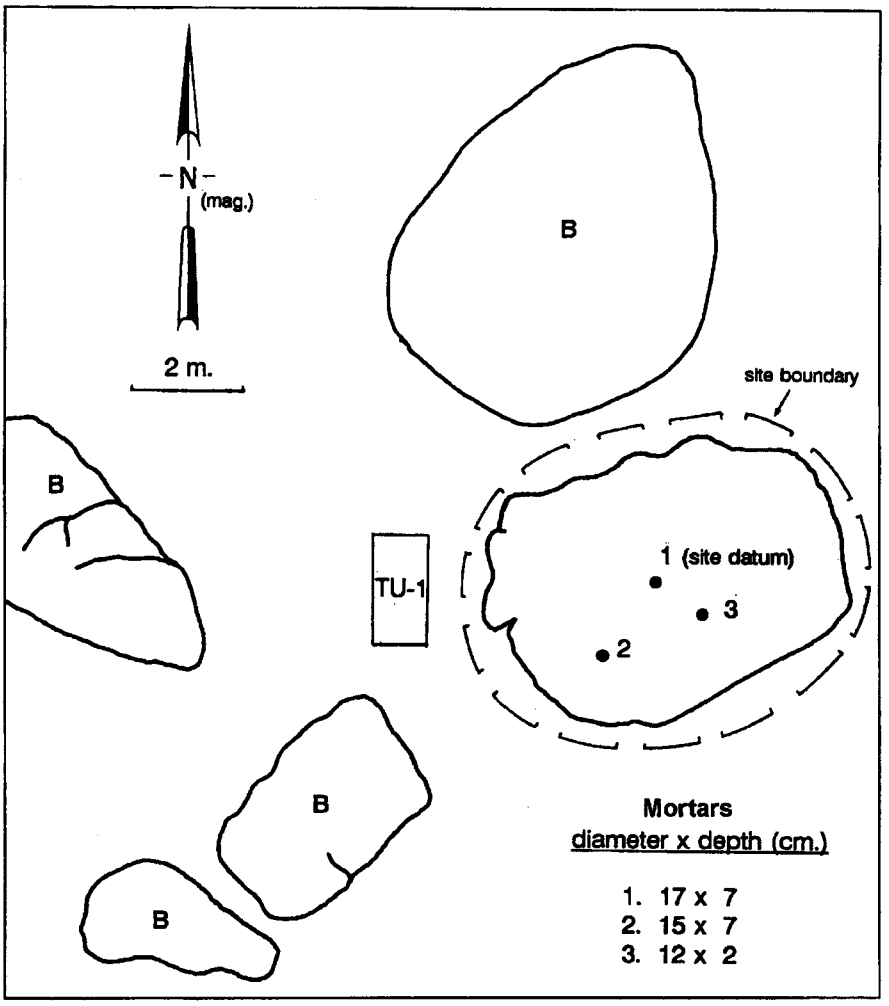

Fig. 11. Site map for CA-KER-1011 (B = unmodified boulders).

se, this site was treated along with the Hart Flat sites because of its proximity and convenient accessibility. CA-KER-1013 consists of four shallow bedrock mortars on a single boulder. No surface artifacts or evidence of a midden deposit were noted in the vicinity. As the site exhibited an apparent meager substance, no subsurface testing was judged necessary, although it was mapped and recorded.

Interpretation. As the milling features are few, small, and dispersed, CA-KER-1013 is believed to represent a short-term milling site.

CA-KER-1014H (Leone Site). The Leone Site is a historical home site located on the west side of Hart Creek approximately one mile south of Clear Creek Road. It is the only historical site identified in Hart Flat. The site consists of a domestic household complex of foundations, features, and refuse related to an early twentieth century domestic occupation. Superimposed on this assemblage are features associated with post-occupation cattle ranching. Features associated with later cattle ranching at the site include an earthen dam, an excavated trench, and three concrete tanks. A sparse scatter of artifacts includes a barbed wire spool band, lengths of pipe, a saw blade, window glass sherds, and an amber bottle base. A Ford Model T chassis is located at the west edge of the creek.

The Leone Site was investigated by Karen K. Swope, Consulting Historical Archaeologist, San Bernardino, who utilized a combination of field observations and information provided by Andy Greene, a long-time local resident. A complete description of the site is presented by Swope (this volume).

CA-KER-1015. Located on the west side and footslope of a hill near the southern terminus of Hart Flat, site CA-KER-1015 consists of a total of 15 bedrock mortars and four milling slicks on three separate outcrops, as well as a diffuse lithic scatter.

Eleven test units excavated at CA-KER-1015 revealed a substantial subsurface cultural deposit up to 140 cm. deep in some places. The major subsurface deposit is confined to a hillside area in the eastern portion of the site. Cultural remains recovered include temporally diagnostic projectile points, ground stone, and debitage of various lithic materials. Interpreted as a campsite, the site and excavations therein are described and discussed in detail by Fleagle (this volume).

CA-KER-1016. Site CA-KER-1016 contains a single granite outcrop with four bedrock mortars (Figs. 12 and 13). It is situated on the west bank of Hart Creek about 120 m. northwest of the core area of site CA-KER-1015 in southern Hart Flat. No surface artifacts or visible midden were observed in the site vicinity, but the nearness of site CA-KER-1015, with its considerable subsurface deposit, necessitated test excavation.

Test Excavations. Two test units (TU-1 and TU-2) were excavated at CA-KER-1016. One unit (TU-1) was placed on the nearest flat spot eight m. to the southwest of the milling feature. The other unit (TU-2) was positioned 15 m. further to the south (Fig. 12).

TU-1 was excavated in contour levels to culturally sterile soil 70 cm. below the ground surface. The soil was a medium brown, extremely hard, compacted silt to about the 30-cm. level, at which point it became relatively soft and friable. Between 40 and 60 cm., it graded in color to a grayish-brown while retaining the same texture. After about 60 cm. the soil became a dense, yellow-brown, clayey silt. Pea-sized gravel occurred throughout. A few small rootlets and a rodent burrow constituted the only observed disturbances. No cultural remains were found in the 60 to 70-cm. level. The test unit yielded a small amount of flaked stone debitage, a steatite fragment, and two quartzite hammerstones. These artifacts are described below.

The second test unit (TU-2) was situated 15 m. to the south of TU-1. The soil was composed of silty loam with gravel. The only disturbances noted were a few small roots. The unit was dug to a depth of 40 cm.

Results. Items recovered from the test excavations at CA-KER-1016 included hammerstones, debitage, steatite, quartz crystals, faunal remains, and an intrusive historical artifact.

Hammerstones. Two ovoid, quartzite hammerstones were found in the southwest corner of TU-1 in the 30 to 40-cm. level (Fig. 14). Both are very smooth, waterworn stream cobbles that exhibit battering on their ends, probably as a result of being used as pecking tools. No similar stones were found, modified or unmodified, in the entire Hart Flat area. The cobbles apparently are not local in origin and must have been transported to the site from some distance away.

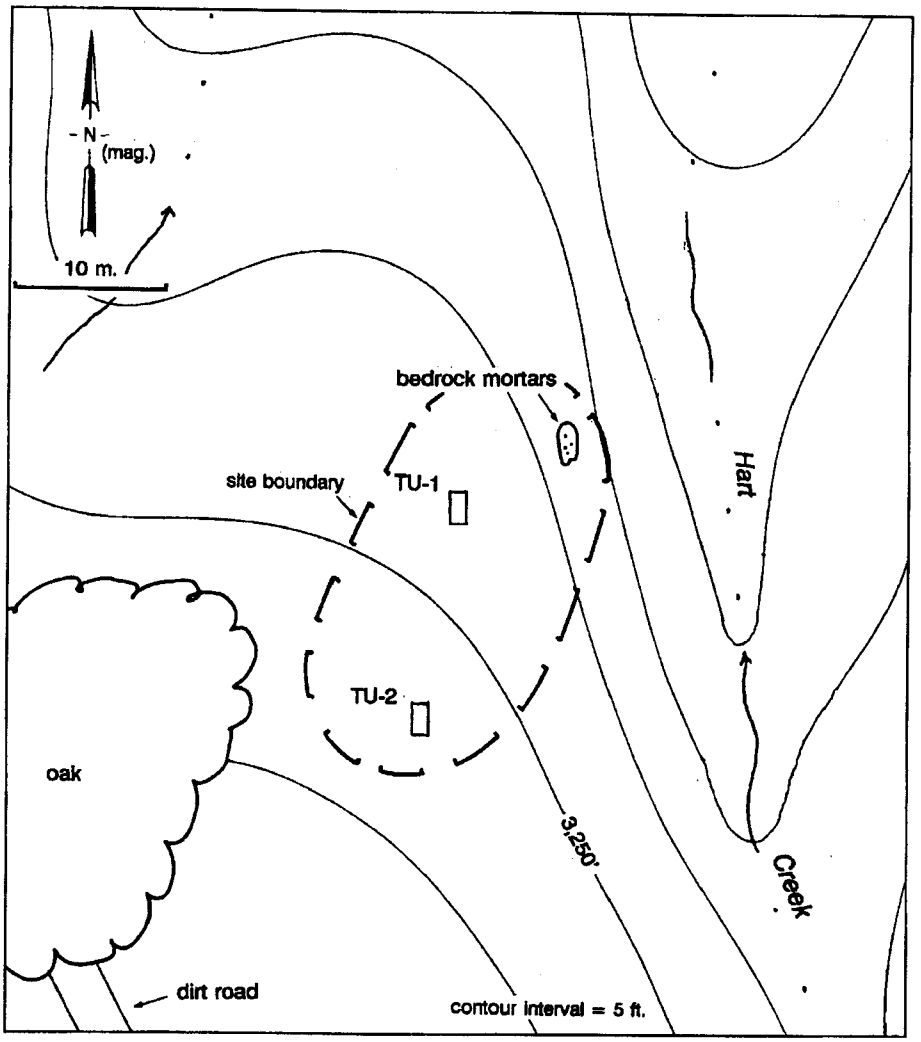

Fig. 12. Site map for CA-KER-1016.

Debitage. A total of 25 pieces of flaked stone debitage was retrieved from TU-1. Materials represented are obsidian (n = 20), chalcedony (n = 3), fine-grained quartzite (n = 1), and quartz (n = 1). Distribution of debitage by level is shown in Table 2. TU-2 produced eight pieces of flaked stone, including obsidian (n = 2) and chalcedony (n = 6). Debitage distribution by level for TU-2 is shown in Table 3. One obsidian specimen was submitted for source analysis and was chemically characterized to the Coso Volcanic Field.

Steatite Fragment. One small fragment of steatite weighing 1.88 g. was recovered from the 30 to 40-cm. level of TU-1. The piece exhibits no evidence of modification but likely was carried in from elsewhere.

Unmodified Quartz Crystals. Two unmodified fragments of crystalline quartz were recovered from TU-1, one each from the 20 to 30-cm. and 30 to 40-cm. levels. Both are angular and are relatively unclouded compared to most of the naturally occurring quartz found in the area. It is not clear whether the crystals are associated with human activity.

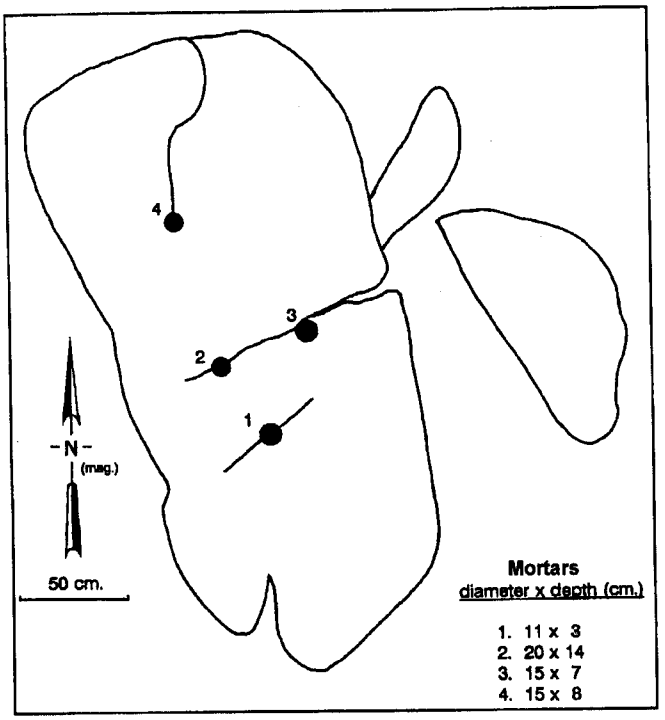

Fig. 13. Feature map for CA-KER-1016.

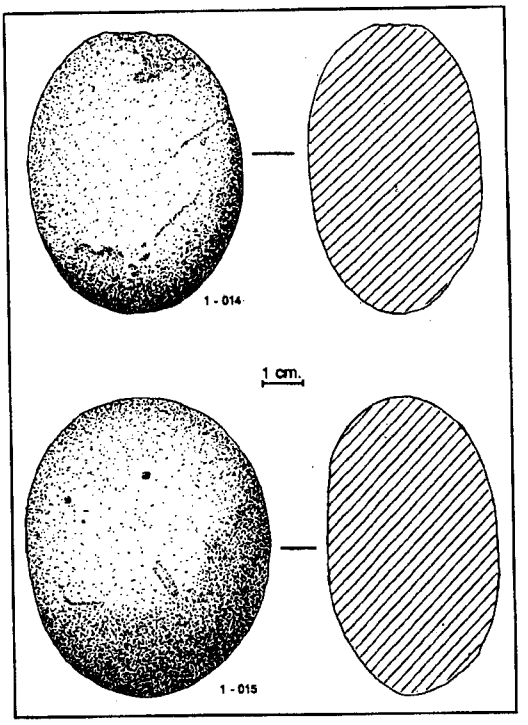

Fig. 14. Hammerstones from CA-KER-1016.

Table 2
DEBITAGE DISTRIBUTION[a] BY LEVEL IN TU-1, CA-KER-1016

Level (cm.)	Chalcedony	Obsidian	Quartzite	Quartz	Totals
0-10	1 (0.11)	3 (0.18)	1 (0.03)	--	5 (0.32)
10-20	--	2 (0.08)	--	--	2 (0.08)
20-30	1 (1.16)	--	--	1 (0.70)	2 (1.86)
30-40	1 (0.56)	7 (0.29)	--	--	8 (0.85)
40-50	--	4 (0.08)	--	--	4 (0.08)
50-60	--	4 (0.44)	--	--	4 (0.44)
60-70	--	--	--	--	--
Totals	3 (1.83)	20 (1.07)	1 (0.03)	1 (0.70)	25 (3.63)

[a] Quantity (weight in grams).

Table 3
DEBITAGE DISTRIBUTION[a] BY LEVEL IN TU-2, CA-KER-1016

Level (cm.)	Chalcedony	Obsidian	Totals
0-10	2 (0.56)	--	2 (0.56)
10-20	1 (0.05)	--	1 (0.05)
20-30	2 (0.62)	2 (0.05)	4 (0.67)
30-40	1 (0.03)	--	1 (0.03)
Totals	6 (1.26)	2 (0.05)	8 (1.31)

[a] Quantity (weight in grams).

Rifle Shell. One late historical artifact, a .22 caliber rifle shell, was recovered from the 0 to 10-cm. level of TU-1. It most likely is intrusive to the deposit.

Faunal Remains. One small, burned bone fragment of an unidentified small mammal came from the 40 to 50-cm. level of TU-1. Three small mammal bones (one rodent incisor and two unidentified small mammal bone fragments) were recovered from TU-2.

Interpretation. Site CA-KER-1016 is interpreted as a probable long-term milling site, based on the presence of a subsurface deposit and fairly substantial (although few in number) milling features. It may be associated with CA-KER-1015.

CA-KER-2614. Site CA-KER-2614 is a milling site located 20 m. west of Hart Creek and about 500 m. southeast of the entrance gate to Hart Flat on Clear Creek Road (Fig. 15). The site consists of five bedrock mortars and a milling slick on a single granite boulder (Fig. 16). There were no surface artifacts visible in the vicinity of the feature nor was there any discernible indication of a midden deposit.

Test Excavation. A single test unit (TU-1) was excavated in proximity to the milling feature (Fig. 15). The soil was hard and very compacted. It was composed of silty sand with decomposed granite gravel. Granite bedrock was encountered in the 10 to 20-cm. level and constituted nearly one half of the surface of the floor of the unit by the 30-cm. level. Disturbances included a rodent burrow and a few small roots. Excavation was terminated at 30 cm.

Results. One chalcedony flake was recovered from the 10 to 20-cm. level and a single obsidian flake came from the 20 to 30-cm. level. A seed, probably a pine nut, also came from the 20 to 30-cm. level.

Interpretation. Due to the presence of fairly substantial features and a subsurface deposit (albeit a sparse one), this site is believed to represent a long-term milling site. It may be an outlier of site CA-KER-2616 (see below) and/or several nearby milling sites.

CA-KER-2615. Located on the west bank of Hart Creek about 120 m. north-northeast of CA-KER-2614, this milling site consists of nine bedrock mortars on two low-lying granite boulders (Figs. 17 and 18). There was no visible midden nor were there any surface artifacts suggesting a subsurface deposit. However, a thick growth of grass made ground visibility poor.

Test Excavation. A single test unit (TU-1) was excavated about four meters northeast of the milling features (Fig. 17). The unit was dug to a depth of 30 cm. through soil composed of hard, compacted silt containing decomposed granite gravel and rocks. A small amount of tree root disturbance was evident. Excavation was stopped at 30 cm. due to the sparse yield and the predominance of decomposed granite and rocks.

Results. The test unit produced two fragments of angular, chalcedony shatter (0 to 10-cm. level), four large mammal long bone fragments (10 to 20-cm. level), and one small obsidian flake (20 to 30-cm. level).

Interpretation. Because it contains numerous and substantial milling features, probably indicating a long period of use, CA-KER-2615 is viewed as a long-term milling site. The thin subsurface deposit

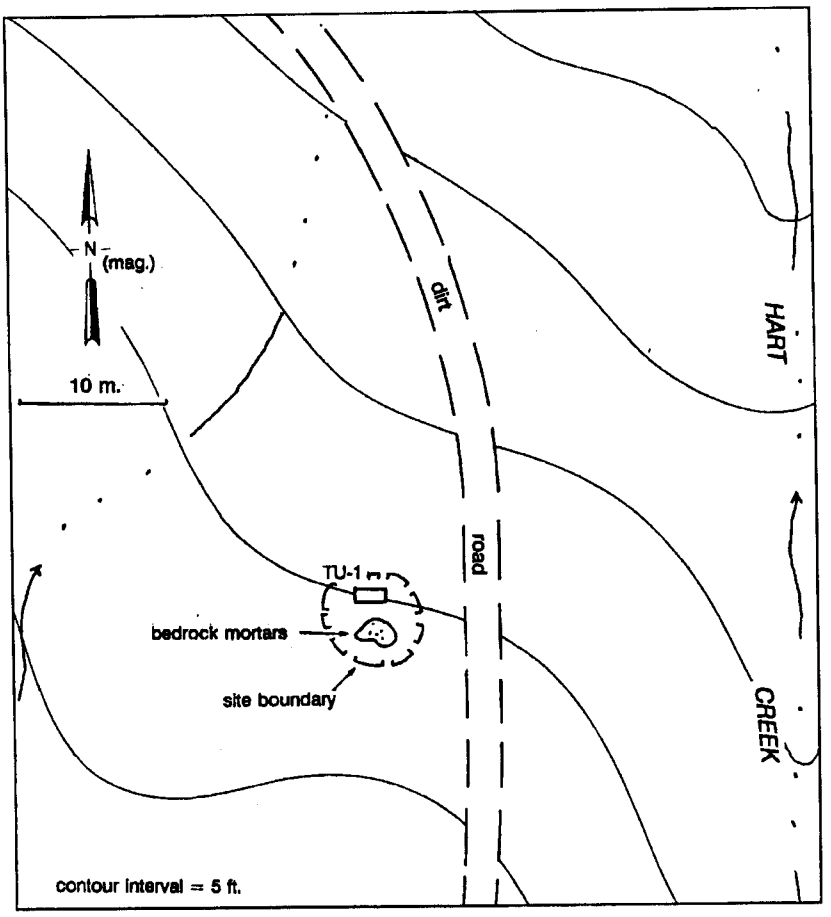

Fig. 15. Site map for CA-KER-2614.

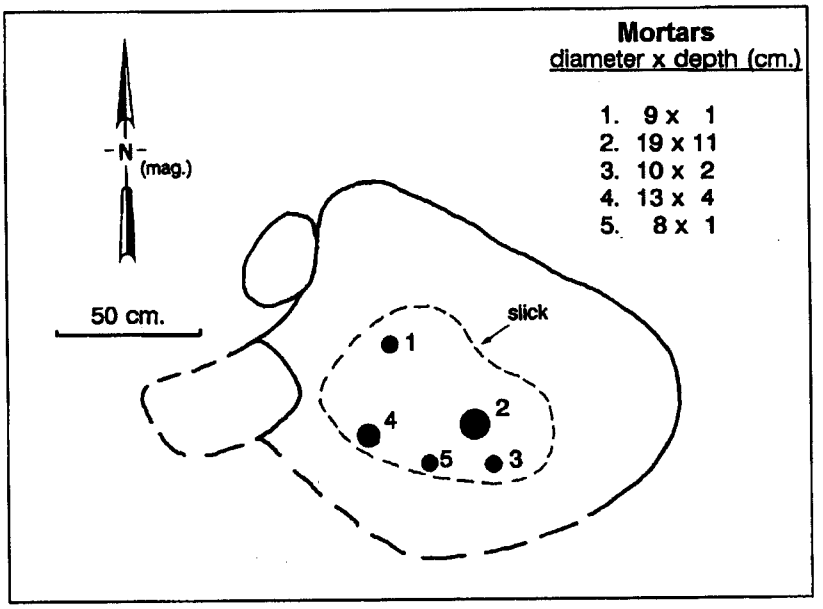

Fig. 16. Feature map for CA-KER-2614.

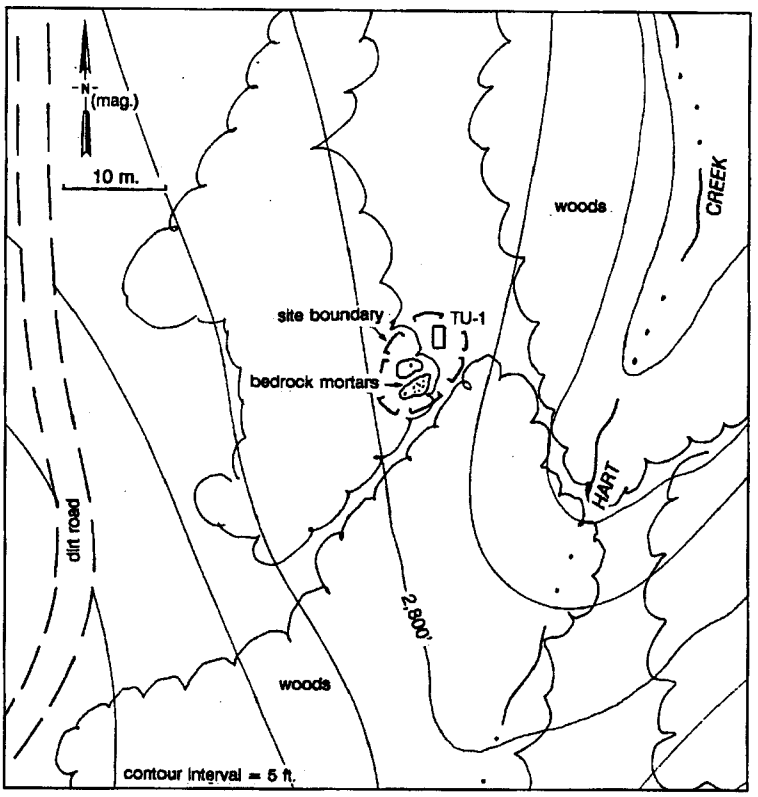

Fig. 17. Site map for CA-KER-2615.

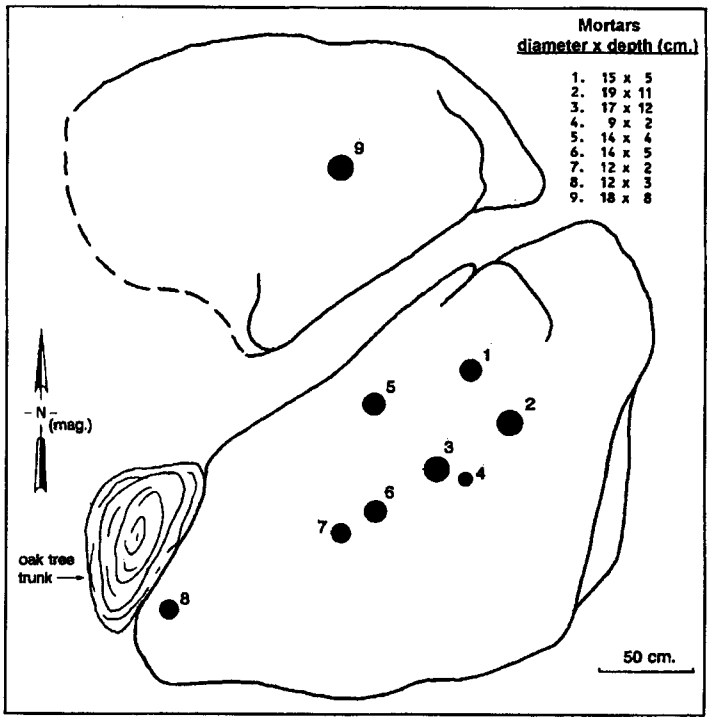

Fig. 18. Feature map for CA-KER-2615.

indicates that it probably was not used as a habitation or campsite but may have been an outlier of another nearby site.

CA-KER-2616. Site CA-KER-2616 is a long-term milling/rock art site located on a group of large rock outcrops on the eastern bank of Hart Creek, immediately north (downstream) of its confluence with a major, unnamed tributary. The site contains substantial archaeological remains in the form of bedrock mortars (n = 7), cupules (n = 17), and a deep subsurface deposit with flaked and ground stone artifacts. Three test units (TUs 1, 2, and 3) were placed in this site. A detailed description of site CA-KER-2616 and a discussion of the studies conducted there are presented by Scott (this volume).

CA-KER-2618. Site CA-KER-2618 (Figs. 19, 20, and 21) is located just south of the confluence of Hart Creek and a major tributary creek that enters from the southwest. The site initially had been recorded as two bedrock milling features on a single granite boulder (Drover and Smith 1989). During fieldwork, however, a second granite boulder containing eight mortars and three large milling slicks was discovered about 15 m. to the north. These were designated Feature 1 and Feature 2, respectively.

Test Excavation. One test unit (TU-1) was excavated next to Feature 1. It was dug in contour levels to a depth of 60 cm. While it would have been desirable to put a test unit by the larger Feature 2, it was situated within a rocky outcrop such that there was no suitable location for digging. In fact, the closest such place was in the vicinity of Feature 1. The soil from TU-1 consisted of loose, silty, stream-deposited sand. A few roots were the only visible ground disturbances.

Results. No prehistoric artifacts were recovered from TU-1, but six clear glass sherds (most likely intrusive) were recovered from the upper five levels. Forty-two small bones and bone fragments were retrieved between the 20 and 60-cm. levels. These bones are not thought to be cultural in origin.

Interpretation. Although exhibiting no clearly identifiable cultural subsurface deposit, this site is nevertheless interpreted as a long-term milling site due to its numerous and substantial features. The lack of any artifacts may be attributable to the fact that the site is located in a major drainage channel of Hart Creek and is subject to flooding. Any cultural remains that might once have been present would undoubtedly have been washed away. Another possibility is that because of its location in the channel, the site was never used as a camp, and thus few artifacts would have been left behind.

CA-KER-2619. Site CA-KER-2619 is a bedrock milling site with two loci (Figs. 22, 23, and 24). It is located immediately west of Hart Creek about 400 m. southeast of the Hart Flat entrance gate at Clear Creek Road. The original site record had indicated the presence of a single milling locus, along with a sparse lithic scatter that included obsidian, a broken chalcedony biface, and a broken slate pendant (Drover and Smith 1989). However, no indication of a lithic scatter was observed during the present study.

Locus 1 consists of a milling feature (Feature 1) with 10 bedrock mortars and two milling slicks on a single granite boulder. Six unshaped granite pestles were found on the surface on and around the feature. Locus 2 is located on the west bank of the creek 28 m. south of Locus 1. It consists of granite boulder with eight bedrock mortars, and two small boulders with a single milling slick in each.

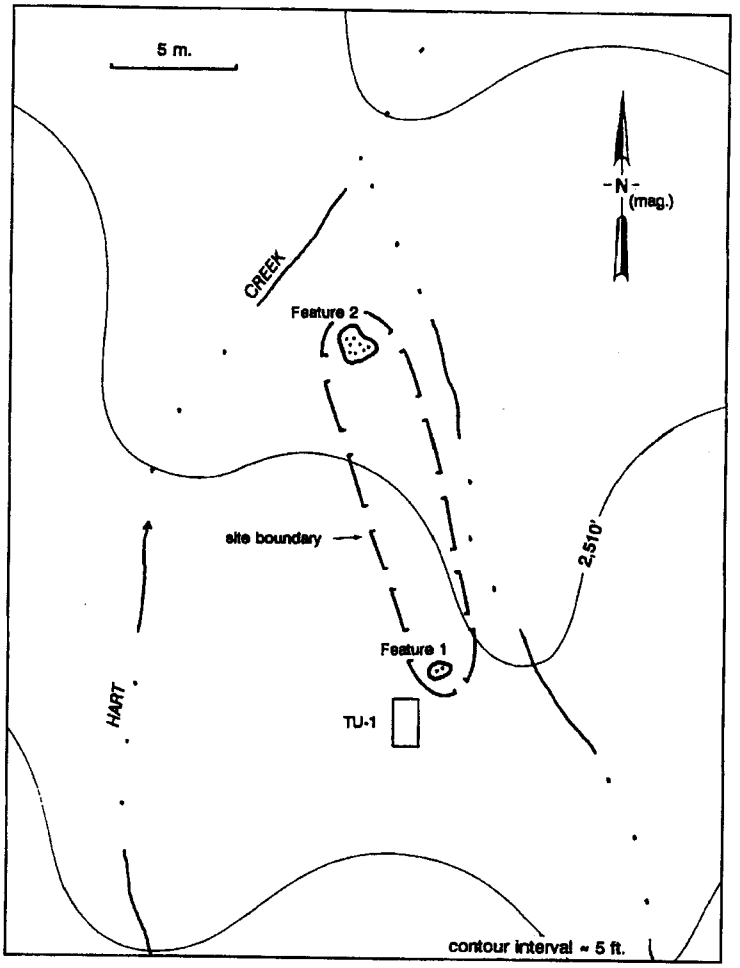

Fig. 19. Site map for CA-KER-2618.

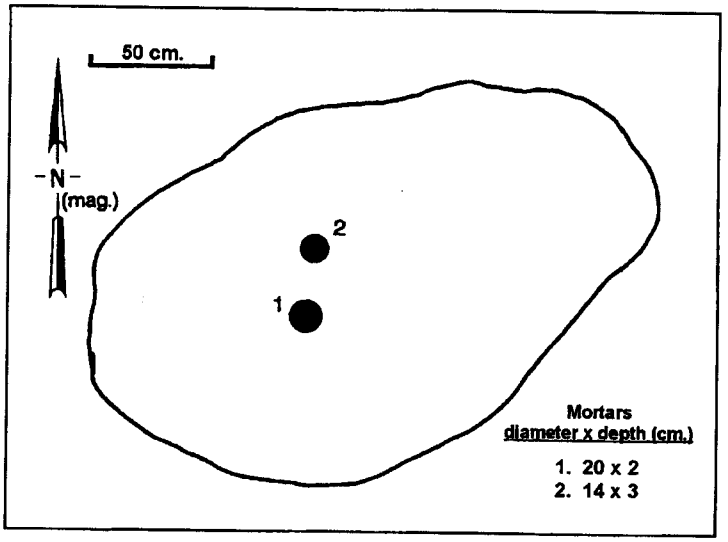

Fig. 20. Feature 1 map for CA-KER-2618.

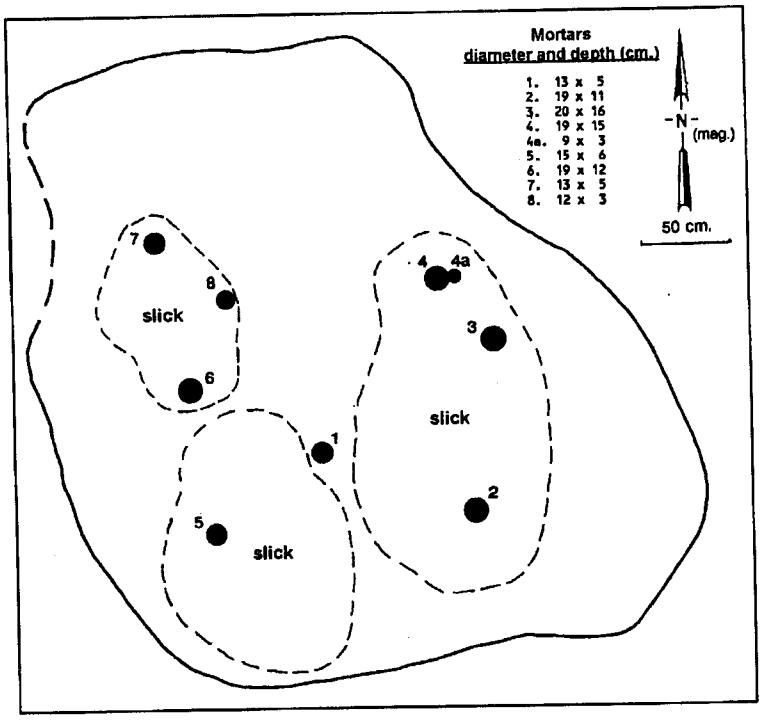

Fig. 21. Feature 2 map for CA-KER-2618.

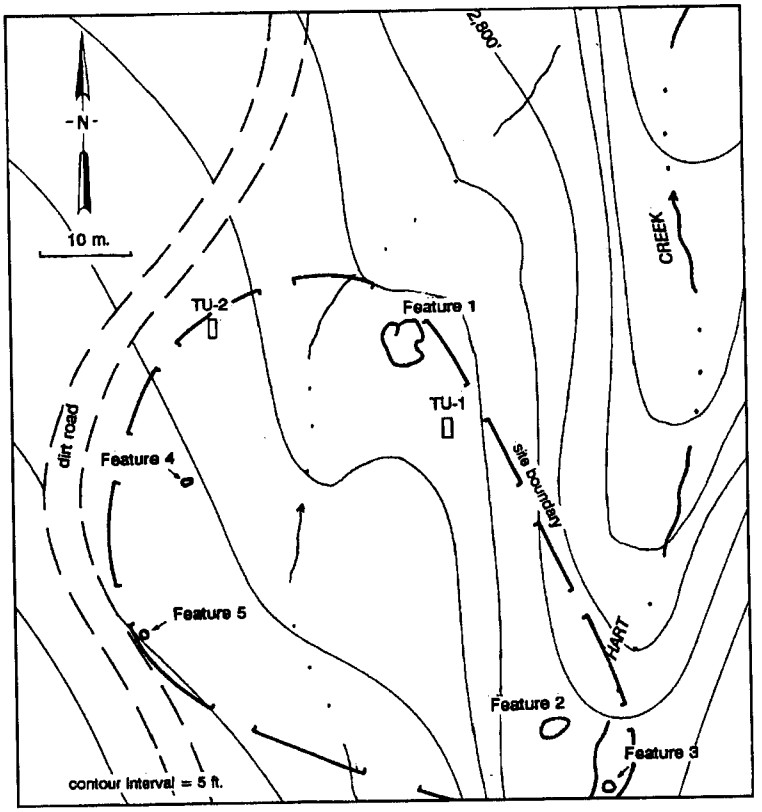

Fig. 22. Site map for CA-KER-2619.

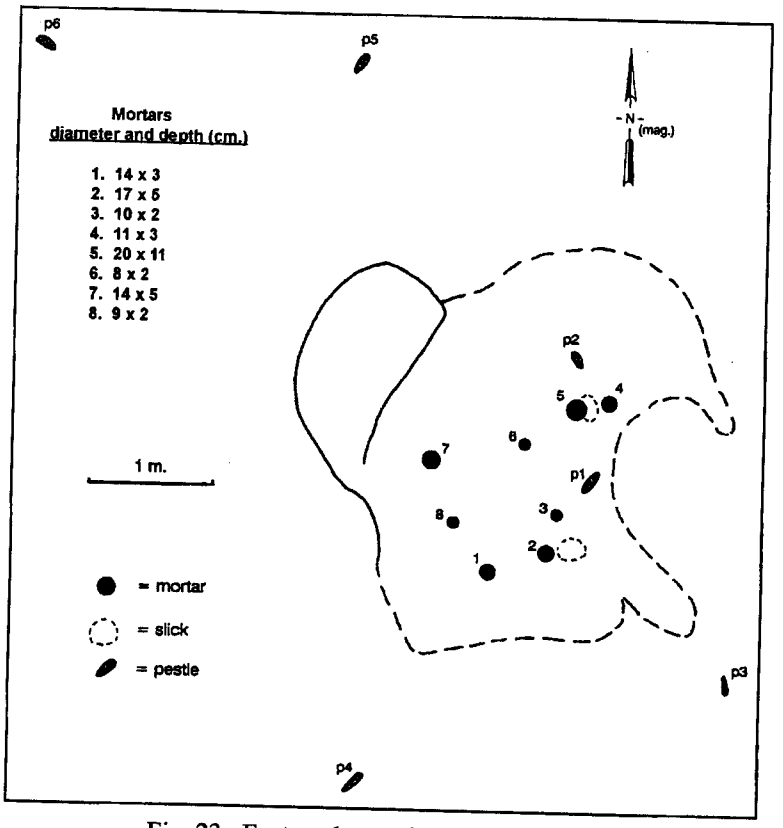

Fig. 23. Feature 1 map for CA-KER-2619.

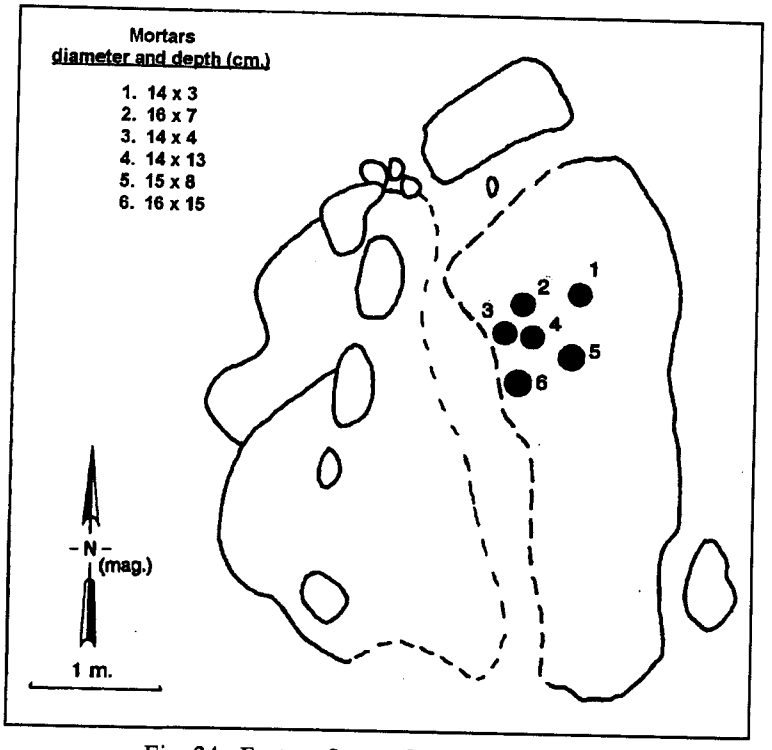

Fig. 24. Feature 2 map for CA-KER-2619.

Surface Collection. Six unshaped granite pestles were discovered, mapped, and collected from the surface at Locus 1 (Fig. 23). These are cobbles of convenient size and shape for expedient use for a short period of time. Two of the pestles are illustrated in Figure 25.

Test Excavations. Two test units (TU-1 and TU-2) were excavated at CA-KER-2619. One unit (TU-1) was placed at Locus 1 eight m. south of Feature 1 and the other (TU-2) was placed 19 m. west of Feature 1 in the area indicated by Drover and Smith (1989) as containing the lithic scatter, biface, and pendant (Fig. 22).

The first test unit (TU-1) was dug to a depth of 40 cm., at which point the soil gave way almost entirely to decomposed granite bedrock. Prior to hitting bedrock, the soil was made up of very hard, compacted silt with angular, decomposed granite gravel. A few tree roots and rodent burrows were noted. The second test unit (TU-2) was dug to culturally sterile soil at a depth of 30 cm. At this point, the excavation encountered nearly solid decomposed granite bedrock. As in TU-1, the soil to this point was a compact, gravelly silt. A single rodent burrow and a few small roots were the only disturbances noted.

Results. Items recovered from the test excavations include a ground stone fragment, a biface fragment, debitage, and faunal remains (described below).

Ground Stone Fragment. A small piece of granite exhibiting a polished surface was found in TU-1 at a depth of 14 cm. The fragment, obviously a remnant of a milling or grinding tool, measures 47 x 39 x 24 mm. and weighs 45.1 g. The polished surface of the artifact covers an area of about 5.5 $cm.^2$

Biface Fragment. A small, triangular fragment of obsidian taken from the 30 to 40-cm. level of TU-1 is a portion of the margin of a thick biface, possibly a bifacial core.

Debitage. Two flakes of chalcedony, three of obsidian, and one of basalt were recovered from TU-1. All are small flakes (average weight = 0.65 g.) and tend to be angular in form. Their distribution by level is provided in Table 4. TU-2 produced a total of 10 flakes; seven of chalcedony and three of obsidian. Distribution of debitage by level is shown in Table 5.

Faunal Remains. Two fragments of small mammal bone were recovered from the 20 to 30-cm. level of TU-1. The pieces were too small to identify but probably are fragments of rodent long bones.

Interpretation. Site CA-KER-2619 is interpreted as a long-term milling site. This interpretation is based on the presence of a subsurface cultural deposit and numerous large milling features.

CA-KER-2622/H. This site is located in the oak woods near the southern extremity of Hart Flat about 2.3 km. south of Clear Creek Road. It consists of 10 mortars and nine milling slicks on a group of six granite bedrock boulders (Figs. 26, 27, and 28).

Test Excavations. A single test unit (TU-1) was excavated in the midst of the features (Fig. 26). The unit was excavated to a depth of 60 cm. The soil was hard, sandy loam with angular, decomposed granite gravel occurring in the lower two levels. Disturbances noted were a single rodent burrow and a few roots. Bedrock was struck at the 60-cm. level.

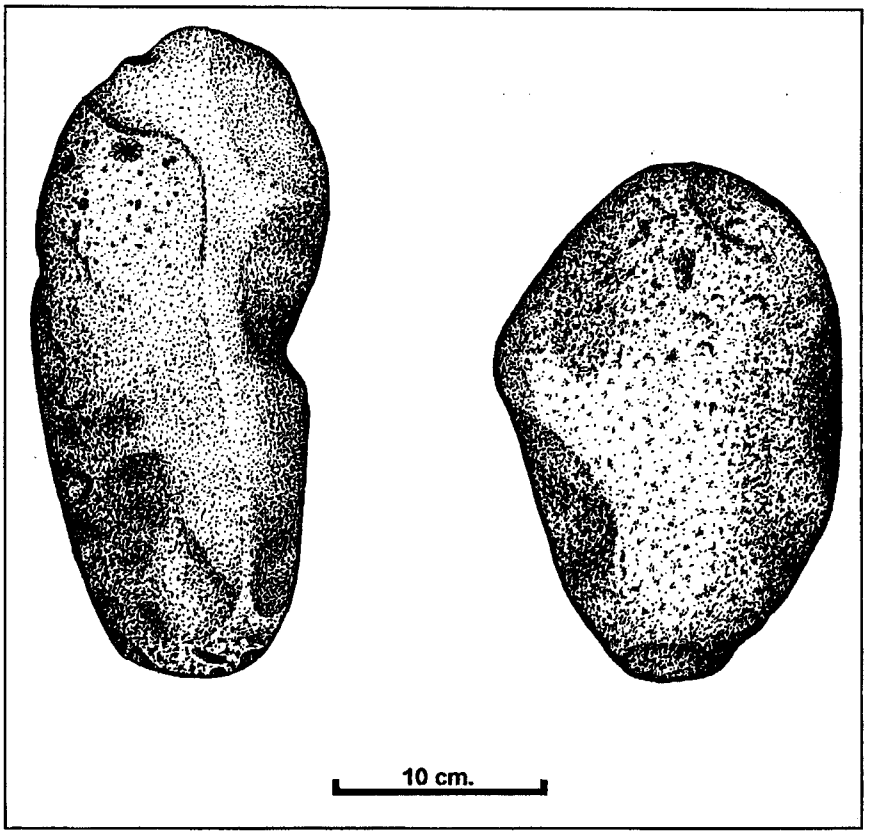

Fig. 25. Pestles from CA-KER-2619 (left to right, Cat. Nos. B-001 and B-005).

Table 4
DEBITAGE DISTRIBUTION[a] BY LEVEL IN TU-1, CA-KER-2619

Level (cm.)	Chalcedony	Obsidian	Basalt	Totals
0-10	--	--	--	--
10-20	2 (2.50)	--	--	2 (2.50)
20-30	--	2 (0.40)	1 (0.10)	3 (0.50)
30-40	--	1 (0.90)	--	1 (0.90)
Totals	2 (2.50)	3 (1.30)	1 (0.10)	6 (3.90)

[a] Quantity (weight in grams).

Table 5
DEBITAGE DISTRIBUTION[a] BY LEVEL IN TU-2, CA-KER-2619

Level (cm.)	Chalcedony	Obsidian	Totals
0-10	2 (8.30)	--	2 (8.30)
10-20	5 (1.60)	3 (1.30)	8 (2.90)
20-30	--	--	--
Totals	7 (9.90)	3 (1.30)	10 (11.20)

[a] Quantity (weight in grams).

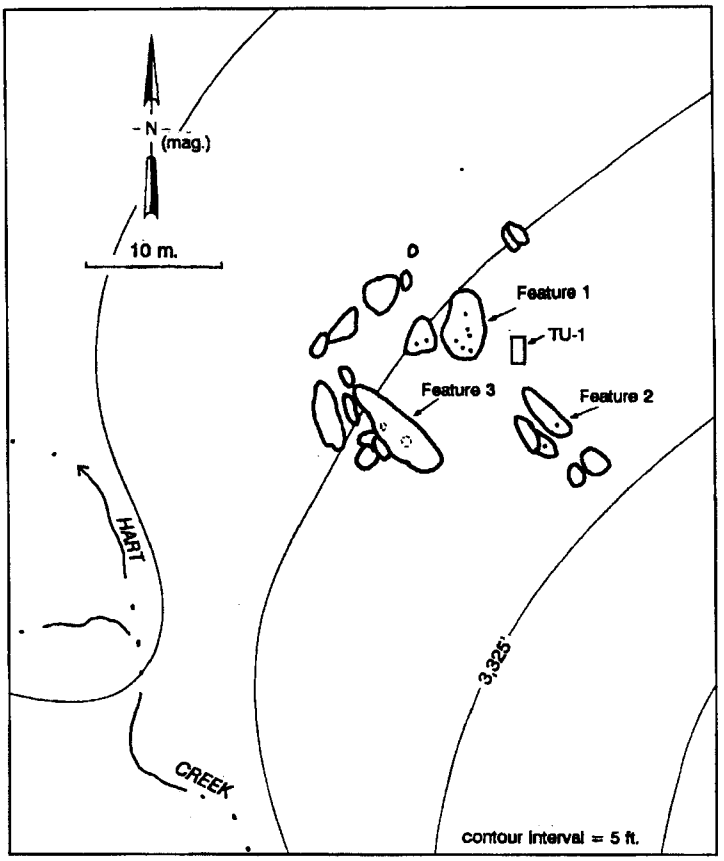

Fig. 26. Site map for CA-KER-2622/H.

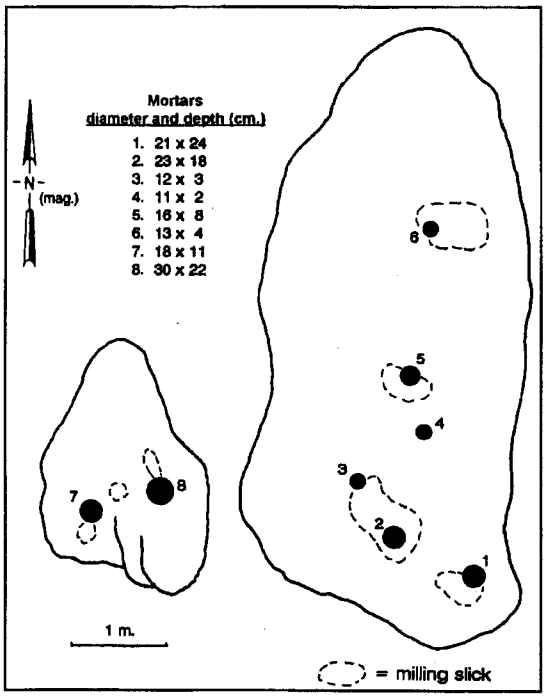

Fig. 27. Feature 1 map for CA-KER-2622/H.

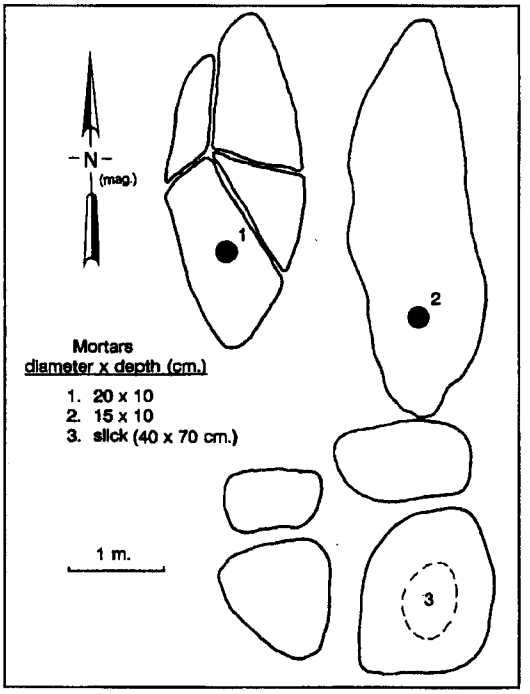

Fig. 28. Feature 2 map for CA-KER-2622/H.

Results. A projectile point fragment, 38 pieces of debitage, one modified and two unmodified small mammal bone fragments, and one historical clear glass bottle base were extracted from the test unit.

Projectile Point Fragment. The distal end of a small obsidian projectile point was recovered from the 30 to 40-cm. level (Fig. 29). The point retains no typologically diagnostic traits. Obsidian source analysis indicated that the specimen was derived from the Coso Volcanic Field (Jackson 1991).

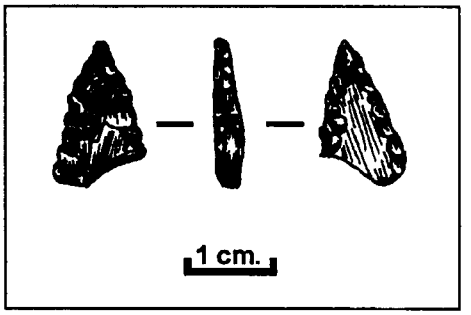

Fig. 29. Projectile point fragment (Cat. No. 1-012) from CA-KER-2622/H.

Debitage. The 38 pieces of debitage that were recovered include obsidian (n = 21), chalcedony (n = 12), basalt (n = 4), and jasper (n = 1). Distribution of the debitage by level is summarized in Table 6.

Modified Bone. A modified small mammal bone fragment was found in the 50 to 60-cm. level. The artifact is a section of long bone that is polished and exhibits microscopic striations probably as a result of use-wear. It is most likely the remnant of a bone awl.

Unmodified Faunal Remains. Two unidentified and unmodified small mammal bone fragments were recovered from the 40 to 50-cm. level.

Historical Artifact. The base of a clear glass bottle was found in the floor of the 0 to 10-cm. level. Its shape is a truncated oval made by an automatic bottle machine. It bears the embossed legend, "PACKED BY CAL CONS CO."

Interpretation. This site is viewed as a long-term milling site by virtue of its subsurface deposit and numerous large milling features. The presence of the historical artifact, if not intrusive, could provide an indication to at least the minimum age of occupancy.

CA-KER-2624. The site designated as CA-KER-2624 consists of a single milling slick on a granite boulder outcrop. It is located in a jumble of large bedrock boulders on the east side of Hart Creek at a point about 500 m. due east of the Hart Flat access gate at Clear Creek Road. No excavations were undertaken at the site, but it was mapped and recorded.

Interpretation. Site CA-KER-2624 is viewed as a very short-term milling site, probably representing a single milling episode.

CA-KER-2625. First discovered and recorded during the present study, CA-KER-2625 is situated on a small granite outcrop on the east bank of Hart Creek. It is located at the toe of a broad, low ridge about 0.5 km. southeast of the intersection at Clear Creek and Hart Flat roads. It consists of a single, shallow bedrock mortar. No surface artifacts or evidence of a midden deposit were noted in the vicinity. As a result, no subsurface testing was deemed necessary, but the site was mapped and recorded.

Interpretation. CA-KER-2625 is interpreted as a short-term milling site. It is likely an outlier of one or more of the larger milling sites located nearby.

Table 6
DEBITAGE DISTRIBUTION[a] BY LEVEL, TU-1, CA-KER-2622/H

Level (cm.)	Chalcedony	Obsidian	Basalt	Jasper	Totals
0-10	--	1 (0.21)	--	--	1 (0.21)
10-20	3 (1.98)	3 (0.13)	--	1 (2.11)	7 (4.22)
20-30	5 (21.85)	5 (0.58)	3 (0.57)	--	13 (23.00)
30-40	3 (0.12)	5 (0.20)	1 (0.08)	--	9 (0.40)
40-50	1 (0.58)	7 (0.16)	--	--	8 (0.74)
50-60	--	--	--	--	--
Totals	12 (24.53)	21 (1.28)	4 (0.65)	1 (2.11)	38 (28.57)

[a] Quantity (weight in grams).

CA-KER-2631. Site CA-KER-2631 is located in the mountains to the east of Hart Flat, rather than in Hart Flat proper. Because of its nearness to the study area, however, the site was accessible for investigation at the same time as the Hart Flat sites. It occurs among granite outcroppings along a broad ridge on the northern slope of a mountainside. It is a milling site consisting of four shallow, bedrock mortars on three widely separated granite boulders. No surface artifacts were noted. No subsurface testing was judged necessary, although it was mapped and recorded.

Interpretation. Based on the meager nature of the site, CA-KER-2631 is interpreted as a short-term milling site.

CA-KER-2632. Site CA-KER-2632 is composed of a single lichen-encrusted, shallow bedrock mortar or cupule on a small granite boulder. It is situated in the dry channel of Hart Creek at the bottom of the canyon at the southern end of Hart Flat. No surface artifacts or evidence of a midden deposit were noted in the vicinity, so no subsurface testing was deemed necessary. The site was mapped and recorded.

Interpretation. As the milling feature is small and isolated, CA-KER-2632 is viewed as a short-term milling site.

CA-KER-2634. While not located in Hart Flat proper, because of its proximity to the study area, site CA-KER-2634 (Figs. 30, 31, and 32) was tested at the same time as the Hart Flat sites. This is a milling site consisting of eight bedrock mortars at two separate loci (Locus 1 and Locus 2). A single artifact, an unshaped pestle, was found on the surface at Locus 2. The pestle was not collected.

One test unit (TU-1 and TU-2) was excavated at each of the loci. TU-1 was positioned about 5 m. from Feature 1. The unit was excavated to a depth of 40 cm. and was culturally sterile. TU-2 was placed at Locus 2. It was dug to the 40-cm. depth and also was culturally sterile.

Interpretation. Inasmuch as the milling features were few, shallow and dispersed, coupled with the absence of any discernible subsurface deposit, CA-KER-2634 is interpreted as a short-term milling site.

CA-KER-2642. Site CA-KER-2642 is located on a small bedrock granite outcropping on level terrain about 300 m. southwest of the Hart Flat overpass of Highway 58 in the northern portion of Hart Flat. It

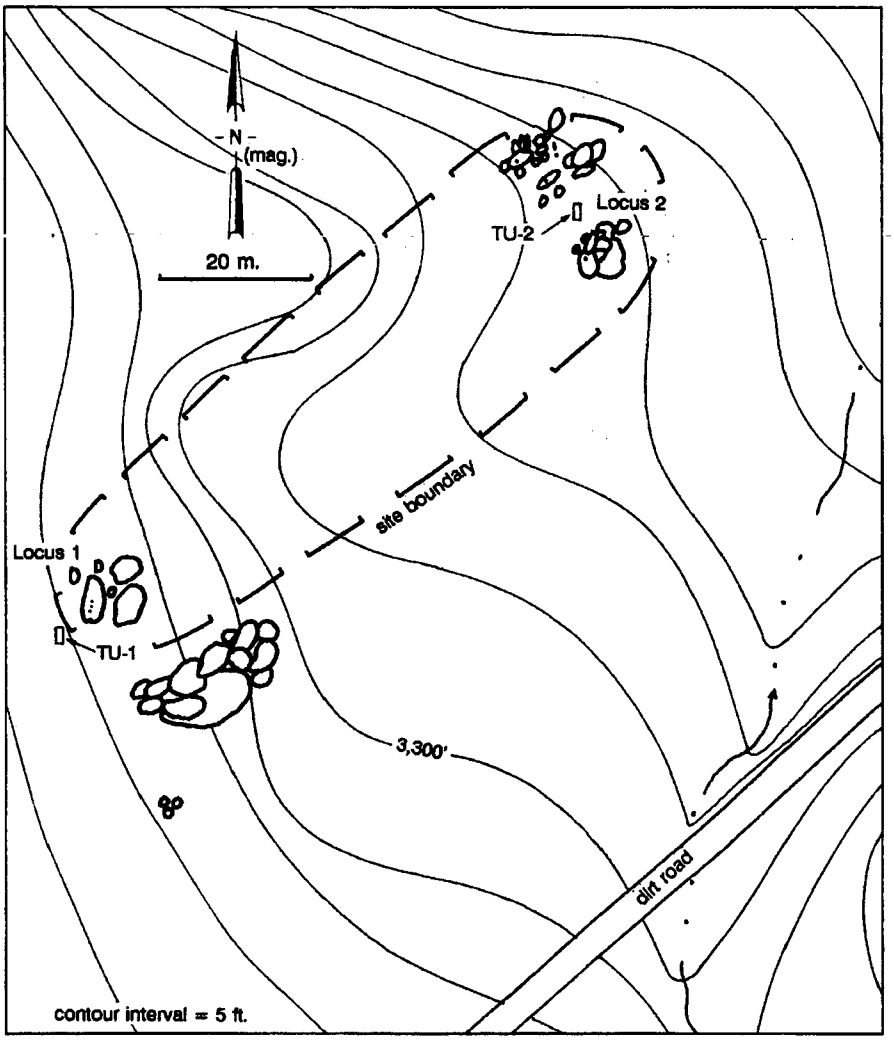

Fig. 30. Site map for CA-KER-2634.

consists of a single, badly exfoliated milling slick on top of a granite boulder. No surface artifacts or evidence of a midden deposit were noted in the vicinity. No subsurface testing was judged necessary. The site was mapped and recorded.

Interpretation. This site is viewed as a short-term milling site, probably representing a single milling episode.

CA-KER-2651. Site CA-KER-2651 is located on a granite outcrop east of Hart Creek at a point about 600 m. east of the Hart Flat entrance gate at Clear Creek Road. The site is composed of 12 bedrock mortars and a milling slick on three separate boulders (Fig. 33). No surface artifacts were observed in the vicinity nor was there visual evidence of a midden deposit.

Test Excavation. A single test unit (TU-1) was placed in proximity to the milling features (Fig. 33). The soil was a fairly compact, sandy silt with fine, decomposed granite gravel. Rodent burrows and a few tree roots were in evidence. The unit was dug to a depth of 40 cm.

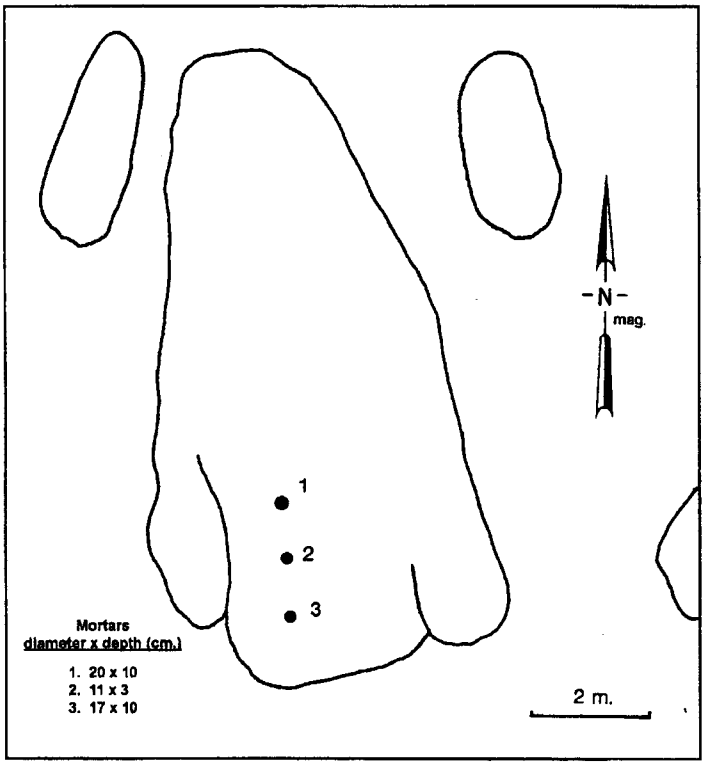

Fig. 31. Locus 1 at CA-KER-2634.

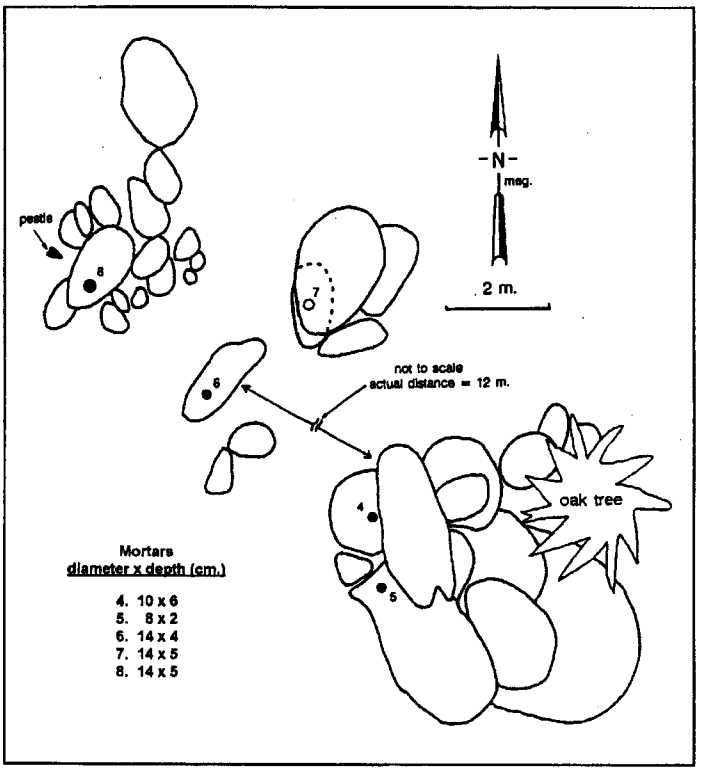

Fig. 32. Locus 2 at CA-KER-2634.

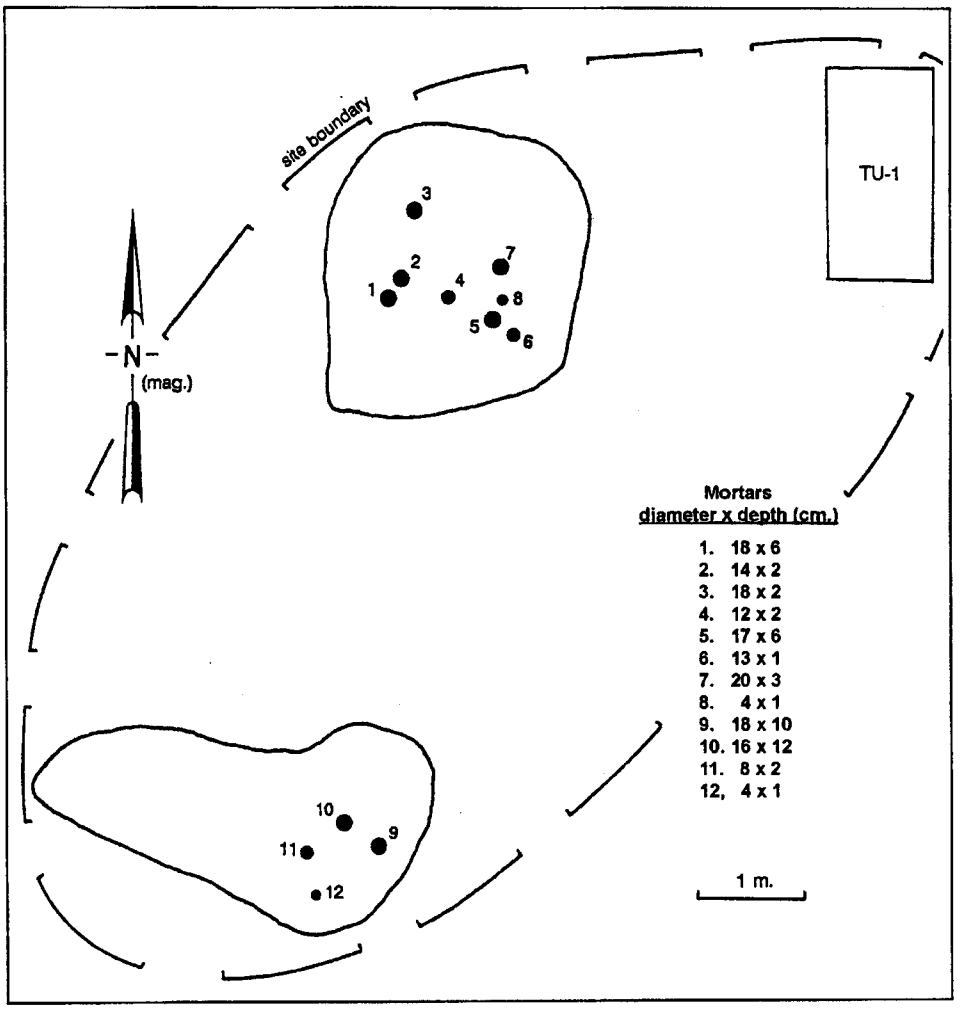

Fig. 33. Site map for CA-KER-2651.

Results. The test excavation produced seven flakes (four obsidian and three chalcedony) and recent historical artifacts. The historical artifacts are an automobile mirror frame, a can lid, and four glass fragments (probably from the mirror). All of the historical artifacts came from the uppermost level and are intrusive. Distribution of the debitage by level is shown in Table 7. One of the obsidian specimens was submitted for chemical characterization, and was determined to have come from the Coso Volcanic Field (Jackson 1991).

Interpretation. Site CA-KER-2651 is interpreted as a long-term milling site based primarily on the presence of numerous and substantial milling features that indicate long-term use.

CA-KER-2668. The site designated CA-KER-2668 is a single bedrock mortar on a small granite boulder located on the east bank of a drainage channel about 350 m. south of the Hart Flat entrance gate at Clear Creek Road. The site was mapped and recorded.

Interpretation. This site is viewed as a short-term milling site. The single milling feature apparently had been minimally used, perhaps only once.

Table 7
DEBITAGE DISTRIBUTION[a] BY LEVEL, TU-1, CA-KER-2651

Level (cm.)	Chalcedony	Obsidian	Totals
0-10	--	--	--
10-20	2 (5.13)	2 (0.40)	4 (5.53)
20-30	--	1 (0.05)	1 (0.05)
30-40	1 (0.17)	1 (0.16)	2 (0.33)
Totals	3 (5.30)	4 (0.61)	7 (5.91)

[a] Quantity (weight in grams).

Prehistoric Isolate

IF-KER-641. The specimen identified as IF-KER-641 was the only isolated artifact recovered from Hart Flat during the current study. It is a complete, shaped, bifacial granite mano (Fig. 34) that was found embedded in a cattle trail on the north bank of Hart Creek about 35 m. south of Hart Flat Road. The mano was located within ca. 100 m. of sites CA-KER-997, -1002, -1006, and -1008, and is probably related to this complex of milling sites. It measures 5.5 x 8.5 x 10.9 cm., and weighs 1,001.0 g.

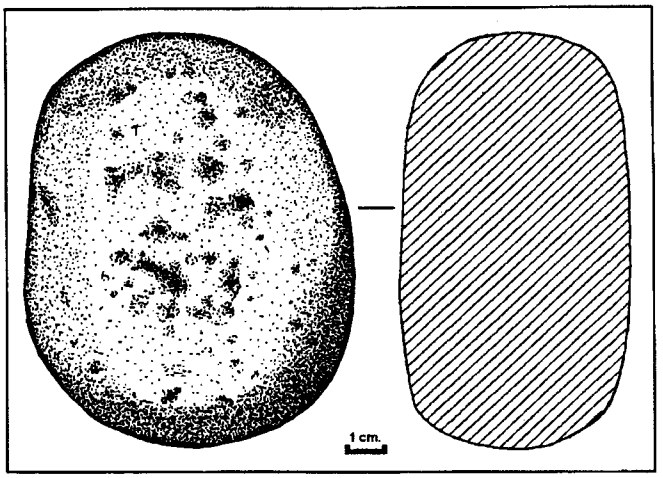

Fig. 34. Complete mano (IF-KER-642).

Discussion. Neither Schiffman (1979) nor Drover and Smith (1989) recorded any isolated artifacts in Hart Flat. The only isolate previously recorded on the entire Keene Ranch property consists of a portable metate found by Schiffman in the Crofton Fan area. For reasons unknown, this artifact was assigned a site trinomial (CA-KER-1030). It seems unusual that an area such as Hart Flat, which contains numerous archaeological sites, does not yield many isolated remains. Upon close examination, however, it becomes clear that isolated finds, as well as small sites (such as diffuse lithic scatters), would tend to be obscured by the relatively lavish vegetation that adorns the area. Without exception, the prehistoric sites that have been recorded at Hart Flat contain bedrock milling features. In every case, it was the discovery of milling features that first identified the sites. Other site elements, such as lithic scatters or midden deposits that occur at some of the sites, were disclosed only as a result of close inspection and/or excavation in the immediate vicinity of the features.

DISCUSSION

The following discussion addresses the results of archaeological testing at Hart Flat in relation to the research design presented above. Differential recovery of data from the Hart Flat sites permits some questions to be dealt with in greater depth than others.

Site Categories

Each site enumerated by Drover and Smith during their inventory of the Keene Ranch was placed into one of six categories: food processing site, lithic quarry, campsite, intermediate campsite, village, or historical site. No lithic quarry or village site has been recorded at Hart Flat; thus, these categories are not considered any further. The remaining categories were defined based upon the number of bedrock milling features present, the presence or absence of surface artifacts that are thought to indicate gender-specific tasks, and/or evidence of subsurface cultural deposit (Drover and Smith 1989:28).

Data from the present study, which was not available to Drover and Smith, have rendered their classification obsolete. In many instances, subsurface deposits that did not manifest themselves by surface indicators were detected as a result of test excavations. In some cases, additional milling features were discovered on sites that resulted in their assignment to another category. While perhaps helpful for the purpose of organizing a site inventory, the classification scheme of Drover and Smith is less than ideal when attempting to generate meaningful interpretations and to evaluate site significance.

The Drover and Smith categories are therefore discarded and the classification scheme described below is used for Hart Flat. It should be noted that any classification system is bound to be arbitrary to some extent. This one is no exception and is subject to revision at a future time, although it serves well for this project.

The general site classification scheme for Hart Flat includes four site categories: short-term milling site, long-term milling site, campsite, and historical site (see Table 8). A fifth category, rock art site, applies in part to CA-KER-2616, a long-term milling site that contains cupules. Since this one example is part of a larger site and is not exclusively a rock art locale, for the present purposes, rock art will be considered as a subcategory and will not be included in the general site categories defined below.

Short-Term Milling Sites. Short-term milling sites are defined as sites that contain milling features exclusively and are judged to have received minimal use. Such sites contain few milling features. In no instance were surface artifacts observed at any of the short-term milling sites at Hart Flat.

All of the sites in Hart Flat judged to be short-term milling sites (n = 14) contain between one and four milling features (with the exception of CA-KER-2634). It is not suggested here that these features, especially some of the more substantial bedrock mortars, were not used repeatedly over time. It may well be that some of these sites were outlying milling stations associated with the larger sites and, in fact, are usually only a few minutes' walk from one or more of the latter. They may have been convenient locations for small groups or single individuals to process the day's gatherings before returning to base camp.

Twelve of the 14 short-term milling sites were not tested for subsurface cultural remains, as they were judged very unlikely to contain a subsurface deposit. For example, four sites contained only one milling slick and four had only one mortar. The rest usually had three or four milling features (although CA-KER-1008 had six and CA-KER-2634 had eight) that were dispersed over a fairly large area. The two short-term milling sites that were tested (CA-KER-1011 and CA-KER-2634) contained no subsurface cultural deposit.

Table 8
ATTRIBUTES OF HART FLAT PREHISTORIC SITES

Site CA-KER-	No. of Bedrock Mortars	No. of Slicks	Subsurface Deposit[a]	No. of Test Units	Category[b]
996	0	1	NT	0	STM
997	5	0	Y	1	LTM
998	0	1	NT	0	STM
999	5	1	Y	2	LTM
1001	9	2	NT	0	LTM
1002	17	3	Y	7	LTM
1004	10	0	N	2	LTM
1006	18	3[c]	Y	1	LTM
1008	6	0	NT	0	STM
1009	4	0	NT	0	STM
1011	3	0	N	1	STM
1012	1	0	NT	0	STM
1013	4	0	NT	0	STM
1015	15	4	Y	11	C[d]
1016	4	0	Y	2	LTM
2614	5	1	Y	1	LTM
2615	9	0	Y	1	LTM
2616	7	0	Y	3	LTM
2618	10	3	N	1	LTM
2619	20	2	Y	2	LTM
2622	10	9	Y	1	LTM
2624	0	1	NT	0	STM
2625	1	0	NT	0	STM
2631	4	0	NT	0	STM
2632	1	0	NT	0	TM
2634	8	1	N	2	STM
2642	0	1	NT	0	STM
2651	12	1	Y	1	LTM
2668	1	0	NT	0	STM

[a] NT = not tested; Y = yes; N = no.
[b] STM = short-term milling site; LTM = long-term milling site; C = campsite.
[c] One slick and two bedrock metates.
[d] In addition to 17 cupules.

Long-Term Milling Sites. Long-term milling sites are defined as those sites containing a relatively large number of milling features and/or subsurface cultural remains. As a rule, these sites tend to contain larger, deeper mortar features than do the short-term milling sites. Presumably, these sites are the result of relatively intensive and extended use. This category (n = 14) has a great degree of variation in the number of milling features and the substantial nature of the subsurface deposit.

It may be that some of the smaller sites included in this category should be grouped with the short-term milling sites. The appellations "long term" and "short term" imply an assumed temporal assignment regarding the length of the use-life of a particular site. Generally, this assumption of duration of

occupation is considered to be sound based on the degree of site usage in terms of quantity and composition of the site features and observed subsurface deposits. In any case, it appears that the long-term milling sites have received more use than the short-term sites. Of the 14 long-term milling sites recorded in Hart Flat, only one (CA-KER-1001) was not tested. This was due to its location on a very steep bank of Hart Creek and to the rocky character of the locale that made it impossible to dig a test unit in the site vicinity. It is very likely that CA-KER-1001 is associated with CA-KER-999 located on the opposite side of the creek. The latter site did contain a subsurface deposit.

Eleven of the 14 tested sites contained subsurface cultural remains. In only four cases were artifacts observed on the surface of a long-term milling site (CA-KER-999, -1002, -2616, and -2619).

Campsite. A campsite contains a relatively wide assortment of artifacts, suggesting that a multiplicity of tasks, especially domestic chores, was carried out. The term "campsite" implies a location where people stayed long enough to leave behind a comparatively large quantity and diversity of remains. It is suggested that such a place would be a base camp to which people working in the vicinity congregated after completing their days' hunting and gathering.

One site in Hart Flat (CA-KER-1015) exhibited a sufficient quantity and diversity of cultural remains to qualify as a habitation locus or campsite. In addition to the presence of bedrock mortars, the assemblage from CA-KER-1015 includes ground stone, bone awls, projectile points, and a large quantity of flaked stone debitage. Interestingly, CA-KER-1015 is the only site at Hart Flat that exhibits substantial evidence of male "gender-specific" activity in the form of a sizable number of projectile points. A detailed description of this site is provided by Fleagle (this volume).

Historical Site. A historical site is one that dates to postcontact times and typically exhibits significant European or Euroamerican influence in its composition. The sole example of a historical site in Hart Flat documented during the current study is CA-KER-1014H, the Leone homestead that dates around the 1930s and was inhabited at that time by a Native American family (A. Greene, personal communication 1990; see Swope [this volume]).

Ethnicity

The determination of ethnic affiliation of the former inhabitants of an archaeological site frequently is a problem of no little consequence. The dearth of published comparative data regarding material culture, both archaeological and ethnographic, in the northern Tehachapi Mountains and southern Sierra Nevada makes any effort to establish site ethnicity based on archaeological remains exceedingly difficult.

One attempt to distinguish the ethnicity of the occupants at archaeological sites in a portion of the southern Sierra Nevada was made by McGuire and Garfinkel (1980). They compared data on relative proportions of lithic material from 29 sites to try to archaeologically differentiate between two neighboring Late Prehistoric Period groups, Kawaiisu and Tübatulabal. It was reasoned that a high percentage of chalcedony in an artifact assemblage was indicative of a Numic (Kawaiisu) site, whereas high percentages of obsidian signified a Tübatulabalic occupation. This was based on the assumption that Numic peoples occupied the desert east of the Sierra Nevada that was the source of the chalcedony (McGuire and Garfinkel 1980:65). It was found that five of seven sites located along the Sierra crest had percentages of

chalcedony varying between about 5% and 75% by weight. Twenty-one of 22 sites located west of the Sierra crest tended to have more obsidian with less than 5% chalcedony by weight. The distribution of chalcedony-rich and obsidian-rich sites seems to correspond with the linguistic boundaries of the two groups, and this was offered as evidence for occupation of the sites by different ethnic groups (McGuire and Garfinkel 1980:65).

If we accept the ratio of chalcedony to obsidian as evidence of ethnicity, then the results from the Hart Flat sites would tend to support the view that the sites there represent a Numic occupation. This is not difficult to accept since the late prehistoric Kawaiisu occupants of the area were speakers of a Numic language.

The sources of Coso obsidian were as much a part of Numic-controlled territory as were those of chalcedony, however, and there is no reason to suppose that access to the two resources would differ significantly. It is suggested here that differences in chalcedony/obsidian ratios may be more a consequence of site function than ethnicity. While chalcedony does not produce as sharp a cutting edge as obsidian, the edge it does produce is much more durable. It is probable that some tasks required an extremely sharp edge while others called for one that was duller but more enduring. If this is so, then a higher percentage of a particular stone would show up at sites where certain activities prevailed. This is just one possible explanation. There probably are additional explanations of lithic ratios that have little to do with ethnicity.

. Another possible clue to ethnicity may be projectile point types (Sutton 1987, 1989). Of the nine diagnostic points recovered from Hart Flat, five are Desert series points and four are Rose Spring series (from CA-KER-1015). It is known that Desert series points occurred late in prehistory and that Numic (i.e., Kawaiisu) people occupied the project area during late prehistoric times. If the occurrence of Desert series points could be equated with Numic occupation, this might contribute evidence for the time depth of Kawaiisu occupancy of the area. Tight temporal controls for the diagnostic points from Hart Flat are lacking, however.

Site Function

All of the known prehistoric sites at Hart Flat contain bedrock milling features, usually mortars but occasionally milling slicks as well. The presence of this type of feature (mortars) commonly is used as evidence to demonstrate the presence of acorn processing. Given the predominance of oaks in the project area, the assumption of the bulk of the Hart Flat sites as acorn processing locales may be a reasonable one. However, other plant (or animal) foods may have been processed as well (such as pine nuts, gooseberries, buckeye, grass seeds, rodents), so it would be imprudent to consider these sites as exclusively acorn processing sites (e.g., Yohe et al. 1991).

Diversity of Artifact Assemblage

The presence of flaked stone debitage, bifaces, and amorphous cores, along with projectile points at a few of the sites, suggests tasks other than milling. Traditionally, projectile points have been interpreted as indicators of a male-specific activity. The one site in Hart Flat that yielded a number of projectile points (CA-KER-1015) is interpreted as a short-term campsite. This interpretation was based, in part, on the

presence of a relatively large quantity of projectile points, milling tools, and bone awls, among other items. For the most part, there does not appear to be a large dissimilarity in artifact assemblages from the Hart Flat sites. The primary intersite difference with respect to the artifact inventories tends to be in quantity rather than in kind.

Seasonality

If acorn processing (as suggested by the 185 recorded bedrock mortars) is presumed to have been the primary occupation of the prehistoric residents of Hart Flat, then it would follow that the principal season of occupancy was probably autumn. The presence of charred bull pine (*Pinus sabiniana*) nut husks at CA-KER-1015 further supports the assumption of an autumn occupation. The Kawaiisu had two gathering seasons for bull pine nuts, June and October. It was in the autumn gathering season that they typically roasted the pine cones in order to extract the nuts (Zigmond 1981:52).

Trade

Obsidian sourcing analysis was conducted on 18 samples of obsidian from six sites in Hart Flat (CA-KER-997, -1016, -1015, -2616, -2622, and -2651). Without exception, the samples were chemically characterized to the Coso Volcanic Field. This result is fairly consistent with findings from other sites in the neighborhood of the northern Tehachapi Mountains/southern Sierra Nevada and indicates either trade connections with the Coso area or ready access to the Coso obsidian quarries by local populations. The Coso obsidian sources are about 75 air miles (about 100 miles on foot) from Keene Ranch. Unfortunately, at this time, there are not sufficient temporal data from Hart Flat to discern any patterns of trade or interaction over time.

Dating

At this time, the only evidence available for dating the Hart Flat sites is in the form of projectile point types that are assumed to be temporally diagnostic. All of the diagnostic points from Hart Flat are either Rose Spring or Desert series and came from a single site, CA-KER-1015. This suggests, for this particular site at least, that occupation may have occurred as early as the Sawtooth Phase (A.D. 600 to A.D. 1300) to the Chimney Phase (A.D. 1300 to historic contact) (McGuire and Garfinkel 1980:52-53). The projectile point data provide scant, coarse-grained evidence for time depth of the CA-KER-1015 site, however. Based on this evidence, the only reasonable statement possible is that the site was occupied during bow-and-arrow times (i.e., ca. A.D. 600 to historic contact).

Environmental Questions

Few data were acquired from Hart Flat that are pertinent to questions regarding the nature of the human paleoecology and effective prehistoric environment in the region around Keene Ranch. What has been recovered, in the form of faunal and botanical remains, suggests that the environment at the time of occupation of the sites was similar or identical to that of the present. Admittedly, this is based on few data and the unsubstantiated assumption that the sites are contemporaneous. Paleoecological reconstruction requires the correlation of paleoenvironmental and chronometric data. These kinds of data from Hart Flat are severely limited at this time.

Regional Settlement and Subsistence Systems

Prior to the discussion of the settlement patterns evident at Hart Flat, it should be pointed out that the present observations and interpretations are based on the undemonstrated assumption that the sites are contemporaneous. Unfortunately, temporal controls for the Hart Flat sites are inadequate at this time and the contemporaneity of the sites has not been firmly established.

The Hart Flat sites tend to cluster around Hart Creek from its head to the point where it exits the project. At the time fieldwork was performed in the summer of 1990, Hart Creek maintained a flow of surface water, albeit an intermittent one, along most of its length. This was in the fourth year of a drought. One of the major tributaries of Hart Creek accommodated an ample flow of water but, although having numerous adjacent granite outcroppings, has only two sites along its banks. A second substantial tributary with surface water and granite outcrops has no sites at all. Common to both of these watercourses is the fact that they issue from the hills west of Hart Flat and flow through its center. Hart Creek, on the other hand, generally hugs the western base of the hills that form the eastern edge of Hart Flat. What advantage or preference may have influenced the choice of this particular watercourse over the others is unclear at this time, but may have had to do with exposure. For instance, this particular area catches the afternoon sun, which could have been an important factor in the autumn.

Another possible explanation for the pattern of site distribution may have to do with the distribution of a particular resource or group of resources not present elsewhere in the vicinity. For example, it may be that certain species of oak tend to grow in greater concentrations along Hart Creek compared with the other nearby drainage channels. No immediately apparent difference was noted between the vegetation along Hart Creek as compared to other creeks in the area. Perhaps a fine-grained, comparative study of the vegetation along the creeks could shed some light on this question. Heavy woodcutting in the past, as indicated by the presence of numerous cut tree stumps, may have obscured or otherwise altered natural vegetation patterns. Cattle grazing over the past hundred years has also undoubtedly modified the distribution of native plants.

There appear to be three distinct groupings of sites along Hart Creek. In each, there occurs a relatively large site associated by spatial proximity with several smaller sites (Fig. 35). The larger or more substantial sites, what might be termed "core sites," associated with these groupings are CA-KER-1002, CA-KER-1015, and CA-KER-2616. These site "clusters" occur (1) at the very southern end of Hart Flat, (2) at the confluence of Hart Creek and a major tributary in the central portion of the flat, and (3) around the northern part of the flat close to Highway 58. How these site clusters relate to other sites or groups of sites outside the project boundaries is not known at this time. No archaeological studies have been conducted, nor any sites identified, at Hart Creek east of the highway.

It appears that each cluster contains a relatively large (for Hart Flat) site with four or five smaller, satellite sites within a distance of about 200 m. In some cases, one or more of the satellite sites approach the physical substantiality of the core site. Often, two or more of the sites are near enough to each other that it is possible they are really divisions of the same entity (see below). This is especially apparent in the situation of sites CA-KER-1002 and CA-KER-1006. The sites are within about 60 m. of each other and are both quite substantial. If it were not for the fact that Hart Flat Road separates them, they might be

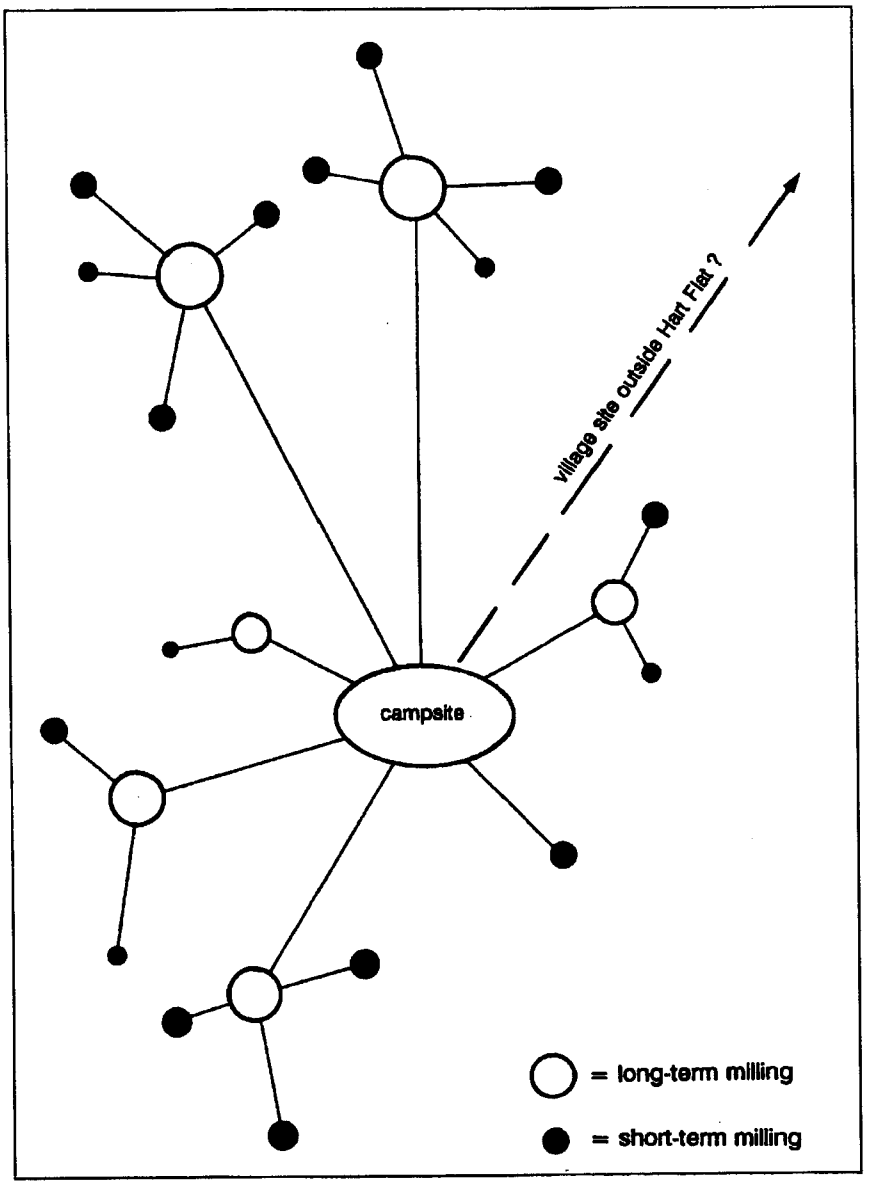

Fig. 35. General pattern of site distribution at Hart Flat.

considered loci of the same site. The decision to call them one site or two would be based on an arbitrary judgment as to whether the two entities *looked* like one site or two to a certain observer on a given day.

A factor that may skew our picture of the settlement pattern at Hart Flat is the perception of what constitutes a site. We tend to distinguish between separate sites based solely on spatial relationship. That is, if two observed archaeological manifestations are separated by an arbitrary distance, we are likely to call them separate sites. In fact, it may be that the two were occupied at the same time by the same group of people who were performing the same tasks. We could accordingly refer to them as separate loci of the same site. What we call them, however, probably is of little consequence as long as we recognize, or at least make an attempt to recognize, the functional and temporal relationships between the two entities—frequently no easy task.

CONCLUSIONS

It is proposed that the Hart Flat sites are the archaeological remains of seasonal, special purpose camps that probably revolved around, but were not confined to, the processing of acorns and/or pine nuts. It is likely that the people who occupied these sites were engaged in seasonal (probably autumn) foraging expeditions from nearby villages. Possible candidates for these village bases are the McCarthy Ranch site (CA-KER-487; Riles 1984; Garcia and McNinch 1992) a few miles away near Caliente, Sand Canyon north of Tehachapi (Price 1954; Sutton 1981, 1982; Pruett 1987), or the substantial "village" site (CA-KER-2667)[1] just to the south in Crofton Fan.

The archaeological character of Hart Flat is reflected in the array of small sites. Glassow (1985) pointed out the importance of small sites to the understanding of settlement systems in California (also see Parr and Sutton 1991). He noted that small sites often contain forms of data not found or obscured in larger, more complex sites. Variations in proportions and quantities of types of data in small sites may provide significant insights into settlement and subsistence patterns. The so-called redundancy of certain types of small sites is in itself important.

For these reasons, the work at Hart Flat and the Keene Ranch project promises to be of considerable importance to our understanding of the prehistory of the area and to contribute substantially to the generation of a data base that will form the foundation of future archaeological studies in the Tehachapi Mountains.

NOTE

1. CA-KER-2667 is one of the sites that were investigated as part of the Hart Flat project, but since the project was abruptly terminated due to funding problems, the analysis was never completed and it was not included in the original report (Parr 1991). Those data are currently stored at CSUB.

ACKNOWLEDGEMENTS

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Figure 34 was drawn by Scott Jackson. Figures 25 and 29 were drawn by Robin Novickas. Rebekah Lewis provided valuable clerical support. Mark Q. Sutton and Catherine Lewis-Pruett commented on drafts of this report. The project was enriched by the enthusiastic participation of the late Andy Greene, Kawaiisu elder, who served as Native American consultant.

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Archaeological Investigations at CA-KER-1002

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INTRODUCTION

The CA-KER-1002 site is located in the northern Tehachapi Mountains, just north of Hart Creek. It is approximately 3.2 km. (2 mi.) west of the town of Keene in Kern County, California. In 1990, it was test excavated as part of the evaluation of the Keene Ranch development. In 1979, two sites (CA-KER-1002 and CA-KER-1003) were recorded during a surface survey (Schiffman 1979). In the course of their inventory, Drover and Smith (1989) could not relocate the site designated CA-KER-1002. During the current study, the site was once again problematic to locate using the 1979 site record as a guide, although eventually a bedrock mortar that fit the description in that site record was located approximately 140 m. south of where it was originally plotted. As it was situated within 33 m. of CA-KER-1003, the two sites were combined under the designation CA-KER-1002.

SITE DESCRIPTION

The combined site CA-KER-1002 is on a west-facing hillside between Highway 58 and Hart Flat Road, about 270 m. west-northwest of the Hart Flat off-ramp. On its southwestern border, the site is adjacent to Hart Flat Road, and it is likely that road construction destroyed a portion of the site. The site covers an area of approximately 2,100 $m.^2$ and rests at an elevation between 786 and 792 m. (2,580 and 2,600 ft.) above sea level. It consists of six milling features with a total of 17 bedrock mortars and three milling slicks at four separate loci, as well as a thin lithic scatter. In addition, it contains a subsurface cultural deposit containing manos, pestles, ground stone fragments, projectile points, a uniface, cores, hammerstones, debitage, worked flakes, and two historical nails.

Three other sites are situated within 200 m. of CA-KER-1002. Site CA-KER-1004 consists of ten bedrock mortars and is located approximately 200 m. northeast of CA-KER-1002. Site CA-KER-1006 is located approximately 100 m. west of CA-KER-1002 and is comprised of 18 bedrock mortars, two bedrock metates, and one milling slick. Site CA-KER-1008 contains six bedrock mortars on four boulders and is located approximately 100 m. south of CA-KER-1002.

NATURAL SETTING

Site CA-KER-1002 is situated in Hart Flat in the northern Tehachapi Mountains. Several drainages are located near the site including Hart Creek and an intermittant stream. Vegetation in the area includes oak (*Quercus* spp.), bull pine (*Pinus sabiniana*), jimsonweed (*Datura stramonium*), redbud (*Cercis occidentalis*), gooseberries (*Ribes* cf. *Roezlii*), and grasses.

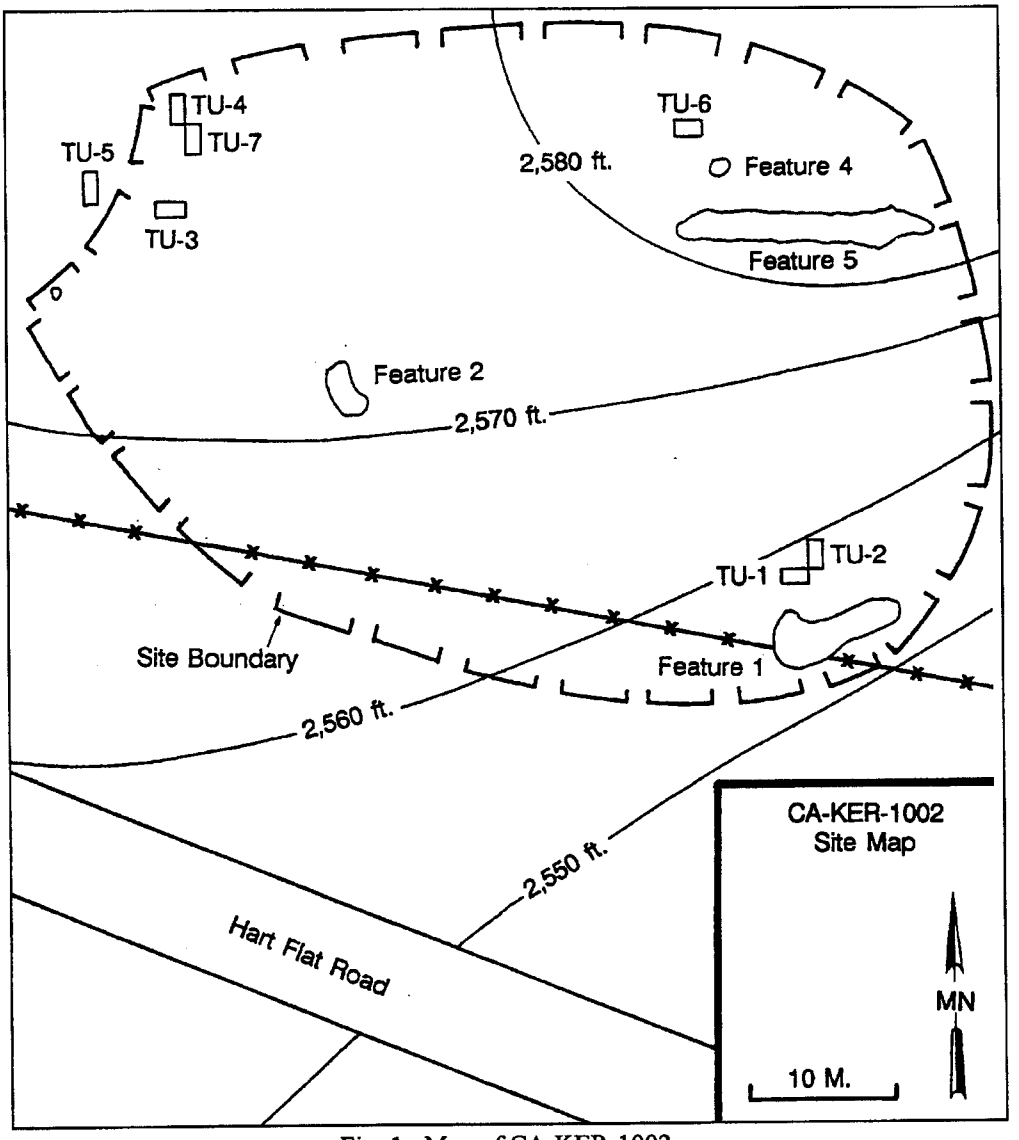

Fig. 1. Map of CA-KER-1002.

FIELD METHODS

Seven 1 x 2 m. test units, the deepest of which was 100 cm., were established using a grid system (Fig. 1). The units were placed judgmentally on the grid, close to the features. The units were oriented north-south or east-west magnetic and were excavated in arbitrary 10 centimeter increments to culturally sterile soil. Excavation was by pick, shovel, and trowel. All soil was passed through 1/8-in. screen.

LABORATORY METHODS

The artifacts from CA-KER-1002 were catalogued with the aid of a computer program. Each artifact was identified, measured, weighed, and bagged according to unit and level. The artifacts and catalogue are stored at the Center for Archaeological Research at CSUB.

RESULTS OF THE EXCAVATIONS

Features

There are a total of six features at CA-KER-1002, five of which contain bedrock milling stations and one of which is a subsurface feature.

Bedrock Milling Stations. Feature 1 at CA-KER-1002 contains fifteen mortars and one slick (Fig. 2). This feature is the largest at the site and nearest to the drainage. Features 2, 3, and 5 are single metate slicks and Feature 4 is a single bedrock mortar (Figs. 3 through 6).

Subsurface Feature. Feature A is located in the 20 to 40-cm. levels of TU-4. The feature consists of a charcoal concentration at the southern end of the unit and a pile of rocks on top of bedrock on the northern end (Fig. 7). The feature is interpreted as a possible hearth.

Soils

Three major soil strata were delineated in the test units at CA-KER-1002 (Figs. 8 and 9). Stratum 1 is a light brown sandy loam. Stratum 2 is a dark brown sandy loam. Stratum 3 is a decomposing granite. All of the units exhibited rodent disturbances. Since artifacts were found in all of the strata, artifacts did not correlate with soil type.

Material Culture

A total of 258 prehistoric artifacts and two historic artifacts was collected from CA-KER-1002. Formed prehistoric tools represented 5% of the total artifacts found while debitage represented 94.2% of the total. Quartzite and obsidian each accounted for 34% of the total materials used for formed tools. Obsidian accounted for 84% of the total number of debitage material. The recovered artifacts are summarized in Table 1 and each category is described and discussed below.

Ground Stone. The ground stone category includes fragmented manos, pestles, and unidentified ground stone. Each category is discussed below.

Mano Fragments. Three mano fragments were found at CA-KER-1002. The first was found in TU-1 but the information for the location and level of the mano was not recorded. The piece is made from granite and measures 55.4 x 44.3 x 44.0 mm., and weighs 181.1 grams. The second was found in the 30 to 40-cm. level of TU-3. It is made of quartzite and measures 93.4 x 87.8 x 48.7 mm., and weighs 1,623.2 g. The third piece was made from quartzite and measures 70.4 x 58.0 x 23.4 mm., and weighs 122.0 g.

Pestle Fragment. One fragmented granite pestle was found. It was recovered from the 30 to 40-cm. level of TU-2, measures 60.5 x 31.0 x 32.0 mm., and weighs 1,099.8 g.

Unidentified Ground Stone. One piece of quartzite groundstone that could not be identified as to form was recovered from the 30 to 40-cm. level of TU-3. The piece measures 145.4 x 133.5 x 41.7 mm., and weighs 1,582.4 g.

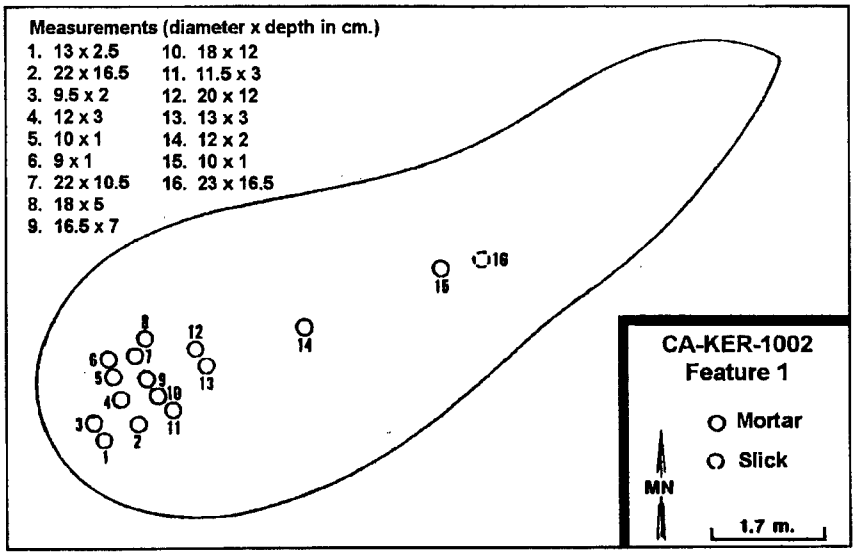

Fig. 2. Feature 1 at CA-KER-1002.

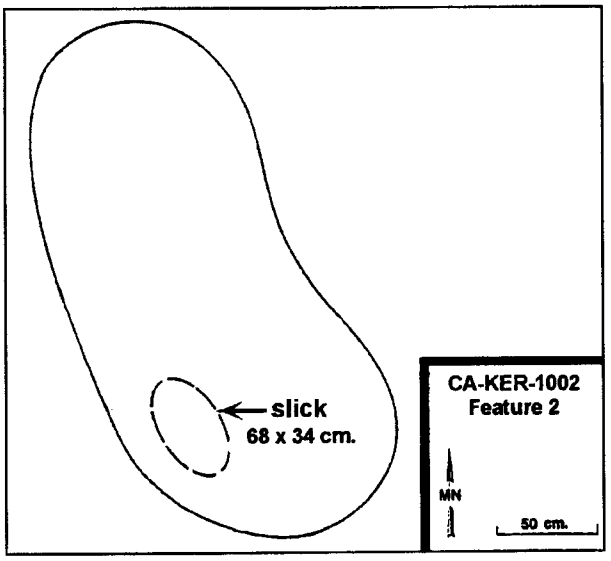

Fig. 3. Feature 2 at CA-KER-1002.

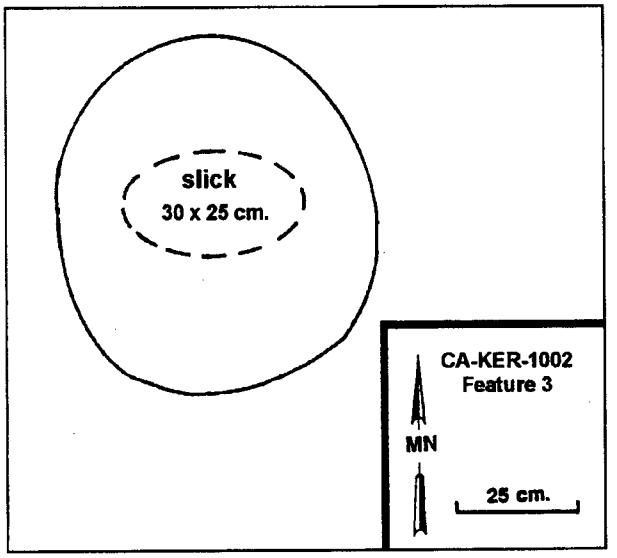

Fig. 4. Feature 3 at CA-KER-1002.

Flaked Stone. The flaked stone category includes fragmented projectile points, unifaces, cores, hammerstones, and debitage. Each category is discussed below.

Projectile Points. Two fragmented projectile points were unearthed from CA-KER-1002. The first is an obsidian midsection that was found in the 20 to 30-cm. level of TU-3. The second is a distal fragment found in the 30 to 40-cm. level of TU-7. It measures 51.0 x 46.0 x 15.0 mm., and weighs 0.03 g. The pieces lack diagnostic attributes and could not be identified to type or style.

Unifaces. One uniface was recovered from CA-KER-1002. The uniface was made from obsidian and was found in the 10 to 20-cm. level of TU-1. It measures 20.9 x 11.3 x 3.9 mm. and weighs 0.9 g.

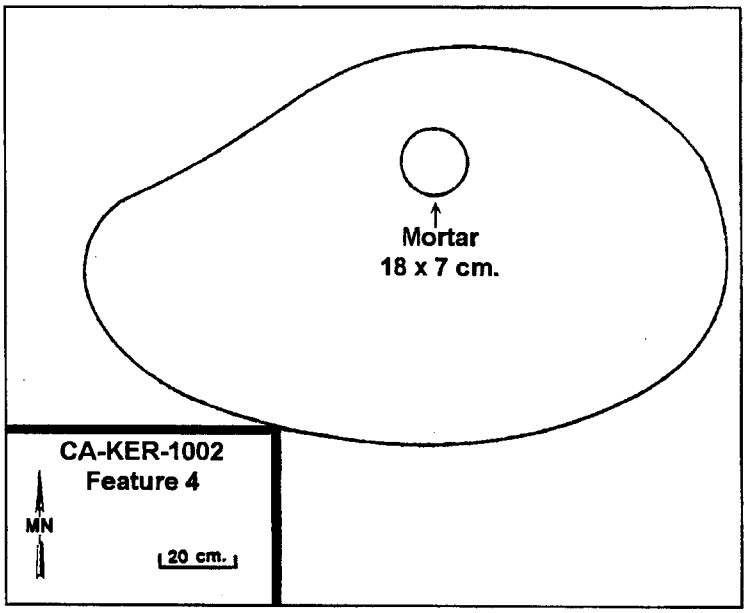

Fig. 5. Feature 4 at CA-KER-1002.

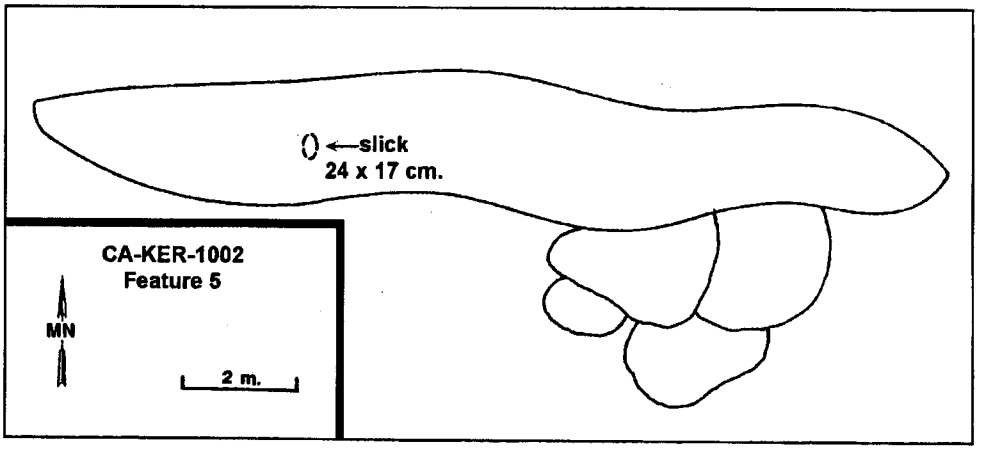

Fig. 6. Feature 5 at CA-KER-1002.

Cores. Two cores were recovered from CA-KER-1002. Both cores were found in the 30 to 40-cm. level of TU-4. The first is a chalcedony core fragment that measures 41.9 x 30.5 x 18.8 mm., and weighs 27.9 g. The second also appears to be a core fragment made from quartzite. It measures 5.1 x 4.6 x 1.5 mm., and weighs 0.03 g.

Hammerstones. Two quartzite hammerstones were retrieved from CA-KER-1002. The surface find was found near Feature 2. It is made from quartzite, measures 89.4 x 57.3 x 54.8 mm., and weighs 1,408.4 g. The second was found in TU-3. It is made from quartzite and measures 86.8 x 84.7 x 71.8 mm., and weighs 1,730.4 g.

Debitage. A total of 245 flakes was recovered from CA-KER-1002. Obsidian accounted for 84% of the debitage by count while chalcedony represented 13%. The debitage is summarized in Table 2.

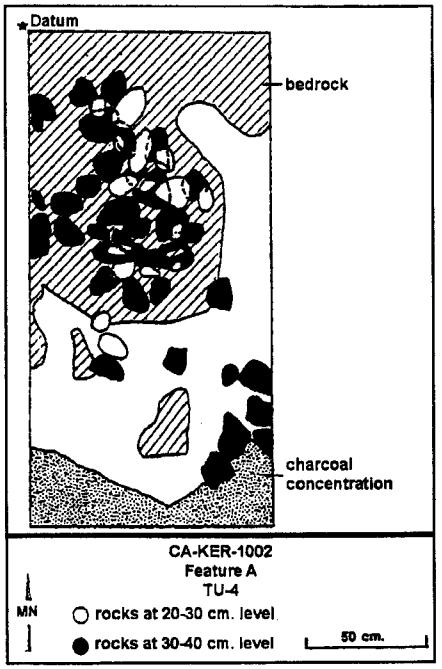

Fig. 7. Feature A at CA-KER-1002.

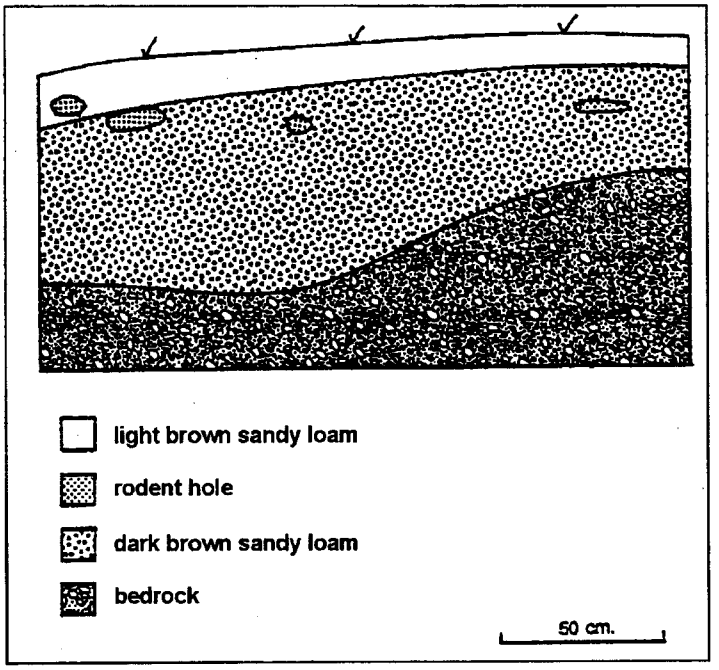

Fig. 8. TU-2 west wall profile.

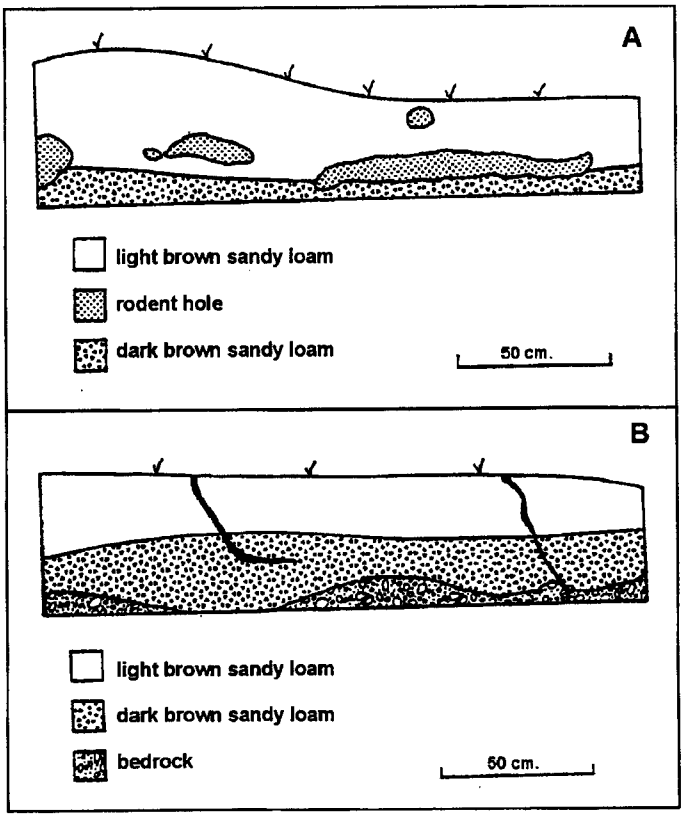

Fig. 9. (a) TU-5 east wall profile; (b) TU-7 west wall profile.

Table 1
ARTIFACT SUMMARY (ALL UNITS) FROM CA-KER-1002

	Surface	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	Total
Artifacts											
mano fragments	--	--	1	--	1	--	--	--	--	--	3[b]
pestles	--	--	--	--	1	--	--	--	--	--	1
ground stone	--	--	--	--	1	--	--	--	--	--	1
proj point frags	--	--	--	1	1	--	--	--	--	--	2
unifaces	--	--	1	--	--	--	--	--	--	--	1
cores	--	--	--	--	2	--	--	--	--	--	2
hammerstones	1	--	--	--	1	--	--	--	--	--	2
debitage	2	7	40	43	50	42	28	16	12	4	244
worked flakes	--	--	--	--	--	2	--	--	--	--	2
square nails	--	--	--	2	--	--	--	--	--	--	2
Totals	3	7	42	46	57	44	28	16	12	4	260

[a] Levels in cm.
[b] The level of one of the manos was not recorded.

Table 2
DISTRIBUTION OF DEBITAGE BY LEVEL[a] AND MATERIAL AT CA-KER-1002

	Surface	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	Totals
Material											
chalcedony	--	1	4	5	11	11	--	1	--	--	33
chert	--	--	1	--	--	--	--	--	--	--	1
jasper	--	--	4	1	--	--	--	--	--	--	5
obsidian	2	6	32	36	39	31	28	15	12	4	205
quartzite	--	--	--	1	--	--	--	--	--	--	1
Totals	2	7	41	43	50	42	28	16	12	4	245

[a] Levels in cm.

Faunal Analysis

A total of 82 faunal remains (all mammal) was recovered from CA-KER-1002. The remains by taxa and level are summarized in Table 3 and the element distribution is provided in Table 4. These faunal remains consisted of rodents, hares, Cervidae, and unidentified mammals, some of which were burned. Only one of the burned remains was identified to species (Cervidae) while the rest were unidentified large and large to medium-sized mammals. The burned mammal remains may represent use of a variety of animals in the area including rabbit, coyote, fox, and deer. The rodent remains in the collection do not appear to be cultural in origin. It is suggested by this faunal analysis that the main resources used by inhabitants of CA-KER-1002 were large to medium-sized mammals.

Table 3
DISTRIBUTION OF FAUNAL REMAINS BY SPECIES AND LEVEL[a] AT CA-KER-1002

	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	Totals
Taxon										
Lepus californicus	--	--	--	--	--	--	--	1	--	1
Citellus beecheyi	--	--	1	--	4	1	1	--	--	7
Thomomys bottae	--	--	--	--	--	--	--	1	--	1
Neotoma sp.	--	--	--	--	--	--	1	--	--	1
unident. small rodent	--	--	--	--	2	2	--	--	--	4
Cervidae	--	1	--	1	--	1	--	--	--	3
large mammal	--	5	--	--	7	6	3	4	4	29
large-medium mammal	--	3	3	--	--	--	--	--	--	6
medium mammal	--	--	--	--	--	--	7	1	--	8
medium-small mammal	--	--	--	--	--	--	1	--	--	1
small mammal	--	--	--	--	3	2	5	11	--	21
Totals	--	9	4	1	16	12	18	18	4	82

[a] Levels in cm.

Table 4
ELEMENT DISTRIBUTION BY SPECIES AT CA-KER-1002

Species\Element[a]	SK	MA	TH	PE	HU	MC	TI	MT	Totals
Lepus californicus	--	--	--	--	--	--	--	1	1
Citellus beecheyi	1	1	2	1	1	1	--	--	7
Thomomys bottae	--	--	--	--	--	--	1	--	1
Neotoma sp.	--	--	--	1	--	--	--	--	1
Cervidae	--	--	3	--	--	--	--	--	3
Totals	1	1	5	2	1	1	1	1	13

[a] SK = skull; MA = mandible; TH = tooth; PE = pelvis; HU = humerus; MC = metacarpal; TI = tibia; MT = metatarsal.

Botanical Analysis

Nine seed husks recovered from four of the test units were submitted to the U.S. Department of Food and Agriculture for identification. Species identified are bull pine (*Pinus sabiniana*) (n = 6), and manzanita (*Arctostaphylos* sp.) (n = 1). One specimen was tentatively identified as pine and another could not be identified.

Immunoprotein Analysis

Immunoprotein analysis was conducted on three pieces of groundstone recovered from the test units. A fragment of unidentified groundstone (Cat. No. 3-007) produced negative results. A fragment of a pestle (2-006) recovered from TU-2 had traces of cat (*Felis* sp.) protein. The third specimen analyzed, a mano (3-008), contained traces of human proteins.

Cat protein on the pestle could indicate that meat, bone or some other part of a bobcat (*Felis rufus*) or mountain lion (*F. concolor*), the only two native Felids known to have inhabited the area, was processed at the site in antiquity. The presence of human protein on the mano is not unusual on an item that has had contact with humans.

Obsidian Studies

Ten obsidian specimens were submitted for chemical characterization. All of the specimens were derived from the Coso Volcanic Field.

Dating

There were no chronological data or diagnostic artifacts available from CA-KER-1002. Thus, the date of this site remains unclear.

SUMMARY AND CONCLUSIONS

CA-KER-1002 is one of only three sites in Hart Flat that contains a relatively deep and substantial subsurface deposit. Thus, it likely was occupied for a comparatively long period of time or, more likely, witnessed repeated occupation over a long period of time. It is viewed as a special activity site, possibly for the processing of acorns and/or other plant materials that were to be and stored at a winter village (or villages). There is no indication, such as the presence of structures, that CA-KER-1002 was inhabited year round.

The bedrock milling features, along with mortars, pestles, metates, and manos, suggest that a variety of milling activities occurred at the site. The presence of projectile points infers that hunting activities also occurred there, apparently of large and medium-sized mammals, most likely deer. Obsidian was an important material at the site as well.

Since there were no diagnostic artifacts or radiocarbon dates available from CA-KER-1002, it is suggested that it was occupied during the Sawtooth Phase (ca. A.D. 600-1300) (Moratto 1984). This is based on the fact that the only dating evidence from any of the Hart Flat sites is in the form of diagnostic projectile points from CA-KER-1015 that indicate an occupation, at least of CA-KER-1015, between the Sawtooth and Chimney phases (see Parr, this volume). Further, the lack of historical artifacts suggests that the site was not inhabited during Euroamerican times, supporting the argument that the site may have been occupied during the Sawtooth Phase rather than the subsequent Chimney Phase. Assuming that CA-KER-1002 is part of an overall settlement and subsistence system that includes CA-KER-1015, this would support the argument that CA-KER-1002 dates to roughly the same time as CA-KER-1015.

In summary, CA-KER-1002 represents a special use locality in the region; i.e., the processing of food resources. As such, a seasonal round may be inferred and the resource gathering of the native peoples of the area better understood. Further, of the 29 prehistoric sites that were recorded and/or testing during this study, all but one (CA-KER-1015) were described as short-term or long-term milling sites (while described as a campsite, CA-KER-1015 also contained milling features; see Fleagle, this volume). Therefore, CA-KER-1002 is viewed as an integral part of a more complete understanding of the Hart Flat site complex.

ACKNOWLEDGEMENTS

This report was prepared in conjunction with the testing and evaluation of the Keene Ranch property. I thank Dorothy Fleagle for her help in cataloguing the artifacts; Missy Peterson and Jean Calvillo for illustrations; Gerrit Fenenga for the faunal analysis; and Robert E. Parr and Mark Q. Sutton for commenting on drafts of the report.

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Archaeological Investigations at CA-KER-1006

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INTRODUCTION

The CA-KER-1006 site is located in the eastern portion of Hart Flat in the northern Tehachapi Mountains, California. It was test excavated in 1991 as part of ongoing environmental evaluation work for the Keene Ranch development. The site originally was recorded in 1979 during a partial survey of Hart Flat (Schiffman 1979) and was relocated during a recent inventory for the Keene Ranch project (Drover and Smith 1989).

LOCATION AND NATURAL SETTING

CA-KER-1006 is located in the northern Tehachapi Mountains about 2.9 km. northwest of the town of Keene. The site is located west of Highway 58, on a granite outcrop on the north bank of Hart Creek just south of where it crosses beneath Hart Flat Road, at a point 200 m. west of the Hart Flat underpass. The main part of the site is 16 meters east (downstream) of a rock-and-earthen check dam. The site is situated within an oak woodland; vegetation includes oaks (*Quercus* spp.), and various shrubs and grasses.

SITE DESCRIPTION

The CA-KER-1006 site is comprised of four bedrock milling features within an area measuring 5 m. x 25 m. (Figs. 1 and 2). Feature 1 consists of one bedrock mortar (not illustrated); Feature 2 includes three milling slicks/metates and eight bedrock mortars; Feature 3 is comprised of two bedrock mortars; and Feature 4 contains seven bedrock mortars.

FIELD METHODS

A 1 m. x 2 m. test unit (TU-1) was placed adjacent to the main concentration of milling features. The unit was oriented to magnetic north. It was excavated in arbitrary 10-cm. increments down to culturally sterile soil at a depth of 70 cm. Excavation was accomplished with pick, shovel, and trowel. All soil was passed through a 1/8-in. mesh screen.

LABORATORY METHODS

All of the artifacts were cataloged using standard techniques, all material was identified, counted, and weighed. An electronic cataloging program was used to expedite the work. Artifacts were appropriately labeled, and stored in bags and vials. The collection currently is stored at California State University, Bakersfield, awaiting transfer to a planned interpretive facility on the Keene Ranch.

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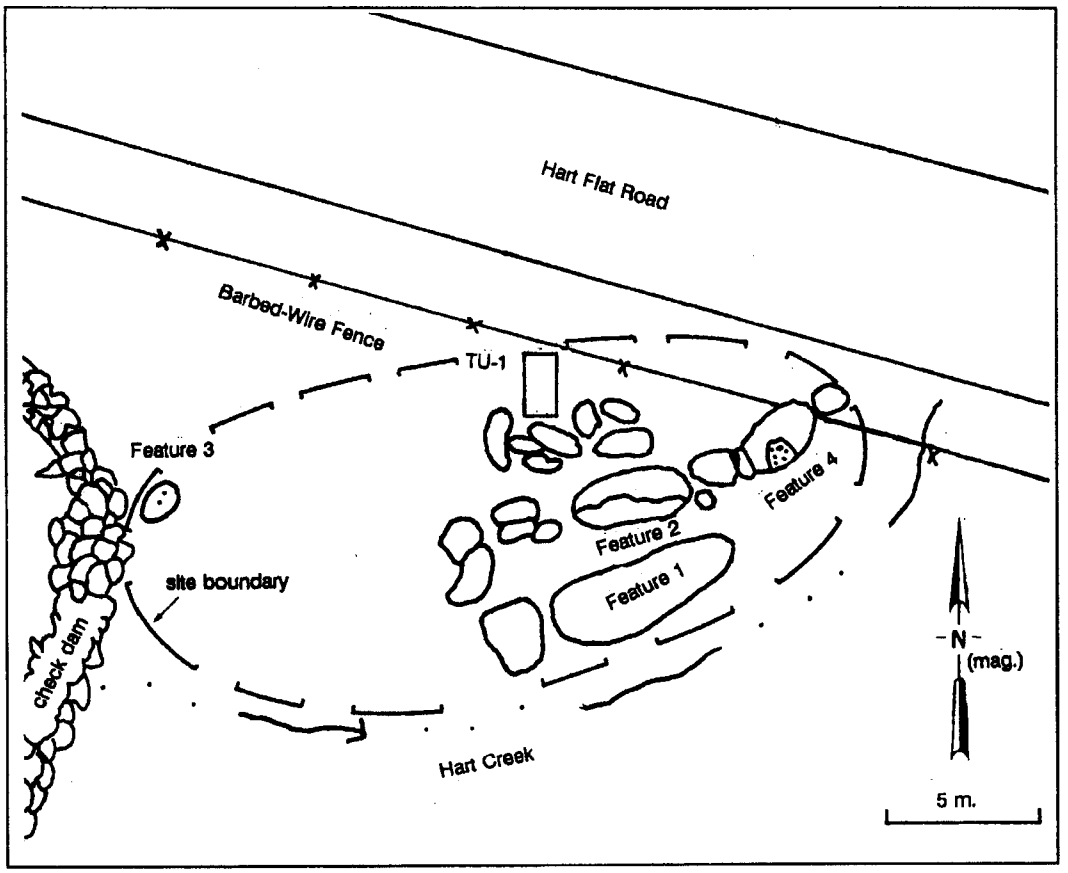

Fig. 1. CA-KER-1006 site map.

RESULTS OF THE EXCAVATIONS

Soils

One major soil type, a relatively compact, dark gray/brown gravelly loam, was present throughout the test unit, although there was a small amount of variation in the consistency. There also was decomposed granite throughout the soil, and a great deal of root disturbance was evident in the test unit.

Material Culture

A total of 38 prehistoric artifacts and five historic artifacts was recovered from TU-1. The artifacts are summarized in Table 1.

Flaked Stone. All of the prehistoric artifacts from TU-1 consist of flaked stone debitage of various lithic materials. These are described below.

Debitage. Thirty-eight pieces of flaked stone debitage were recovered from TU-1. Materials represented are basalt (n = 26), chalcedony (n = 7), quartz (n = 3), chert (n = 1), and rhyolite (n = 1). All are small, tertiary flakes and shatter.

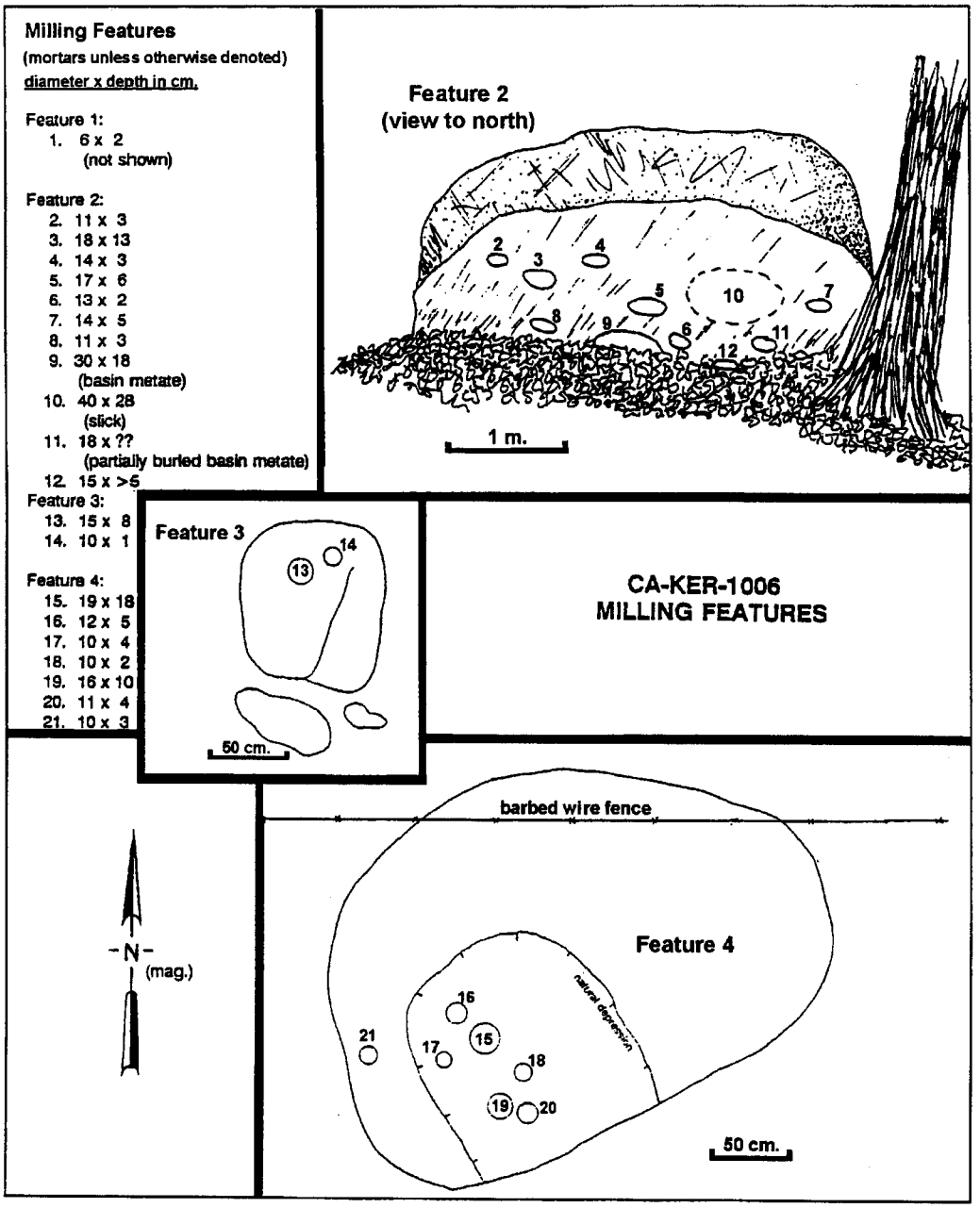

Fig. 2. CA-KER-1006 features.

Historical Artifacts. Five historical artifacts were found in the upper two levels of TU-1. These are thought to be intrusive to the deposit. A fence runs across the northern edge of the site, as does Hart Flat Road. Both probably have existed there for a considerable amount of time, and the activities surrounding them may have been the source of these artifacts. That the historical artifacts are contemporaneous with the other elements of the site cannot be discounted, however, although no definite correlation between the historical and prehistoric components of the site could be demonstrated based on the available evidence. On the contrary, the context of the historical material (i.e., stratigraphically superior to over 92% of the prehistoric material) argues for its having been deposited after the site was abandoned in prehistory.

Table 1
DISTRIBUTION OF ARTIFACTS AND BOTANICAL REMAINS BY LEVEL

Level (cm.)	0-10[a]	10-20	20-30	30-40	40-50	50-60	60-70	Totals
Debitage								
basalt	--	2	17	5	2	5	--	26
chalcedony	--	1	2	3	--	1	--	7
chert	--	--	1	--	--	--	--	1
quartz	--	--	2	--	--	1	--	3
rhyolite	--	--	1	--	--	--	--	1
Historical								
metal	--	1	--	--	--	--	--	1
glass	--	1	--	--	--	--	--	1
nails	2	1	--	--	--	--	--	3
Ecofacts								
bone	--	--	1	7	--	--	--	8
tooth	--	--	1	--	--	--	--	1
seed	--	--	1	--	--	--	--	1

[a] Levels in cm.

Nails. Three square nails were recovered from the test unit. Two nails came from the 0 to 10-cm. level and one from the 10 to 20-cm. level.

Glass. One small fragment of amber glass, probably from a beer bottle, was recovered from the 10 to 20-cm. level. The piece measures 12 x 9 x 5 mm.

Metal Fragment. A small, flattened fragment of lead was retrieved from the 10 to 20-cm. level of TU-1. The piece measures 29 x 19 x 3 mm. and is basically amorphous so that its original shape and function cannot be determined.

Faunal Remains

Faunal remains from TU-1 consist of eight bone fragments and a tooth fragment (Table 1), most of which were considered to be natural rather than cultural in origin. All but one of these specimens were identified as small mammal species.

Bones. One burned bone fragment, apparently that of long bone from a ground squirrel, came from the 20 to 30-cm. level. The 30 to 40-cm. level produced seven unburned bone and tooth fragments. These include one complete and two broken rodent incisors, a fragment of rodent maxilla with attached tooth, a rodent long bone fragment, and a piece of rib also from a rodent. The rodent remains were tentatively identified as ground squirrel (cf. *Spermophilus beecheyi*) and unknown rodent.

Tooth. A small fragment of artiodactyl tooth enamel, probably from a deer (cf. *Odocoileus hemionus*), was retrieved from the 20 to 30-cm. level of TU-1. It is unclear whether this tooth fragment was the result of natural or cultural processes.

Botanical Remains

A fragment of an unidentified seed husk taken from the 20 to 30-cm. level appears recent in origin and is considered intrusive to the deposit (Table 1).

DATING OF THE SITE

There were no chronological data or diagnostic artifacts recovered from CA-KER-1006 that would establish its age. Thus, this site remains undated.

SUMMARY AND CONCLUSIONS

The numerous features found within the site indicate that CA-KER-1006 was a milling site. Based on the large numbers and sizes of the features, the presence of a subsurface cultural deposit and the low artifact diversity, this site is classified as a long-term milling site. It probably served as a special purpose site associated with the procurement and processing of seasonally available foods, such as acorns, pine nuts, and gooseberries. Processing of animal foods also may have occurred at the site. The proximity of CA-KER-1006 to other similar milling sites in Hart Flat (e.g., CA-KER-1002, -1004, and -1008) suggests that it might have been part of a larger pattern of seasonal occupation along Hart Creek.

The debitage assemblage, dominated by tertiary flakes and shatter, suggests that stone working probably was limited to fine work such as tool retouch. Notably absent from the lithic assemblage is obsidian. This is of interest in light of the fact that CA-KER-1002, located only about 65 m. from CA-KER-1006, contained a relatively large amount of obsidian; in fact, it had the highest percentage of obsidian of all the sites investigated at Hart Flat. This implies that the two sites probably served different functions besides that of milling; what that purpose was remains unclear based on the limited information available.

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1979 Archaeological Overview of the Keene and Broome Ranches, Kern County. Report on file at the Southern San Joaquin Valley Information Center, California State University, Bakersfield.

Archaeological Investigations at CA-KER-1015

Dorothy Fleagle, Three Girls and a Shovel, Bakersfield, California.

INTRODUCTION

Located in the northern Tehachapi Mountains just east of Hart Creek, site CA-KER-1015 is approximately 2.5 miles west of the town of Keene. It was test excavated in 1990 as part of ongoing environmental evaluation work for the Keene Ranch development. The site originally was recorded in 1979 during a partial survey of Hart Flat (Schiffman 1979) and relocated during the inventory for the Keene Ranch project (Drover and Smith 1989).

NATURAL AND CULTURAL SETTING

The site designated as CA-KER-1015 is on the west side and footslope of a hill at the southern end of Hart Flat. The elevation of the site is between 3,265 and 3,300 ft. (995 to 1,005 m.) above sea level. The site is situated in an open oak woodland. Site vegetation includes oaks (*Quercus* spp.), bull pine (*Pinus sabiniana*), datura (*Datura stramonium*), redbud (*Cercis occidentalis*), gooseberries (*Ribes* cf. *Roezlii*), and various grasses. The region is known to have been occupied ethnographically and prehistorically by the Kawaiisu (e.g., Zigmond 1986).

SITE DESCRIPTION

CA-KER-1015 is roughly 100 x 80 m. in size (Fig. 1). Contained within its boundaries is a midden deposit measuring 40 x 35 m. and three milling features with a total of 15 mortars and four milling slicks. Feature 1 (Fig. 2) consists of nine bedrock mortars on a single boulder, Feature 2 (Fig. 3) is comprised of five bedrock mortars, and Feature 3 (Fig. 4) consists of one mortar and four milling slicks (see below for further discussion of results).

FIELD METHODS

A north-south (magnetic) baseline and grid were established on the site. Eleven judgmental test units were set up on the grid in a north/south or east/west direction and were excavated in arbitrary 10-cm. increments down to culturally sterile soil. Excavation was by pick, shovel, and trowel. Due to the slope, the units were dug in contour levels and all soil was passed through 1/8-in. mesh screen.

LABORATORY METHODS

All of the artifacts recovered were catalogued using standard techniques, i.e., all material was identified, counted, and weighed. An electronic cataloguing program was used to facilitate the work. Artifacts were appropriately labeled, and prepared for storage in bags, vials, and/or boxes according to

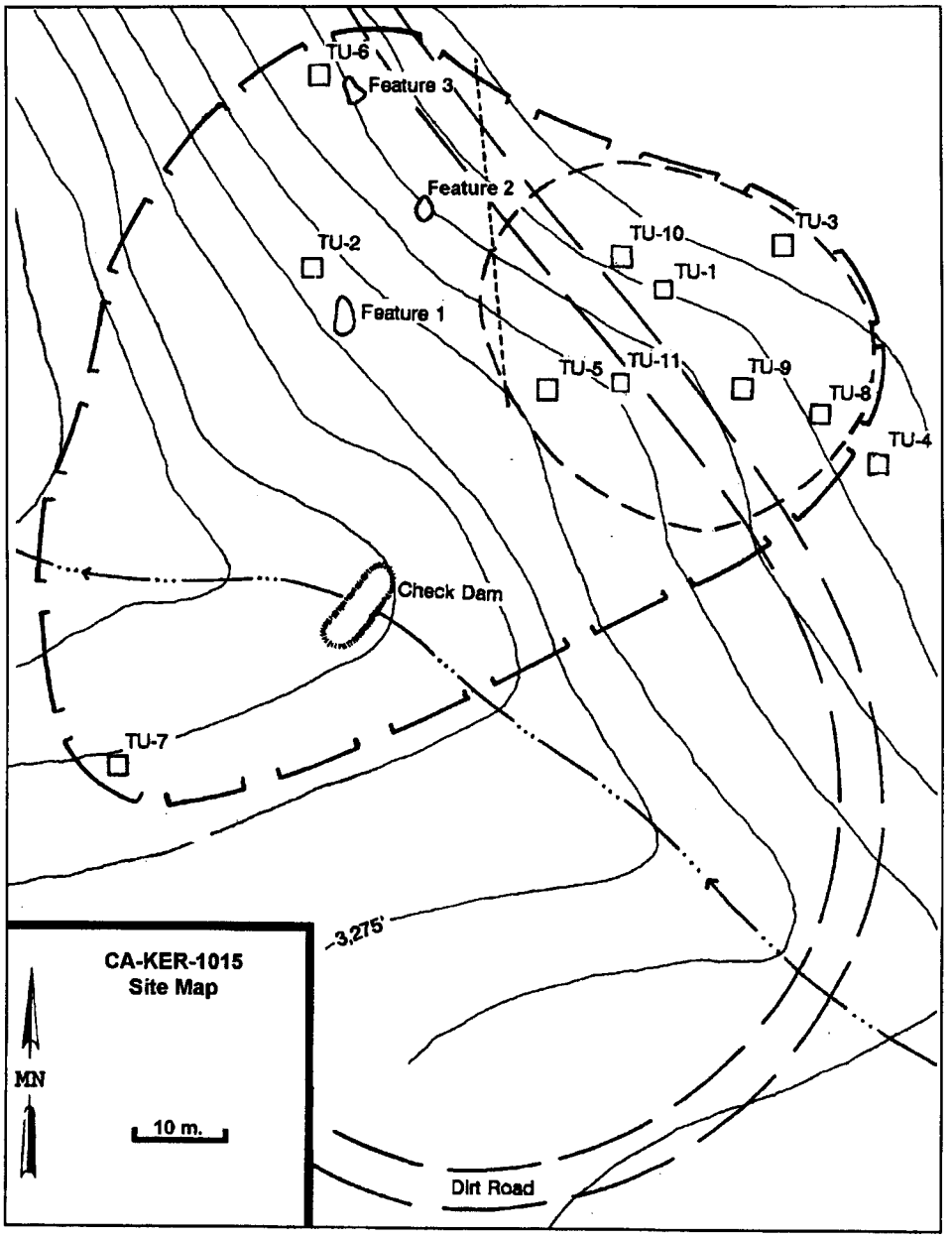

Fig. 1. Map of CA-KER-1015.

need. The collection currently is stored at the Center for Archaeological Research, California State University, Bakersfield, awaiting transfer to a planned interpretive facility on the Keene Ranch.

RESULTS OF THE EXCAVATIONS

Soils

One major soil type, a gray/brown silty loam, was present throughout the site, although there was some variation in consistency. Wall profiles from two units, TU-5 and TU-8, were illustrated to show the

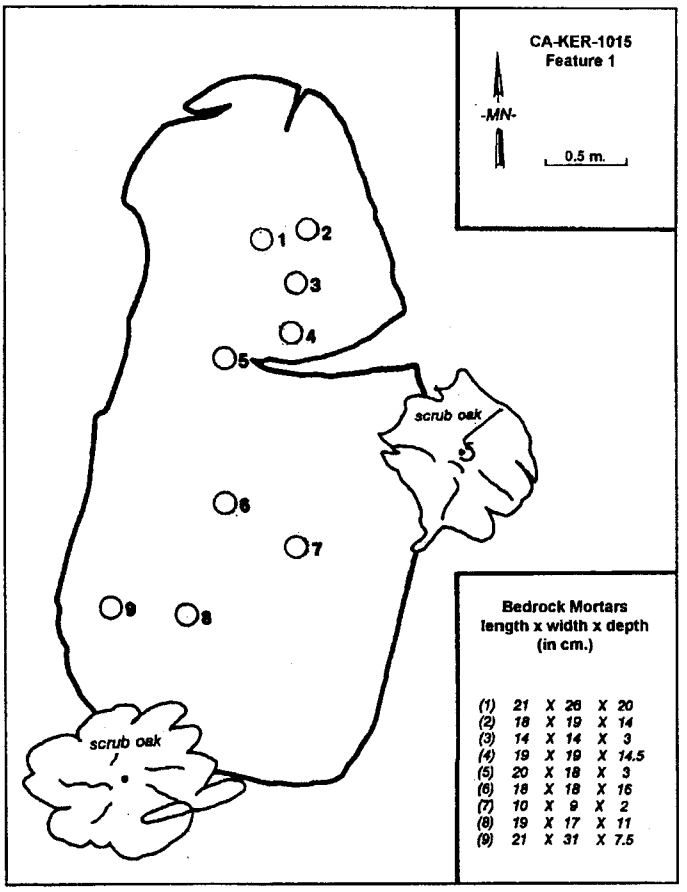

Fig. 2. Feature 1 at CA-KER-1015.

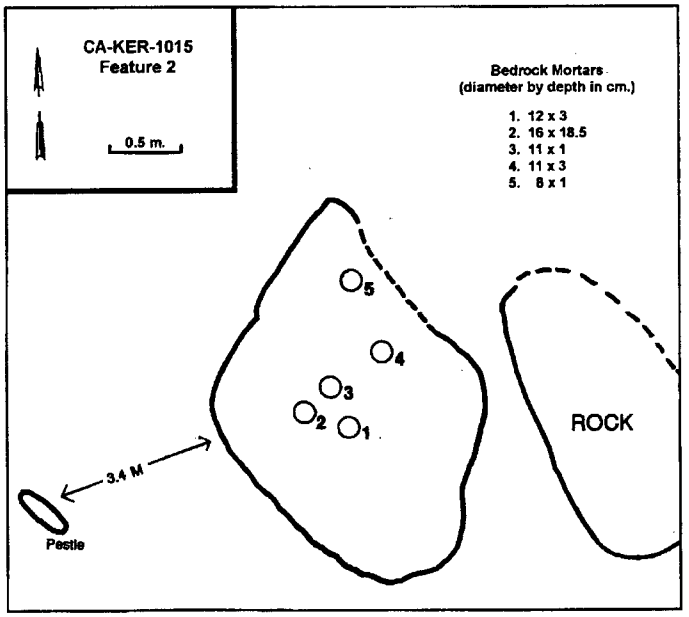

Fig. 3. Feature 2 at CA-KER-1015.

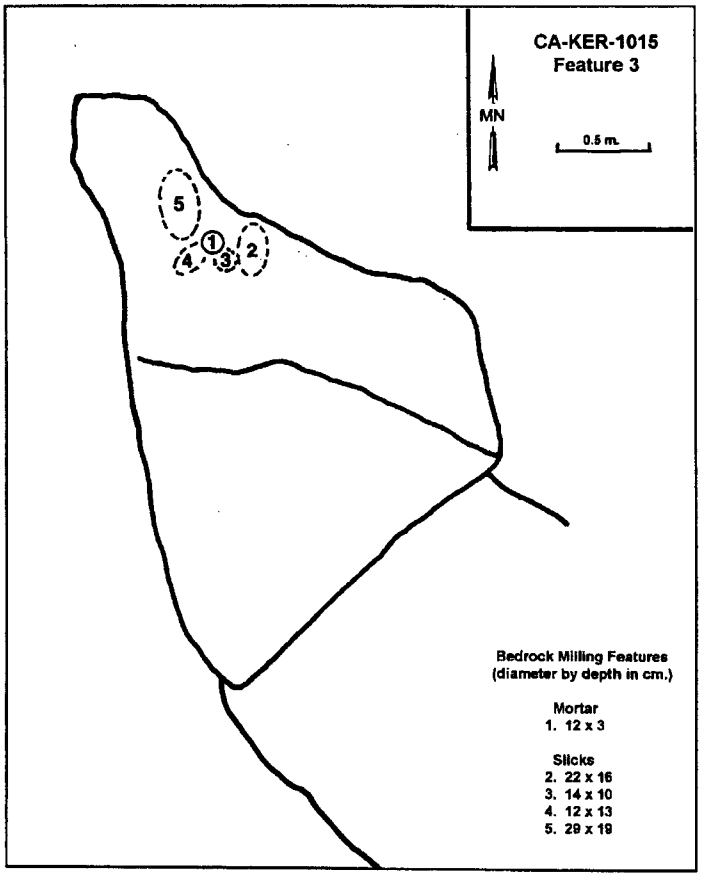

Fig. 4. Feature 3 at CA-KER-1015.

contrast (Fig. 5). There was decomposing granite throughout the area, which was reflected in the form of gravel in the soil. In addition, there was a great deal of rodent disturbance in the midden.

Possible Feature

Along with the three milling features discussed above, a concentration of artifactual and ecofactual materials was encountered in the 30 through 60-cm. levels of TU-9. Included in this concentration were a complete inverted metate, one complete obsidian Rose Spring point, six burned seeds, a small amount of charcoal, more than 450 bone fragments (some burned), one bone awl fragment, and four fire-affected ground stone fragments. It is possible that this represents a hearth feature.

Material Culture

A total of 556 prehistoric artifacts was recovered from CA-KER-1015. Formed tools represented 4.2% of the total artifacts found by count. Debitage represented 95.0% by count of the artifacts recovered. The artifacts are summarized in Table 1 and each category is described and discussed.

Ground Stone. The ground stone category includes one complete mano, one complete metate, one complete pestle, one possible anvil, and nine unidentified ground stone fragments. Each ground stone artifact type is discussed below.

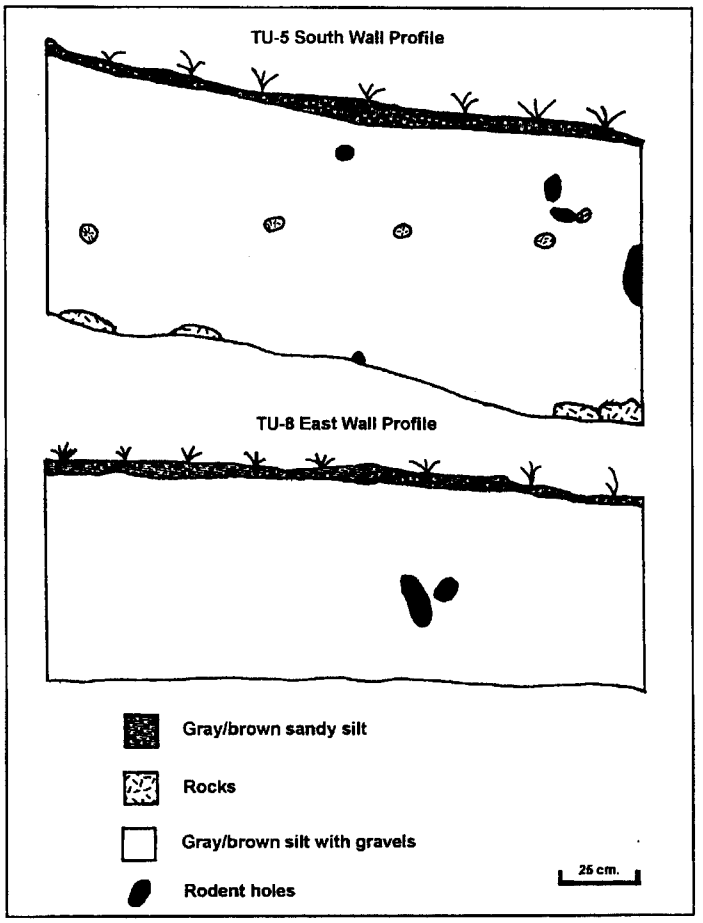

Fig. 5. CA-KER-1015 selected wall profiles.

Mano. One complete, granitic mano (Cat. No. 11-025; Fig. 6) was found in TU-11. It was discovered in the corner of the adjoining south and west walls at a depth of 63 cm. The unburned specimen measured 121.7 x 95.4 x 63.3 mm. and weighs 1,203.3 g.

Metate. One large, granitic metate (Cat. No. 9-040; not illustrated) was found face down in TU-9. It was 22.2 cm. to 56.3 cm. from the south wall, 16.0 cm. to 50.5 cm. from the east wall, and 42 cm. deep. The specimen measured 445.0 x 320.0 x 127.0 mm. and weighed 25.4 kg.

Pestle. One complete granite pestle (Cat. No. B-001; Fig. 7) was recovered from the surface at CA-KER-1015. The specimen measured 419.0 x 979.0 x 102.2 mm.

Possible Anvil. One granitic, shaped rock interpreted as an anvil (Cat. No. 9-066; Fig. 8) was found in TU-9. It was 84.5 cm. from the south wall, 11.8 cm. from the west wall, and at a depth of 106.0 cm. The specimen measured 154.0 x 151.0 x 151.0 mm., and weighed 1774.3 g.

Unidentified Ground Stone. Nine unidentified pieces of granitic ground stone were recovered from CA-KER-1015 (Table 2). It is interesting to note that 44% of the ground stone was burned and that 75% of the burned specimens were from the same level.

Table 1
SUMMARY OF ARTIFACTS (ALL UNITS)[a] FROM CA-KER-1015

Level	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100-110	110-120	120-130	130-140	Totals
Artifact															
mano	--	--	--	--	--	1	--	--	--	--	--	--	--	--	1
metate	--	--	--	--	1	--	--	--	--	--	--	--	--	--	1
pestle	1	--	--	--	--	--	--	--	--	--	--	--	--	--	1
anvil	--	--	--	--	--	--	--	--	--	--	1	--	--	--	1
CT[b]	--	1	1	--	2	--	1	--	--	--	--	--	--	--	5
RS[c]	1	1	--	1	1	--	--	--	--	--	--	--	--	--	4
HU[d]	1	--	--	--	--	--	--	--	--	--	--	--	--	--	1
bifaces	4	--	3	1	--	1	1	--	--	--	--	--	--	--	10
modified flakes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
debitage	34	75	74	80	59	68	35	34	26	16	13	8	4	2	528
bone awls	--	--	--	1	1	--	--	--	2	1	--	--	--	--	5
Totals	40	77	78	83	64	70	37	34	28	17	14	8	4	2	556

[a] Levels in cm.
[b] Cottonwood Triangular projectile points.
[c] Rose Spring projectile points.
[d] Humboldt projectile point.

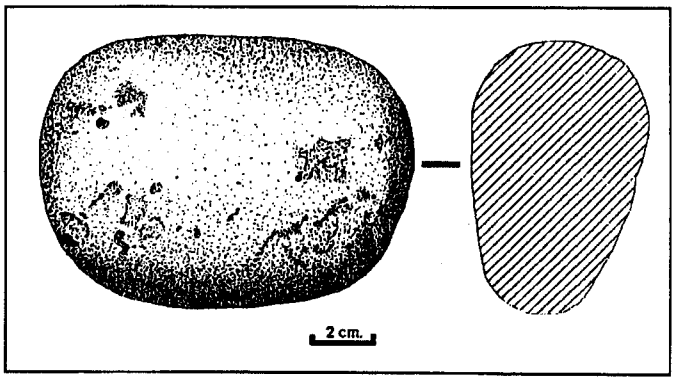

Fig. 6. Mano from CA-KER-1015.

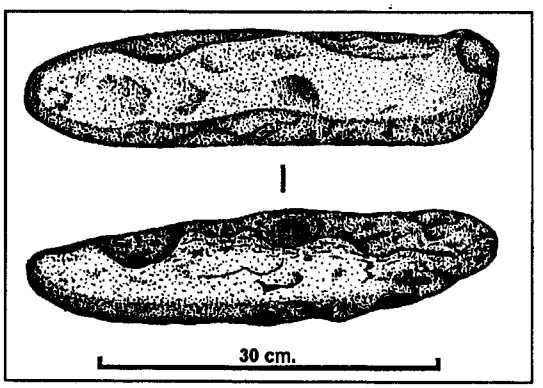

Fig. 7. Pestle from CA-KER-1015.

Flaked Stone. The flaked stone category includes complete and fragmented projectile points, bifaces, and debitage. Each category is discussed below.

Projectile Points. Ten projectile points, representing two (possibly three) projectile point series (Desert, Rose Spring, and possibly Humboldt) were recovered. The provenience and attributes of the projectile points are summarized in Table 3 and all are illustrated in Figure 9.

Desert Series. Five points typologically classified as Desert series (Cat. Nos. 1-004, 9-013, 10-023, 10-024, and 10-039) were recovered from the site, all of the Cottonwood Triangular type. These are dispersed throughout the deposit, occurring as deep as 60 to 70 cm. Two of the five are complete. Raw materials represented include two made of chalcedony, one of rhyolite, one of basalt, and one of obsidian.

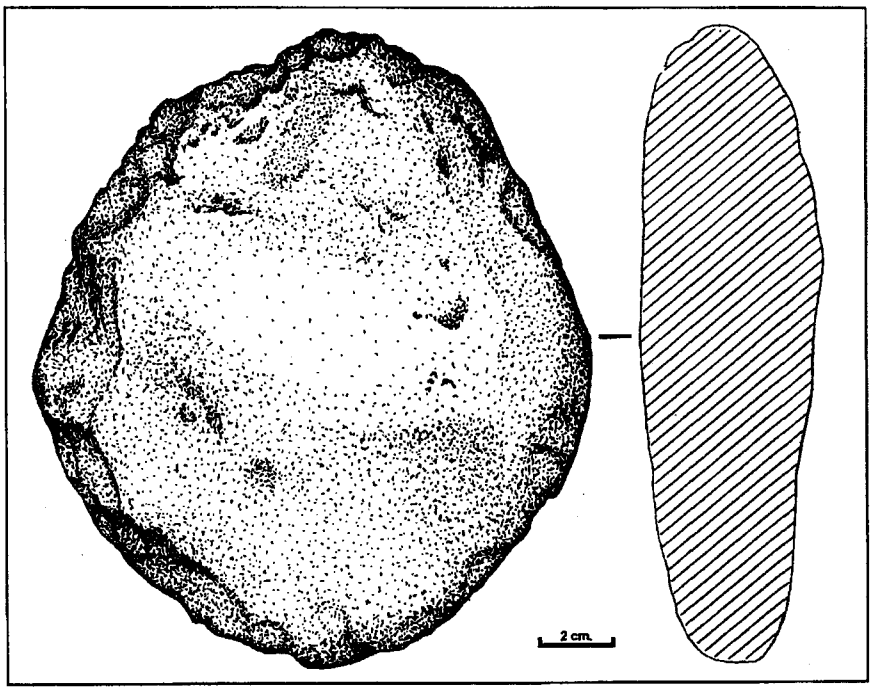

Fig. 8. Anvil from CA-KER-1015.

Table 2
PROVENIENCE AND ATTRIBUTES[a] OF UNIDENTIFIED GROUNDSTONE

Cat. No.[b]	Material	Fire Affected	Level[c]	Weight	Length	Width	Thickness
8-007	granitic	yes	40-50	54.7	58.0	49.5	18.0
9-015	granitic	no	30-40	182.5	55.0	48.5	46.0
9-032	sandstone	yes	40-50	94.9	82.0	58.5	18.5
9-033	granitic	no	40-50	192.5	78.0	67.0	51.0
9-034	granitic	no	40-50	1,779.3	164.0	81.0	69.0
9-052	granitic	yes	70-80	264.0	63.0	54.0	47.5
9-071	granitic	no	110-120	174.2	75.0	47.0	40.0
10-017	granitic	no	20-30	302.6	92.0	54.2	54.0
11-018	granitic	yes	40-50	55.2	69.0	38.5	19.0

[a] Metrics are in mm. and g.
[b] First number in column is test unit number.
[c] Levels in cm.

Desert series projectile points are thought to date sometime after A.D. 1300 (Heizer and Hester 1978:155-157).

Rose Spring Series. Four Rose Spring series points were found, three fragmentary and one complete (Cat. Nos. 1-005, 1-014, 9-001, and 9-016). Three of the four are obsidian, while the other is chalcedony. Rose Spring series points are believed to date between A.D. 700 and A.D. 1300 (Heizer and Hester 1978:155-157). The Rose Spring specimens were also dispersed throughout the deposit, the deepest specimen occurring at the 40 to 50-cm. level.

Table 3
PROVENIENCE AND ATTRIBUTES[a] OF PROJECTILE POINTS

Cat. No.[b]	Level[c]	Material	Weight	Length	Width	Thickness	Fig.
CT							
1-004	10-20	rhyolite	1.02	21.0	13.0	4.0	9a
9-013	20-30	basalt	1.10	22.0	16.0	4.5	9b
10-023	40-50	chalcedony	0.71	18.5	13.0	3.6	9c
10-024	40-50	obsidian	0.87	26.0	11.5	3.8	9d
10-039	60-70	chalcedony	1.09	12.5	13.0	5.0	9e
RS							
1-005	10-20	obsidian	0.89	23.0	12.0	4.0	9f
1-014	40-50	obsidian	0.05	17.0	13.0	3.0	9g
9-001	0-10	chalcedony	0.91	16.0	15.8	4.0	9h
9-016	30-40	obsidian	0.45	17.5	11.0	3.0	9i
HU							
B-003	surface	obsidian	43.1	31.3	9.0	10.4	9j

[a] Metrics are in mm. and g. CT = Cottonwood Triangular; RS = Rose Spring; HU = Humboldt.
[b] First number in column is test unit number.
[c] Levels in cm.

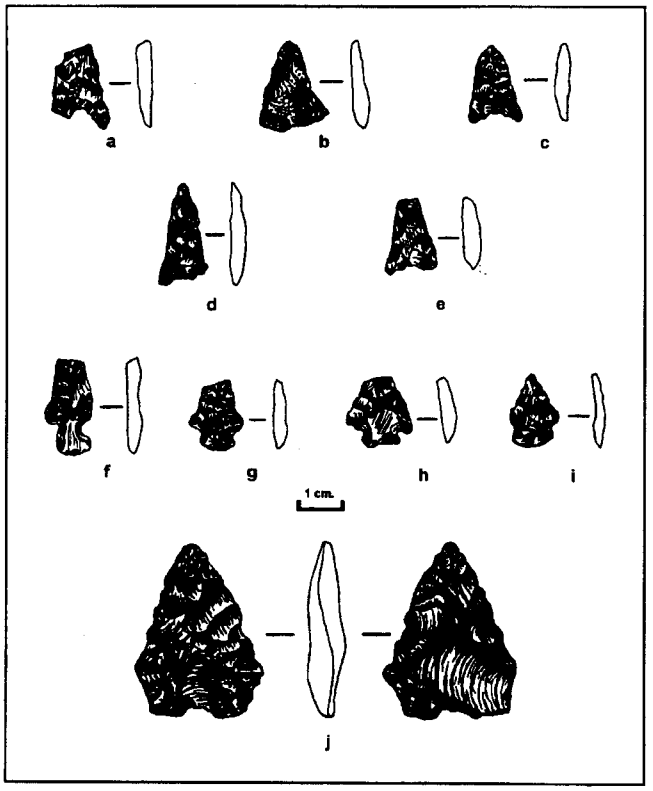

Fig. 9. CA-KER-1015 projectile points: (a-e) Cottonwood Triangular (Cat. Nos. 1-004, 9-013, 10-023, 10-024, and 10-039, respectively; (f-i) Rose Spring (Cat. Nos. 1-005, 1-014, 9-001, and 9-016, respectively; (j) possible Humboldt (Cat. No. B-003).

Humboldt Series. One projectile point found on the surface, and manufactured from obsidian, was tentatively identified as a Humboldt series point (Cat. No. B-003). The dating of this series is unclear and it is not certain whether they were projectile points. Large points can change morphologically over time, becoming smaller after each use-life, confusing the issues of temporal significance and function (Thomas 1981:37).

Discussion. The projectile points appear to reflect an occupation beginning sometime around 1,000 years ago. Interestingly, the majority of the Rose Spring series points (75%) were made of obsidian while only 20% of the Desert series specimens were made of that material. Although the absolute numbers are small, this same trend seems to be reflected in the archaeological record of the western Mojave Desert as well (Sutton 1988:43). It may be that obsidian became more scarce during Desert series times.

Bifaces. Ten biface fragments were recovered from the site. One large, bifacially worked chalcedony flake (Cat. No. B-002) most

likely represents a preform. Two, and possibly three, of the fragments (Cat. Nos. 1-015, 6-006, and 11-010) are point or knife tips and although interesting, are not diagnostic. One obsidian biface fragment (Cat. No. 9-005) could be a point tip or ear. The remaining biface (Cat. No. 3-009) is a midsection.

Debitage. A total of 528 flakes was recovered (Table 4). Obsidian accounted for 43% of the debitage by count, while chalcedony represented 44%. Basalt, chert, jasper, quartz, rhyolite, and schist accounted for the remaining 13%.

Bone Awls. Five bone awl fragments (Cat. Nos. 9-022, -023, -028, -031, and -048) were found at CA-KER-1015. The fragments were recovered from four units, TU-3, TU-9, TU-10, and TU-11. Table 5 shows the provenience and attributes of the bone tools (also see Fig. 10).

Faunal Remains

The faunal analysis of the site was never completed, but a preliminary examination indicated the presence of ground squirrel (*Spermophilus* sp.), cottontail rabbit (*Sylvilagus* sp.), gopher (cf. *Thomomys* spp.), and deer (*Odocoileus hemionus*).

Botanical Remains

A total of 91 seed husks, both complete and fragmented, was recovered from ten of the test units (Table 6). This number includes the seeds of bull pine (*Pinus sabiniana*), oak (*Quercus* sp.), California juniper (*Juniperus californica*), hackberry (cf. *Celtis reticulata*), and manzanita (*Arctostaphylos* sp.). Pine seed husks account for 72 by count of the total, all but three of which are burned. Oak is represented by nine pieces, two burned and seven unburned. There are also three burned juniper seeds, three burned hackberry seeds, one unburned manzanita seed, and three burned, unidentified husk fragments.

Discussion. The predominance of burned bull pine seeds suggests that this species was the most important plant resource at CA-KER-1015. This is interesting in light of the fact that convention generally dictates that the presence of bedrock mortars at a site equates to acorn processing (e.g., Zigmond 1981, 1986). This predominance of pine seeds also has implications for seasonality, as it was during the autumn season that the Kawaiisu collected the cones of the bull pine and burned them to extract the seeds (Zigmond 1981:52).

Obsidian Studies

Ten obsidian samples from CA-KER-1015 were sent for source analysis by Biosystems Analysis Inc. All samples were sourced to the Coso Volcanic Field.

SUMMARY AND CONCLUSIONS

The variety of the artifacts and ecofacts suggests that CA-KER-1015 was a habitation site. The presence of the diagnostic artifacts (i.e., Rose Spring and Desert series projectile points) dates the site to at least 1,000 years ago and probably represents at least two occupations of the area. Given the presence of the possible Humboldt series point, it is also plausible to postulate an earlier occupation. However, rodent

Table 4
DISTRIBUTION OF DEBITAGE BY LEVEL[a] AND MATERIAL AT CA-KER-1015

Material	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100-110	110-120	120-130	130-140	Totals
basalt	2	12	10	7	0	2	0	0	2	0	0	0	0	0	35
chalcedony	17	34	18	37	33	32	16	17	8	6	6	4	2	0	230
chert	1	0	0	4	0	0	0	0	0	0	0	0	0	0	5
jasper	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
obsidian	14	26	36	30	26	27	17	16	13	10	7	1	2	2	227
quartz	0	1	0	1	0	6	2	0	3	0	0	3	0	0	16
rhyolite	0	2	10	0	0	0	0	0	0	0	0	0	0	0	12
schist	0	0	0	1	0	0	0	1	0	0	0	0	0	0	2
Totals	34	75	74	80	59	68	35	34	26	16	13	8	4	2	528

[a] Levels in cm.

Table 5
PROVENIENCE AND ATTRIBUTES[a] OF BONE AWL FRAGMENTS AT CA-KER-1015

Cat. No.[b]	Level[c]	Burned	Length	Width	Thickness	Weight	Fig.
3-028	80-90	no	23.6	4.4	4.4	0.55	--
9-022	30-40	no	15.0	8.0	3.3	0.30	9
10-048	90-100	yes	29.6	7.5	5.0	5.1	--
11-023	50-60	no	20.8	14.9	6.9	1.97	--
11-031	80-90	yes	10.0	3.5	3.3	0.12	--

[a] Metrics are in mm. and g.
[b] First number in column is test unit number.
[c] Levels in cm.

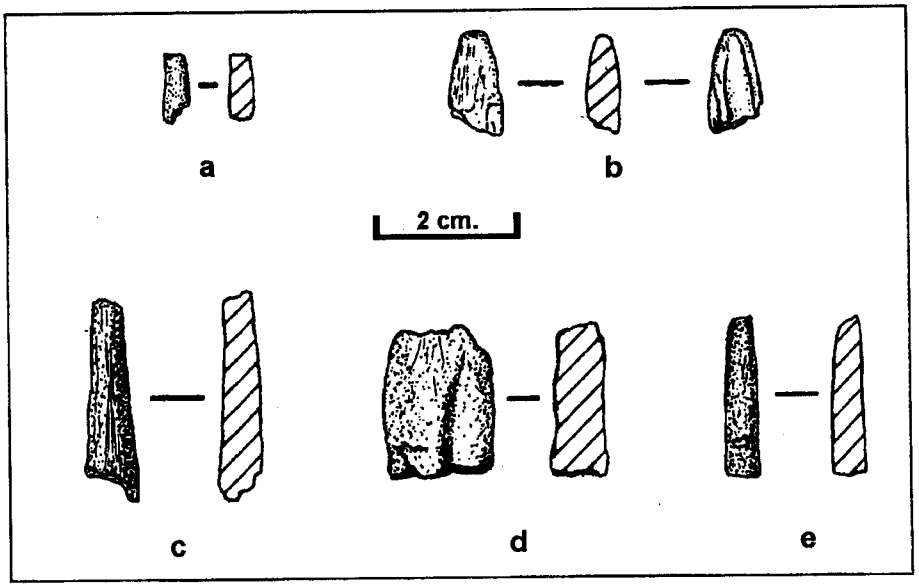

Fig. 10. Bone awl fragments from CA-KER-1015.

Table 6
SUMMARY OF BOTANICAL REMAINS FROM CA-KER-1015

Cat. No.[a]	No. of Pieces	Burned	Identification
1-021	1	yes	*Pinus* sp.
3-015	9	yes	*Pinus* sp. (8), *Quercus* sp. (1)
3-019	11	yes	*Pinus* sp. (10), *Quercus* sp. (1)
3-025	8	yes	*Pinus* sp.
3-030	2	yes	*Juniperus californica*
4-002	2	yes	*Pinus sabiniana*
5-027	2	yes	*Pinus* sp.
6-001	1	yes	*Celtis* cf. *reticulata*
6-008	1	yes	*Pinus* cf. *sabiniana*
6-012	2	yes	*Pinus* sp.
7-001	7	no	*Quercus* sp.
8-010	2	yes	*Pinus* cf. *sabiniana*
8-013	1	yes	*Juniperus californica*
9-007	2	no	*Pinus sabiniana* (1), unknown (1)
9-026	4	yes	*Pinus sabiniana*
9-031	3	yes	*Pinus sabiniana* (2), *Celtis* cf. *reticulata* (1)
10-008	1	yes	*Pinus* sp.
10-015	1	yes	*Celtis* cf. *reticulata*
10-022	7	yes	*Pinus* cf. *sabiniana*
10-028	12	yes	*Pinus* sp.
10-034	2	no	*Pinus* sp.
10-047	4	yes	*Pinus* sp. (3), unknown (1)
10-052	4	yes	*Pinus* sp. (3), unknown (1)
11-003	1	no	*Arctostaphylos* sp.
11-035	1	yes	*Pinus* cf. *sabiniana*

[a] First number in column is test unit number.

disturbances throughout the test units prohibited accuracy in spacial and temporal knowledge provided by the projectile points.

As demonstrated by the projectile points, hunting activities were likely important to the site inhabitants, and the presence of mammal bones indicates that a number of protein sources were available in the area. The size of the points suggests that hunting was conducted with bows and arrows. The two most popular materials for flaked stone seemed to have been chalcedony and obsidian. The percentages of each found in the debitage (Table 5) showed that each was equally used.

There are six other sites within 400 m. of CA-KER-1015, all of which have bedrock mortars and/or a cupule (Table 7). None of the nearby sites contained the substantial subsurface deposit or diversity of artifacts that occurred at CA-KER-1015. It seems reasonable to postulate that CA-KER-1015, which contained three bedrock mortar features, could have been the hub of a milling site complex. The site is

Table 7
MILLING FEATURES AT CA-KER-1015 AND SURROUNDING SITES

Site	Mortars	Slicks	Cupules	Totals
CA-KER-1015	15	4	0	19
CA-KER-1009	3	0	0	3
CA-KER-1010	5	0	0	5
CA-KER-1011	3	0	0	3
CA-KER-1016	4	0	0	4
CA-KER-2622	10	9	0	19
CA-KER-2632	0	0	1[a]	1
Totals	30	4	1	54

[a] Identified herein as a cupule but may be a small mortar.

located in an oak woodland and water was readily accessible (via a nearby stream channel and seep spring). Zigmond (1986:398-401) observed that the Kawaiisu were known to consume acorns; however, botanical evidence from CA-KER-1015 points to the use of pine seeds as well. The presence of the many milling features tends to confirm that this site was, in fact, an important milling and habitation site that formed the nucleus of a complex of similar, although smaller, seasonal special purpose sites. The sites probably were occupied in the autumn and revolved around the processing of pine seeds, as well as acorns and other seeds. Projectile points from CA-KER-1015 suggest that the period of occupation may have commenced as early as 1,000 years ago and continued perhaps to the Late Prehistoric Period.

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Archaeological Investigations at CA-KER-2616

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INTRODUCTION

The site designated CA-KER-2616 is a small site containing several milling features and a number of cupules. It is located in Hart Flat in the Tehachapi Mountains of Kern County. The site was test excavated in 1990 as part of the archaeological evaluation (Phase II study) of the Keene Ranch Property.[1] It was originally recorded in 1989 (Drover and Smith 1989) during an archaeological inventory (Phase I study) of the Keene Ranch.

NATURAL AND CULTURAL SETTING

CA-KER-2616 is located adjacent to the east bank of Hart Creek, just north of its confluence with an unnamed tributary, approximately 3.2 km. west of the town of Keene. The elevation of the site is between 841 and 853 m. (2,760 and 2,800 ft.) above sea level. The site is located in Douglas Oak woodland and riparian vegetation communities. Site vegetation includes oak (*Quercus* spp.), bull pine (*Pinus sabiniana*), sycamore (*Platanus racemosa*), datura (*Datura stramonium*), redbud (*Cercis occidentalis*), wild rose (*Rosa* sp.), and a variety of grasses. The site is located within a region that was claimed ethnographically by the Kawaiisu (Kroeber 1925; Zigmond 1986; also see Parr, this volume).

SITE DESCRIPTION

CA-KER-2616 encompasses an area of approximately 2,400 $m.^2$ (Fig. 1). The site consists of bedrock mortars (n = 7), cupules (n = 17), a very sparse lithic scatter, and a subsurface deposit with flaked and ground stone artifacts (see below).

FIELD METHODS

Three 1 x 2 m. test units were excavated at the site. These were located judgmentally on a grid established on the site. All units were oriented in a north/south direction and were excavated in arbitrary 10-cm. increments to culturally sterile soil. All soil was passed through 1/8-in. screen.

LABORATORY METHODS

Cataloguing of materials recovered from the site was accomplished with the aid of a computer program. Each formed artifact received a separate number. Debitage was separated by material and given a separate number. During the cataloguing process, metric attributes (length, width, thickness, and weight) were obtained on each artifact.

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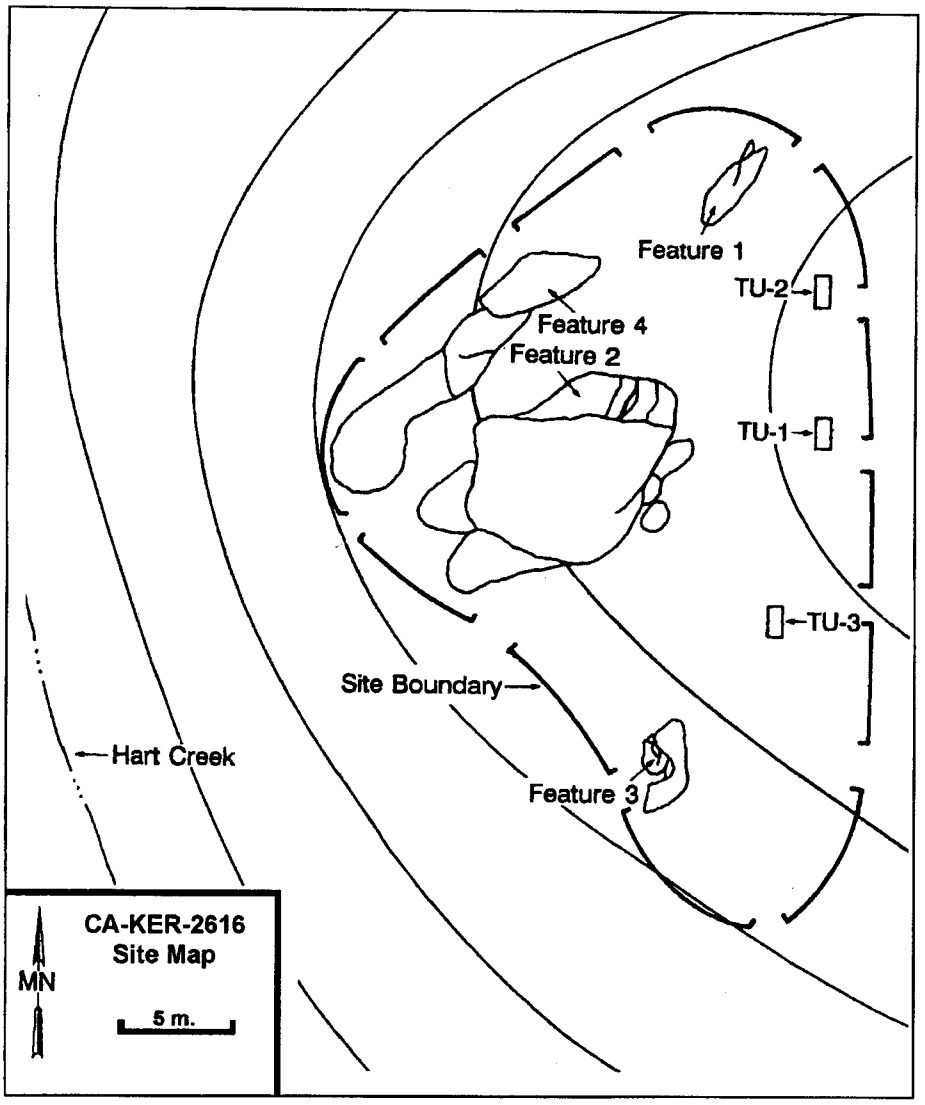

Fig. 1. CA-KER-2616 site map.

RESULTS OF THE EXCAVATIONS

Soils

The test unit wall profiles were examined to determine soil types (Fig. 2). One major soil type, silty sandy loam, was present in all three test units. All units bottomed out in decomposing granite. Rodent burrows were noted in all three units.

Features

There are four features at CA-KER-2616. Feature 1 is bedrock milling station containing six bedrock mortars (Fig. 3). Feature 2 is a shallow bedrock mortar (11 cm. x 6 cm.; not illustrated). Features 3 and 4 are separate rock outcrops containing a total of 17 cupules (Fig. 4).

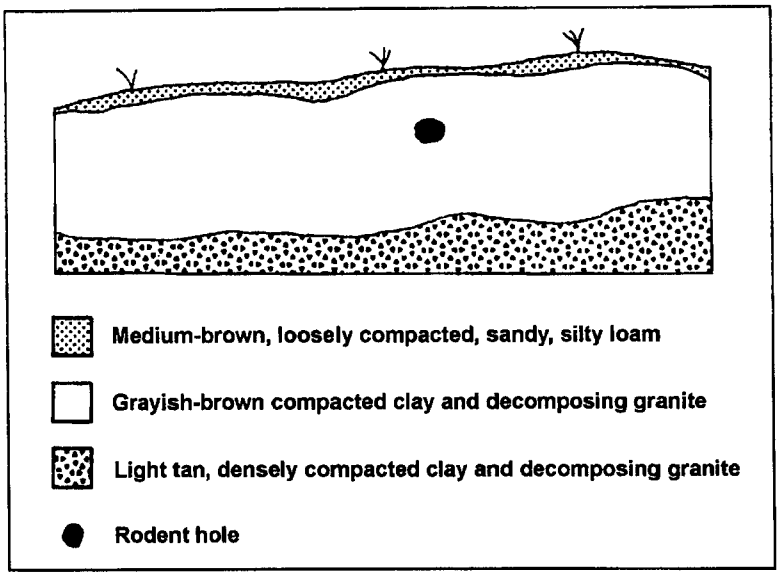

Fig. 2. Wall profile of TU-1 at CA-KER-2616.

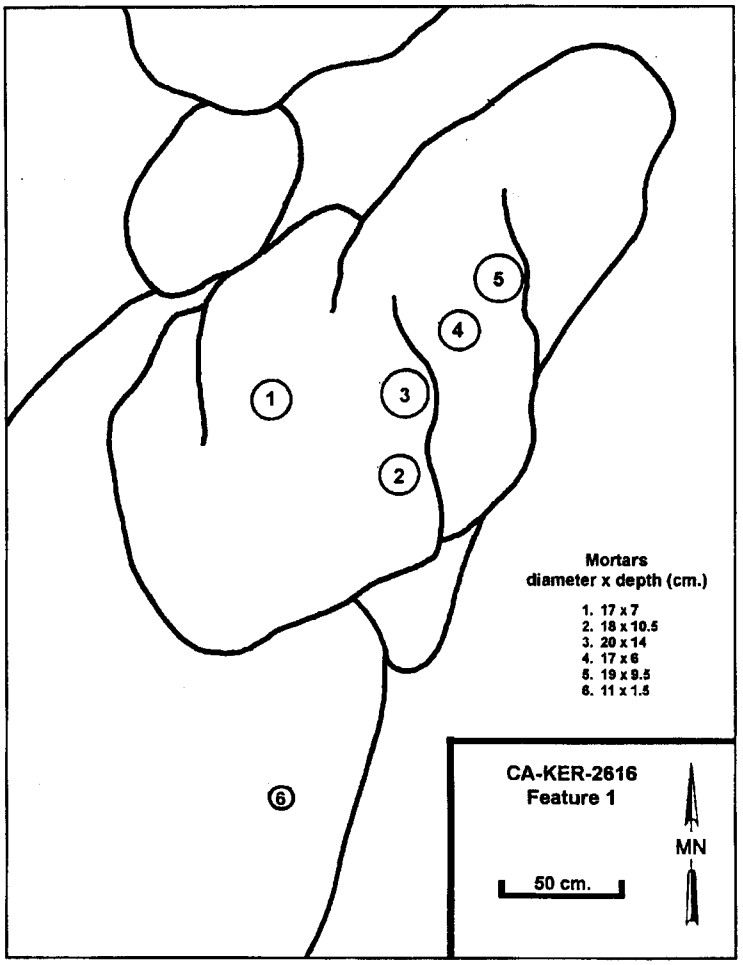

Fig. 3. Feature 1 at CA-KER-2616.

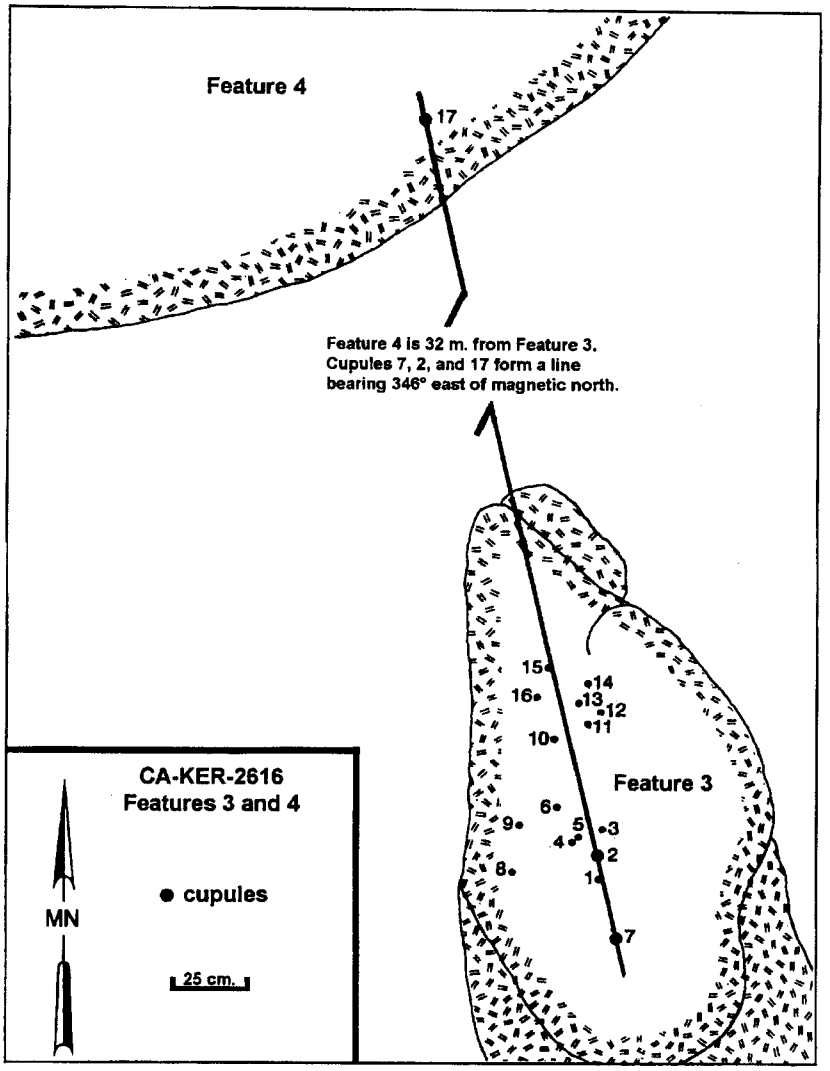

Fig. 4. Features 3 and 4 at CA-KER-2616.

Test Excavations

One test unit (TU-1) was placed in a flat area about 15 m. south of Feature 1 and 20 m. east of Feature 2 (Fig. 1). The unit was excavated to 70 cm., where decomposing granite bedrock was encountered. Before encountering decomposing granite at the 50-cm. level, the soil was moderately compacted, silty loam. The datum for the site was placed in the northwest corner of TU-1.

The second test unit (TU-2) was placed 9 m. north of TU-1 (Fig. 1). A depth of 30 cm. was reached in TU-2, at which point decomposing granite was encountered. Above the decomposing granite, the soil was silty sand with pebbles and a few rodent disturbances (Fig. 4).

The remaining test unit (TU-3) was placed 12 m. south-southwest of TU-1 (Fig. 1). The unit was dug to a depth of 40 cm., at which point the soil gave way to decomposing granite. Prior to this, the soil consisted of sandy loam. A few rodent burrows were encountered.

Table 1
ARTIFACT SUMMARY (ALL UNITS)[a] AT CA-KER-2616

Level	Surface	0-10	10-20	20-30	30-40	40-50	50-60	60-70	Totals
Artifact									
mano	1	--	--	--	--	--	--	--	1
mano fragment	1	--	--	--	--	--	--	--	1
projectile point fragments	1	--	1	--	--	--	--	--	2
biface fragments	--	--	--	--	1	1	--	--	2
debitage	1	8	21	24	29	19	12	3	117
Totals	4	8	22	24	30	20	12	3	123

[a] Levels in cm.

Material Culture

A total of 127 prehistoric artifacts was recovered from CA-KER-2616. By count, debitage represented 92.1% of the artifacts found. Obsidian accounted for 21.4% (by count) of the material used for the prehistoric artifacts. These artifacts are summarized in Table 1 and each category is described and discussed.

Ground Stone. The ground stone category consisted of one intact mano and a mano fragment. Each is described below.

Mano. One granitic mano (Fig. 5) was located on the surface of the site. The specimen is unburned, ground on two sides, and shaped. It measures 123.0 x 82.0 x 54.0 mm., and weighs 559.15 g.

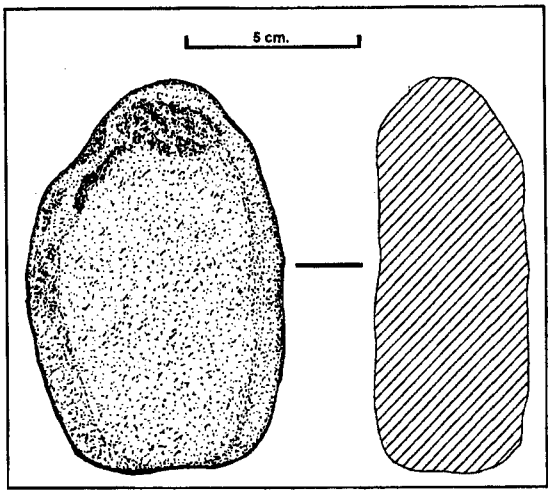

Fig. 5. Mano from CA-KER-2616.

Mano Fragment. One granitic mano fragment was located on the surface. The specimen is unburned and ground on one surface, although it is possible that it may have been ground on more than one susrface. It measures 93.5 x 56.2 x 36.0 mm., and weighs 262.9 g.

Flaked Stone. Included in the flaked stone category are projectile point fragments, biface fragments, and debitage.

Projectile Point Fragments. Two projectile point fragments were retrieved from the site; neither was diagnostic as to type. A distal fragment made of chalcedony (Cat. No. S-001; Fig. 6a) was found on the surface. It measures 22.0 x 17.5 x 6.5 mm., and weighs 1.45 g. An obsidian point fragment (Cat. No. 2-003; Fig. 6b) is possibly an ear from a concave-base point or knife (e.g., Humboldt), and was found in the 10 to 20-cm. level of TU-2. It measures 20.8 x 20.5 x 8.1 mm., and weighs 2.4 g.

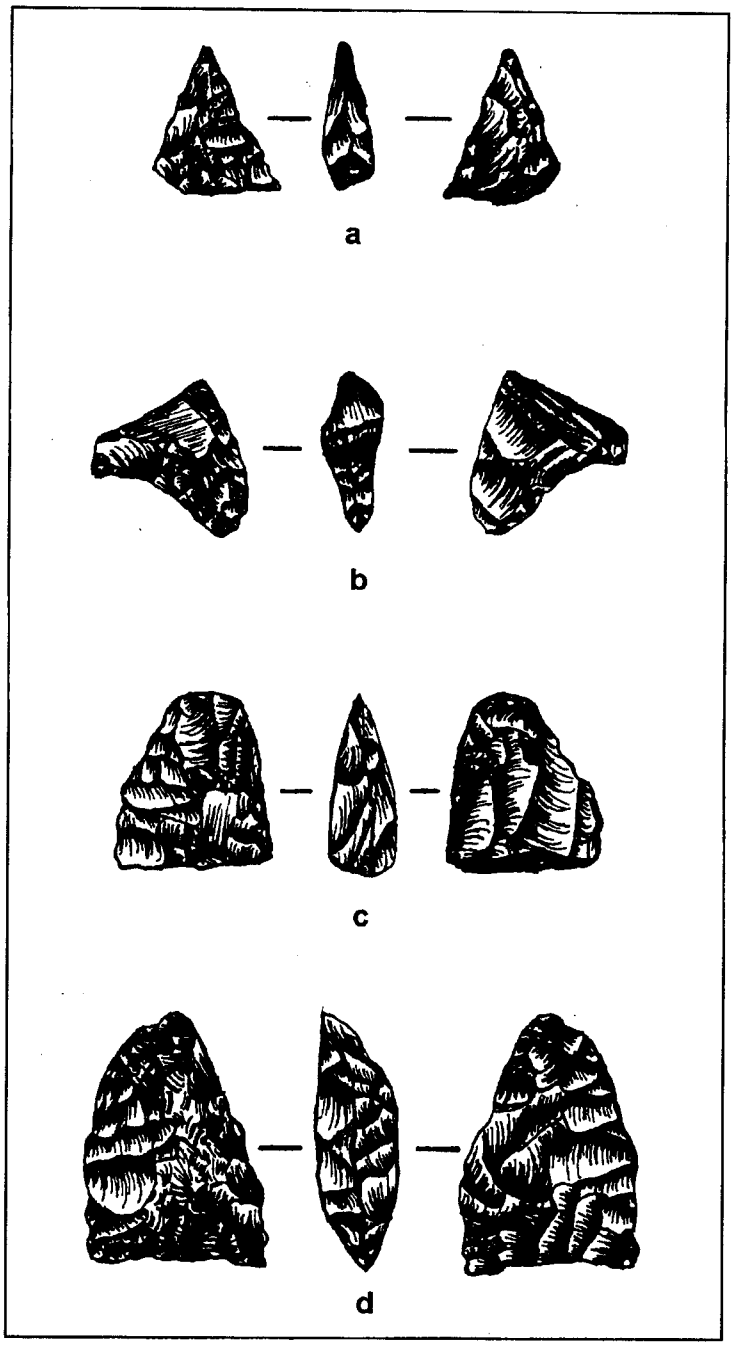

Fig. 6. Flaked stone artifacts from CA-KER-2616: (a) untyped chalcedony projectile point (Cat. No. S-001); (b) obsidian point or knife fragment (Cat. No. 2-003); (c) chalcedony biface fragment (Cat. No. 1-012); (d) obsidian biface fragment (Cat. No. 1-014). (For scale, the length of the biface in Figure 6d is 37.7 mm.)

Biface Fragments. Two biface fragments were recovered. One of these fragments (Cat. No. 1-012; Fig. 6c) is made of chalcedony and was found in the 30 to 40-cm. level of TU-1. It measures 24.9 x 21.9 x 9.4 mm., and weighs 5.7 g. An obsidian biface fragment (Cat. No. 1-014; Fig. 6d), was found in the 40 to 50-cm. level of TU-1. It measures 37.7 x 24.8 x 11.6 mm., and weighs 9.6 g.

Table 2
DEBITAGE FROM CA-KER-2616 (ALL UNITS)[a]

	Surface	0-10	10-20	20-30	30-40	40-50	50-60	60-70	Totals
Material									
chalcedony	--	5	14	12	22	--	5	3	61
chert	--	--	2	2	4	15	--	--	23
granitic	1	--	--	--	--	--	--	--	1
jasper	--	--	1	--	--	--	6	--	7
obsidian	--	2	3	7	3	4	1	--	20
quartzite	--	--	--	3	--	--	--	--	3
rhyolite	--	--	1	--	--	--	--	--	1
sandstone	--	1	--	--	--	--	--	--	1
Totals	1	8	21	24	29	19	12	3	117

[a] Levels in cm.

Debitage. A total of 117 pieces of flaked stone debitage was recovered from the site (Table 2). This represents 92.1% (by count) of all the artifactual material found at CA-KER-2616. Most of the debitage (n = 62; 53.0%) is chalcedony. Chert was the second most common stone in this category (n = 23; 19.7%), while obsidian (n = 20; 17.1%) ranked third. The remaining 10.2% was comprised of jasper, quartzite, rhyolite, and sandstone. Debitage distributions for each unit are presented in Tables 3, 4, and 5.

Faunal Remains

Three small, unburned bone fragments were recovered from the site. One bone fragment from the 40 to 50-cm. level of TU-1 appears to be from a large mammal but is otherwise nondiagnostic. The other two fragments from the 10 to 20-cm. level of TU-2 were too small to identify.

Immunological Studies

Four specimens of flaked and ground stone were submitted to the Department of Archaeology at the University of Calgary for immunological studies. The purpose of such studies is to attempt, through the analysis of immunological protein residues, to determine the identity of any organisms that may have been processed by a particular tool. One of the biface fragments (Cat. No. 1-014) had positive reactions for cat, rat, and mouse.

Obsidian Studies

Four obsidian debitage specimens (Cat. Nos. 1-006, 1-013, 2-004, and 2-006) were sent for sourcing analysis. All four were chemically characterized to the Coso Volcanic Field (Jackson 1991).

DATING OF THE SITE

There were no chronological data or diagnostic artifacts available from CA-KER-2616 in order to establish its age. As a result, the date of this site remains uncertain.

Table 3
DEBITAGE DISTRIBUTION[a] BY LEVEL IN TU-1, CA-KER-2616

Level (in cm.)	Chalcedony	Obsidian	Chert	Jasper	Totals
0-10	--	--	--	--	--
10-20	7 (1.8)	2 (0.01)	1 (0.02)	1 (0.8)	11 (2.63)
20-30	7 (5.3)	5 (1.6)	2 (1.55)	--	14 (8.45)
30-40	22 (41.35)	2 (0.5)	4 (5.8)	--	28 (47.65)
40-50	--	4 (1.0)	15 (30.09)	--	19 (31.09)
50-60	6 (6.51)	--	--	1 (0.01)	7 (6.52)
60-70	3 (5.4)	--	--	--	3 (5.4)
Totals	45 (60.36)	13 (3.11)	22 (37.46)	2 (0.81)	82 (101.74)

[a] Quantity (weight in grams).

Table 4
DEBITAGE DISTRIBUTION[a] BY LEVEL IN TU-2, CA-KER-2616

Level (in cm.)	Chalcedony	Obsidian	Chert	Rhyolite	Sandstone	Quartz	Totals
0-10	2 (1.4)	--	--	--	1 (0.08)	--	3 (1.48)
10-20	4 (8.7)	1 (0.01)	1 (1.0)	1 (0.8)	--	--	7 (10.51)
20-30	--	1 (0.01)	--	--	--	2 (0.4)	3 (0.41)
Totals	6 (10.1)	2 (0.02)	1 (1.0)	1 (0.8)	1 (0.08)	2 (0.4)	13 (12.40)

[a] Quantity (weight in g.).

Table 5
DEBITAGE DISTRIBUTION[a] BY LEVEL IN TU-3, CA-KER-2616

Level (in cm.)	Chalcedony	Obsidian	Totals
0-10	3 (4.5)	2 (0.02)	5 (4.52)
10-20	3 (1.8)	--	3 (1.8)
20-30	5 (4.5)	1 (0.6)	6 (5.1)
30-40	--	1 (0.3)	1 (0.3)
Totals	11 (10.8)	4 (0.92)	15 (11.72)

[a] Quantity (weight in g.).

DISCUSSION AND CONCLUSION

While all four features contribute to the overall picture of CA-KER-2616, Features 3 and 4 (Fig. 4) provide particularly interesting insight into the belief system of the Kawaiisu. While separated by approximately 32 m., these two features appear to be related. Feature 3 is a rock outcrop containing 16 cupules, and Feature 4 is a rock outcrop that contains one cupule. Cupule sites have been recorded throughout California, oftentimes referred to in the literature as rock art. Their designation as rock art is usually because the recorders could find no form or function in their style. Minor (1975) called the cupule rock art style "Pit and Groove." Researchers dealing with cupule sites have used analyses of both the

cultural and natural setting, along with an assessment of the ethnographic literature on cupules, to understand their style and function.

By using the cultural setting of northern California, Hedges (1982) defined the function of cupules known as "Pomo Baby Rocks," or fertility places with related fertility rituals. Using ethnographic evidence and modern informants, Minor (1975) attempted to correlate cupules with fertility or puberty rites, but did little to tie the information to specific archaeological sites. Another explanation of cupules was provided by Weinberger (1980), who detailed ethnographic evidence of a "Ringing Rock." The pits or cupules in certain rocks were said to have been caused by passersby who had "rung" the rock. A nearly identical account is given for a rock in Orange County (Knight 1979).

Attempts have also been made to explain cupule sites in terms of their natural setting. Foster and Jenkins (1990) hypothesized that cupules were placed as trail markers for certain elements of the natural environment. Parkman (1976) noted that cupule sites in the Diablo Range may have been used to mark water sources or boundary markers, or that they may have been clan or personal symbols.

While any of the above may explain the cupules at CA-KER-2616, information provided by Andy Greene, a Kawaiisu consultant, indicates that these features may have served a different function at the site. During this study, Andy related a story from his youth that was told to him by his step-grandfather, who was a Shoshone shaman. From him, Andy learned that cupules were used to tell time during the day, and were also important for taking observations at the solstices. According to Andy, two or three of the cupules would be aligned on Polaris, the North Star. Others would be situated in order to catch the shadows cast by stones or sticks placed in certain cupules at particular times of the day or year. Andy described the stones as conical in shape. He thought there might be a few such stones stashed nearby, but a search of the site yielded no such stones. The sticks were described as having been cut to specific lengths and placed upright in the cupules with pitch to make them remain in place. Stones or sticks placed directly in specific cupules would thereby indicate time or date by casting their shadows into other cupules.

Andy did not know, could not remember, or could not explain in terms we could understand how to read the cupule clock, but recalled that his step-grandfather had been very good at it. He related an occasion from his youth when he had witnessed his step-grandfather determine the time of day from a cupule-adorned rock somewhere in the western Mojave Desert.

In accordance with Andy's prediction that two or three cupules should form a base line centered on celestial north (Polaris), a compass azimuth was taken along several pairs and trios of cupules on Feature 3; one such azimuth does indeed fall within one or two degrees of Polaris, but it could not be established that this alignment was intentional. Later that year, during additional fieldwork at CA-KER-2616, a single cupule (Feature 4) was discovered on a boulder that appeared to be in a north/south line with Feature 3. Further mapping with a transit showed that the cupule on Feature 4 is 30.5 m. distant and did line up with two cupules on Feature 3 within two degrees of Polaris (Fig. 3). It is the author's opinion that the Kawaiisu believed the cupule feature to function as a clock; whether hourly, yearly, or seasonally is unclear at this time. The important fact is that Andy believes that Features 3 and 4 constitute a clock of some kind.[2]

Overall, CA-KER-2616 appears to have been used for milling activities. The presence of milling features at the site indicates that it was likely used to process acorns and possibly other materials. The lack

of extensive habitation debris at CA-KER-2616, as well as four other sites within 240 m. of CA-KER-2616 (CA-KER-2614, -2615, -2618, and -2619), suggests a possible seasonal use for all five sites. However, while these other four sites resemble CA-KER-2616 on the surface, they lack the deep subsurface deposit and cupule features found at this location. The fairly deep cultural deposit (70 cm.) seems to indicate repeated use of the site over time. While an age for the site could not be determined with any certainty, if it is part of a settlement and subsistence system that encompasses all or most of the Hart Flat sites, it may date between the Sawtooth and Chimney phases established at CA-KER-1015 on the basis of diagnostic projectile points (see Fleagle, this volume).

NOTES

1. Although much of this article is taken almost directly from Scott (1992), that earlier publication focused almost exclusively on the "clock rock" at CA-KER-2616 (discussed above), while the foregoing is a complete description of the site.

2. It was hoped that further investigations with Andy Greene would lead to the discovery of two other "clock rocks," one in the Mojave Desert that his step-grandfather mentioned and one that Andy was aware of in Angeles National Forest. Andy also knew of a Kawaiisu fertility rock (featuring cupules) near Monolith that we had hoped to pursue. Unfortunately, as is often the case, too much time was allowed to go by, and Andy passed away in 1999 before any such investigations could be conducted.

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The Leone Home Site, CA-KER-1014H

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INTRODUCTION

The Leone Home site (CA-KER-1014H) is situated on the west side of Hart Creek about 1.75 km. south of Clear Creek Road. The site consists of a domestic household complex that includes foundations, outlying features, and domestic refuse related to an early twentieth century occupation. Superimposed on this assemblage are features associated with post-occupation cattle ranching.

Archaeological field data collected at the site were supplemented by an oral interview with the late Andy Greene, a Kawaiisu consultant who had personal experience with the site and was a long-time local resident. The following description of the Leone Home site is a combination of field observations of extant features and information provided by Greene.

HISTORICAL BACKGROUND

A wood-frame house was built at the location of CA-KER-1014H by a man named Ericson. Although it was not possible to determine a precise date of construction, location tradition states that the house was built around the turn of the twentieth century. No further information concerning Ericson's activities at the site was recovered during this investigation.

The house subsequently was occupied by the family of Florentino Leone. The Leone family held the longest occupancy at the site, and probably built and maintained the support facilities that were noted archaeologically and described by Greene (Fig. 1). Florentino was a Kawaiisu who worked as a cowboy for the Tehachapi Cattle Company. One of the largest western cattle companies, the ranch comprised over 100,000 acres, ranging north from Rancho El Tejon to Caliente and east to include Tollhouse and Sand canyons. Eventually, Crofton purchased the Tehachapi Cattle Company, and its lands were absorbed by the Keene Ranch (Miller 1989:10, 13-14). Figure 2 shows a group of Tehachapi Cattle Company cowboys ca. 1915 (Vaquero Heritage n.d.). One of the men in the photograph is Roque Leiva; the others have not been identified. Greene remembered Leone as an excellent rider. Florentino's wife, Mary, was a Paiute from Walker Basin near Lake Isabella. The couple had three children named George, Joe, and Julia.

Greene indicated that Mary Leone kept a metate for everyday use outside the back door of the house. He remembered that she also frequently used a bedrock mortar located south of the house in the vicinity of aboriginal site CA-KER-1011; however, his attempts to relocate it were unsuccessful. During the latter years of the Leone occupation, health problems prevented Mrs. Leone from walking to the mortar, so Mr. Leone drove her to the site in their Model T automobile.

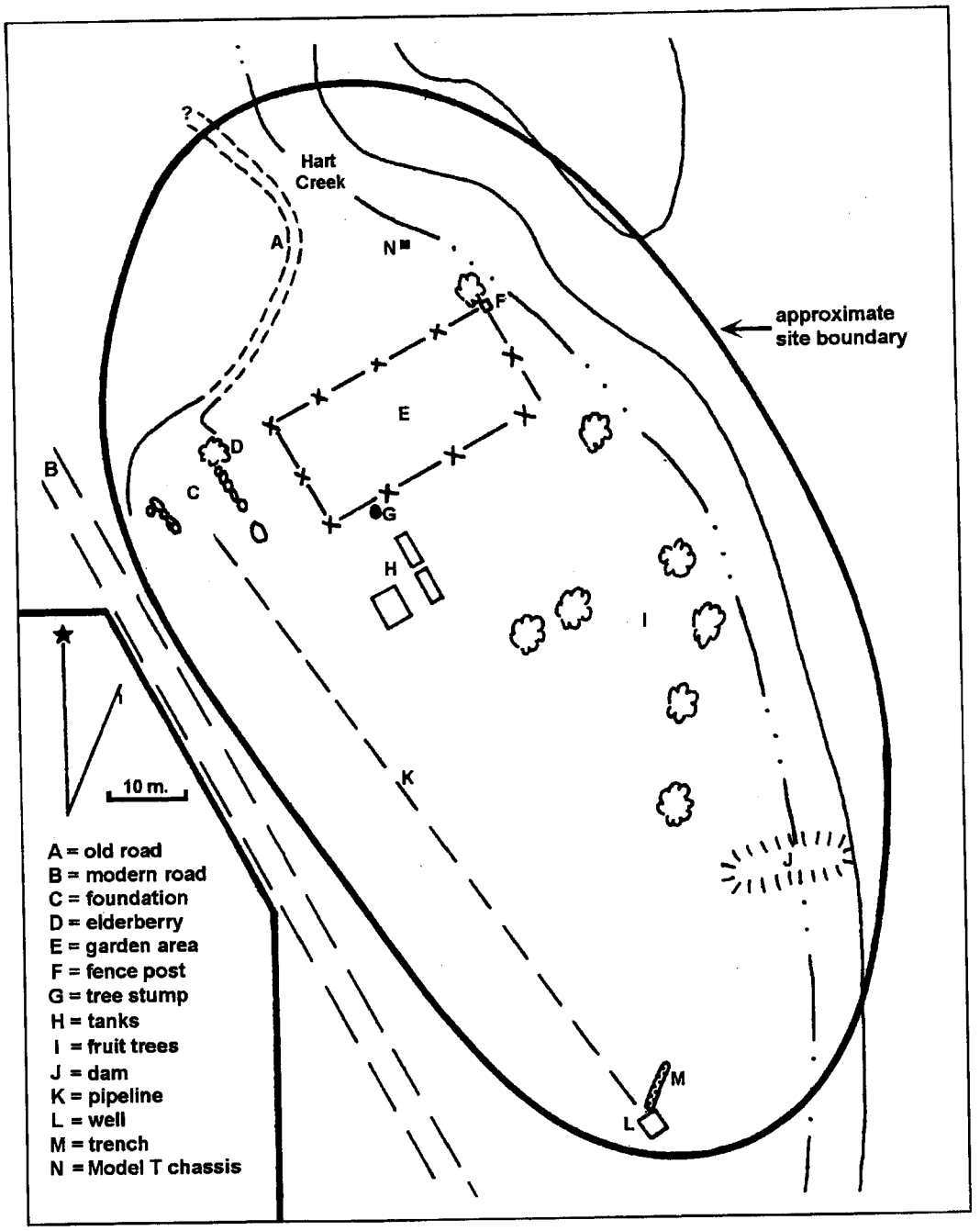

Fig. 1. Map of the Leone Home site (CA-KER-1014H).

The Leone family were absent from the site for a brief time during the 1930s to work in another area. During this period, the house was vacant for a time, and then in about 1938, Andy Greene and his wife came to the site with the intention of staying until the Leone family returned. The Greenes spent one night in the house, but were distressed to discover that packrats had taken up residence in the attic, and they decided not to live there. The Leone family eventually returned to the site and continued their residence. Research failed to disclose when the Leones left the site or where they went, but Greene indicated that they moved away in the company of a man named Raleigh Duntley.

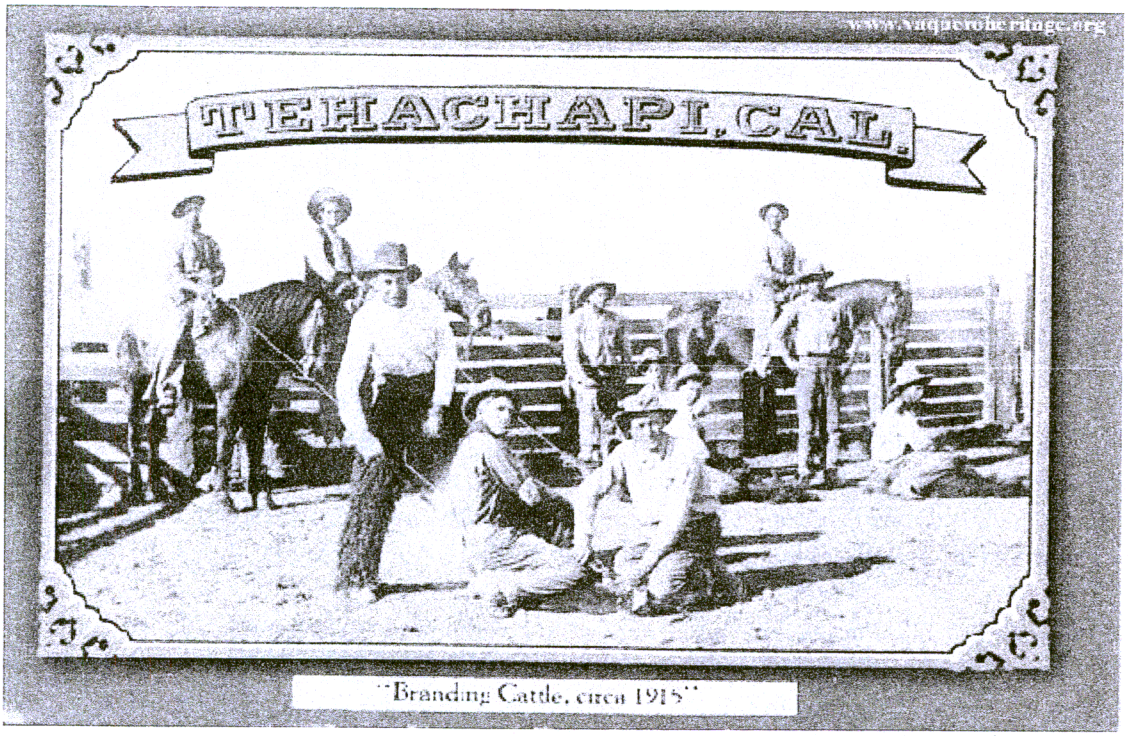

Fig. 2. Historical photograph of Tehachapi Cattle Company cowboys, ca. 1915. Photograph provided by Pamela Wildermuth from her collection, used by permission (Vaquero Heritage n.d.).

After the home site was abandoned, cattle watering features were added during the late historical period. Greene noted that these may have been constructed by Crofton at the time the frame house was demolished. Greene believed that Crofton or a man named Russell Hill may have razed the house, but noted that it may have been demolished even earlier. Hill, who lived in Keene, was a son of pioneering Kern County rancher, Ross Hill. Ross arrived in Kern County in 1882, and sons Russell and Roland eventually took over management of their father's ranch (Miller 1989:11-12). Russell was a breeder of champion Morgan horses during the 1930s (Algranti n.d.:43).

RESEARCH METHODS

Fieldwork at CA-KER-1014H was performed on August 20 and 21, 1990, by this author and a small crew of archaeology students from California State University, Bakersfield. Field tasks included identification of historical site features and assignment of archaeological feature designations, preparation of a sketch map and photographic record, inventory of the surface artifact assemblage, and collection of on-site oral interview data. No artifacts were collected. Detailed archival research was beyond the scope of this project; however, potential avenues for further research are provided below.

SITE DESCRIPTION

Feature numbers used in the following descriptions appear in Figure 1. The household complex was accessed from the north via a dirt road (Feature A) that roughly paralleled Hart Creek east of the site. The road ended at the flat on which the house stood. The wood-frame house faced the drainage

and hill to the east. There were brick steps at the front entrance. It was built on stone footings (Feature C) with no subsurface foundation, and was fitted with glass windows.

An outhouse was originally located northeast of the house near the edge of the drainage. A Model T chassis (Feature N) was found in the area where the outhouse once stood. Between the house and the drainage was a fenced garden (Feature E), which according to Greene contained tomatoes, peppers, squash, and corn. One upright fencepost (Feature F) remains at the northern corner of the garden area. Several fruit trees were located south of the garden area, some of which remain extant today (Feature I). Greene remembered that apples and pears were grown at the site.

A well (Feature L) is located about 112 m. southeast of the house. Dry-laid stone masonry and wood framing were used to brace and stabilize the upper portions of the well. The top of the well is fitted with a concrete cover. Water was piped from the well to the house and to the garden. Greene remembered that Mr. Leone patched his pipeline when necessary; however, he believed that the pipeline running roughly parallel to the dirt access road was added at a later date by cattle ranchers.

The Leones' Model T chassis (Feature N) rests on the west side of the drainage. Greene remembered two modifications that Florentino Leone made to the car, both of which are visible on the extant parts. Brackets were added to strengthen the hood, and weak points on both front fenders were patched. Other site features are associated with later cattle ranching at the site. An earthen dam (Feature J) was constructed across the drainage south of the orchard. A trench (Feature M) was excavated adjacent to the well, leading a short distance to the northeast. Three concrete tanks (Feature H) were built just south of the garden area. As noted above, the pipeline (Feature K) may have been added during this period.

At this time of this study, the scatter of artifacts at the site was sparse, and largely dated from the ranching period of activity at the site. Included were a barbed wire spool band, lengths of pipe, and a saw blade. Window glass sherds were noted near the house foundation. Olive green and amber bottle glass sherds were present. One amber bottle base exhibited an Owens Automatic Bottle Machine scar. This bottle manufacturing technology was patented in 1903, with major production beginning in 1905, and continuing until 1982 (Miller and McNichol 2002:2, 4). The base is embossed "MG" (conjoined), a mark used circa 1958 by the Maywood Glass Company of Compton, California (Toulouse 1971:357). Contents of the bottle were not identified.

AVENUES FOR FURTHER RESEARCH

Archival research was not part of this investigation; however, several historical data sets exist that might provide additional data relevant to CA-KER-1014H. Many of these pertain to land ownership and land use. Whether Ericson or the Leone family homesteaded this land remains unclear. Homestead patent records on file at the Bureau of Land Management might contain information in this regard. A search of records at the Kern County Recorder's Office and Kern County Assessor's Office might provide details regarding land ownership and physical improvements, such as dates of transfers and development. Research into census data could add personal information regarding site occupants, including full names, places of birth, and occupations.

Historical maps and aerial photographs may hold additional data regarding site layout and construction dates. Records of the Tehachapi Cattle Company/Keene Ranch might contain employee information, historical photographs, historical maps, information regarding cattle watering improvements and demolition of the frame house.

DISCUSSION

Failure to identify a concentrated refuse disposal area is not surprising; discarded items commonly were tossed into nearby drainages when such features were present. The most logical area for disposal of site refuse would have been over the bank of the drainage on the east edge of the site. A close inspection of the drainage floor and cut bank revealed a few isolated glass and ceramic sherds, but no concentration of artifacts. Drainage flow following heavy rains would have washed away most traces of refuse dumping in this area.

The Leone home site is representative of rural domestic household sites of the early twentieth century. The features (house foundation, access road, garden, orchard, well) are common in single-component archaeological sites of the period. Mr. Leone's work was conducted away from home, and consequently, no indicators of his duties for the Tehachapi Cattle Company were present at the site. Activities represented by the features and artifact assemblage at the Leone home site are typical domestic subsistence activities, such as shelter, cultivation, and food preparation. Despite evidence that the foundation was trampled by cattle, and the later ranching features added to the site complex, the Leone home site maintains a reasonable degree of integrity. Site features are preserved to a degree sufficient that use areas are readily identifiable. No subsurface investigation was conducted to pinpoint the location of the outhouse reportedly located in the vicinity of Feature N. Although investigation of the outhouse would undoubtedly have yielded additional information concerning the material culture of the Leone family, no structural remains or depressions were evident. A search for this feature was not warranted; effort was instead expended on valuable first-hand data collection in the form of the oral interview.

Much is known concerning rural domestic life of the early twentieth century. However, few, if any, archaeological investigations have been directed at the domestic life of sedentary twentieth century cowboys. This study of the Leone home site has provided such an opportunity. Information has been revealed concerning the physical arrangement of one family's domestic life, along with some previously unrecorded historical details. The archaeological investigation has effectively exhausted the research potential of the physical remains of CA-KER-1014H.

ACKNOWLEDGEMENTS

Kawaiisu elder and long-time local resident Andy Greene (now deceased) enthusiastically shared his memories of the Leone home site during the course of this project. The information he provided was invaluable in the identification of site elements and interpretation of activities performed there. Tehachapi artist Pamela Wildermuth graciously allowed the use of the historical photograph shown in Figure 2. The original postcard is in her family photo album. Ms. Wildermuth is a fourth-generation Californian, and the great-granddaughter of renowned vaquero Don Antonio Leiva.

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Cumulative Bibliography for the Yokuts and Related Miscellaneous Topics

Revised and expanded by

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INTRODUCTION

A cumulative bibliography for the Yokuts has been included in almost every issue of the *Kern County Archaeological Society Journal* (KCASJ). Over the years, it has been compiled, revised, and expanded by Mary Gorden, Richard H. Osborne, Nelson Siefkin, and Jill K. Gardner. The following references for Yokuts and related topics is a compilation of all prior bibliographies originally published in Volumes 3 (1992), 4 (1993), 5 (1994), 6 (1995), 7 (1996), and 8 (1997) of the KCASJ, as well as others that have recently been published or acquired. There is an extensive number of cultural resource management reports–too numerous to include in this bibliography (although a few are listed below)–that are available from a number of sources that also relate in some way to the Yokuts. The most comprehensive local source is the Southern San Joaquin Valley Historical Resources Information Center (HRIC), located at California State University, Bakersfield. Interested readers may contact the HRIC if they wish to follow up on these references. Readers with additional references are encouraged to contact the Kern County Archaeological Society (address on back cover) in order to facilitate the continued updating of the Yokuts bibliography.

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