SITES AND SITE CLUSTERS: MIDDLE PERIOD ARCHAEOLOGY OF THE SAN FRANCISQUITO DRAINAGE

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ABSTRACT

This paper focuses on Middle Period occupation sites of the San Francisquito watershed, on the San Francisco Peninsula in central California. The distribution of sites with Middle Period components is examined, and the Stanford West site (CA-SCL-464) is used as a case study to illustrate the structure and contents typical of Middle Period sites in this region. The cultural and natural processes contributing to site structure are discussed, and the paper ends with several recommendations for future research that may enhance our understanding of Middle Period adaptations.

INTRODUCTION

This paper focuses on Middle Period sites of the San Francisquito watershed, which encompasses 100 km^2 of area in San Mateo and Santa Clara counties. Between the bayshore and the summit of the Santa Cruz mountains, the watershed includes environmental strata typical of coastal mediterranean California: grasslands, oak woodland, chaparral mosaic in the foothills, and on the steep upper slopes, a mixed-evergreen forest. 58 prehistoric sites -- villages, petroglyphs, bedrock mortars, quarries and flake scatters -- have been discovered here thus far. Well-known sites include University Village, Hiller, Stanford West, and Jasper Ridge.

Fifteen San Francisquito sites have been dated, using radiocarbon or diagnostic artifact types. Eleven of these fifteen sites may be assigned to the Middle Period. First, this paper will examine the distribution of Middle Period sites within the watershed. Second, the Stanford West site, with a long Middle Period sequence, is used to illustrate the structure and contents typical of this period in the mid-Peninsula area. Third, I discuss the natural and cultural processes that contribute to Middle Period site structure, and offer suggestions for identifying such processes in the archaeological record.

MIDDLE PERIOD SITE DISTRIBUTION

Of the 58 San Francisquito sites shown in Figure 1, eleven sites -- highlighted on the map -- have dates between 750 BC and AD 500. In contrast, only four sites can be assigned to the Early Period, and five to the Transitional and Late Periods.

Site #	Date	Lab #	Site Name	Bayshore	Woodland	Foothills
Late Period Phase I,II						
SCL-464	AD 1510	WSU3434	Stanford West		W	
SMA-204	AD 1335	WSU2993	Jasper Ridge			F
SMA-160	AD 1290	RL-1046	Hiller	B		
SCL-583	AD 1185	[USGS]	Greer Road	B		
SMA-160	AD 1150	UCR-785	Hiller	B		
SMA-204	AD 940	BETA3786	Jasper Ridge			F
SCL-464	AD 920	BETA6694	Stanford West		W	
Late/Middle Transitional						
SMA-204	AD 890	BETA3787	Jasper Ridge			F
SMA-160	AD 840	RL-1044	Hiller	B		
SMA-160	AD 800	UCR-785	Hiller	B		
SCL-464	AD 795	WSU2994	Stanford West		W	
SCL-623	AD 770	WSU3654	Children's Hosp		W	
SMA-160	AD 760	RL-1047	Hiller	B		
Middle Period						
SCL-561	AD 300/500?		Radar 515A*			F
SCL-3	AD 300/500?		Matadero*		W	
SCL-586	AD 300/500?		Golf Course*		W	
SMA-160	AD 290	RL-1043	Hiller	B		
SCL-586	AD 60	WSU3652	Golf Course		W	
SCL-464	AD 20	WSU2995	Stanford West		W	
SCL-613	35 BC	[USGS]	St. Man II hearth		W	
SMA-263	320 BC	I-7589	Oak Knoll		W	
SMA-248	370 BC	BET12928	Tarlton	B		
SCL-623	400 BC	WSU3653	Children's Hosp		W	
SCL-464	540 BC	WSU3436	Stanford West		W	
SCL-609	600 BC	WSU3599	Ronald McDonald		W	
SCL-354	730 BC	UCR419A	Adobe Creek			F**
SMA-77	750 BC		Univ. Village	B		
Early Period						
SMA-77	1000 BC	L-187A	Univ. Village	B		
SMA-77	1100 BC	I-7591	Univ. Village	B		
SMA-77	1200 BC	Columbia	Univ. Village	B		
SCL-464	1240 BC	WSU3435	Stanford West		W	
SCL-354	1310 BC	UCR419B	Adobe Creek			F**
SMA-77	1315 BC	I-7592	Univ. Village	B		
SMA-77	1450 BC	L-187B	Univ. Village	B		
SCL-613	2400 BC	UCLA1425B	St. Man II		W	
SCL-613	2450 BC	UCLA1425A	St. Man II		W	
SMA-269	3180 BC	UCLA1861	St. Man I		W	

* Date based on presence of Olivella beads, Types 3b or 3c.
** Not in San Francisquito watershed; in next drainage to the southeast

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Figure 1. San Francisquito watershed radiocarbon dates.

These dates are listed in Figure 2. Sites with long occupation histories, such as Stanford West and Hiller (see Cartier and Carrico 1987), contribute to the count for more than one period, but omitting Stanford West and Hiller from Figure 2 would not change the overall picture: that there are significantly more Middle Period than Early or Late occupation sites along San Francisquito Creek. It is clear that the San Francisco Peninsula, like the south and east Bay Areas, supported a dense population during Middle Period times (see Anastasio and Cartier, San Filippo and Cartier, Hall, and others in this volume).

Sites with Middle Period dates are primarily located in the oak woodland zone, between 20 and 40 meters of elevation, and along the bayshore. Only one is located in the foothills, but few foothill sites have been excavated. Some researchers have suggested that foothill regions were only inhabited after growing populations were forced to expand beyond the flatland regions surrounding the bay (see Moratto 1984:283). The presence of late Middle bead types (Olivella 3B, 3C) at foothill site SCL-561, plus the Adobe Creek radiocarbon dates from the next stream drainage south (see Figure 2), suggest that the San Francisquito foothills were inhabited during the Middle Period. In addition to SMA-204 (Jasper Ridge) and SCL-561, there are eight known village sites in the San Francisquito foothills. I expect that continued research will uncover traces of Middle Period foothill occupation.

From the number and distribution of Middle sites, it is reasonable to assume that the San Francisquito area supported more than one village community during most of this period. For sites whose boundaries can be determined accurately, surface area ranges from 5,000 (SCL-561) to 12,000 m^2 (SCL-464); the total area estimated for Middle sites in Figure 2 is almost 89,000 m^2 (Bocek 1987). Additional radiocarbon dates will help us determine which Middle sites are likely to be contemporaneous. This information in turn will identify the total site area actually inhabited at any point in time.

While the dates in Figure 2 give a useful overview of San Francisquito occupation history, the reader should not take these dates as representative. As of this writing, only a fourth of San Francisquito Creek's known sites have been dated. As research proceeds and as other sites are discovered, the relative frequency of Middle Period sites may change, as may the distribution of Middle Period sites within the watershed. At present, we can only say that the number of Early and Middle Period sites argues for population expansion during the Middle Period, and that the location of Middle Period sites suggests increased use of the oak woodland zone as well as continued use of the bayshore.

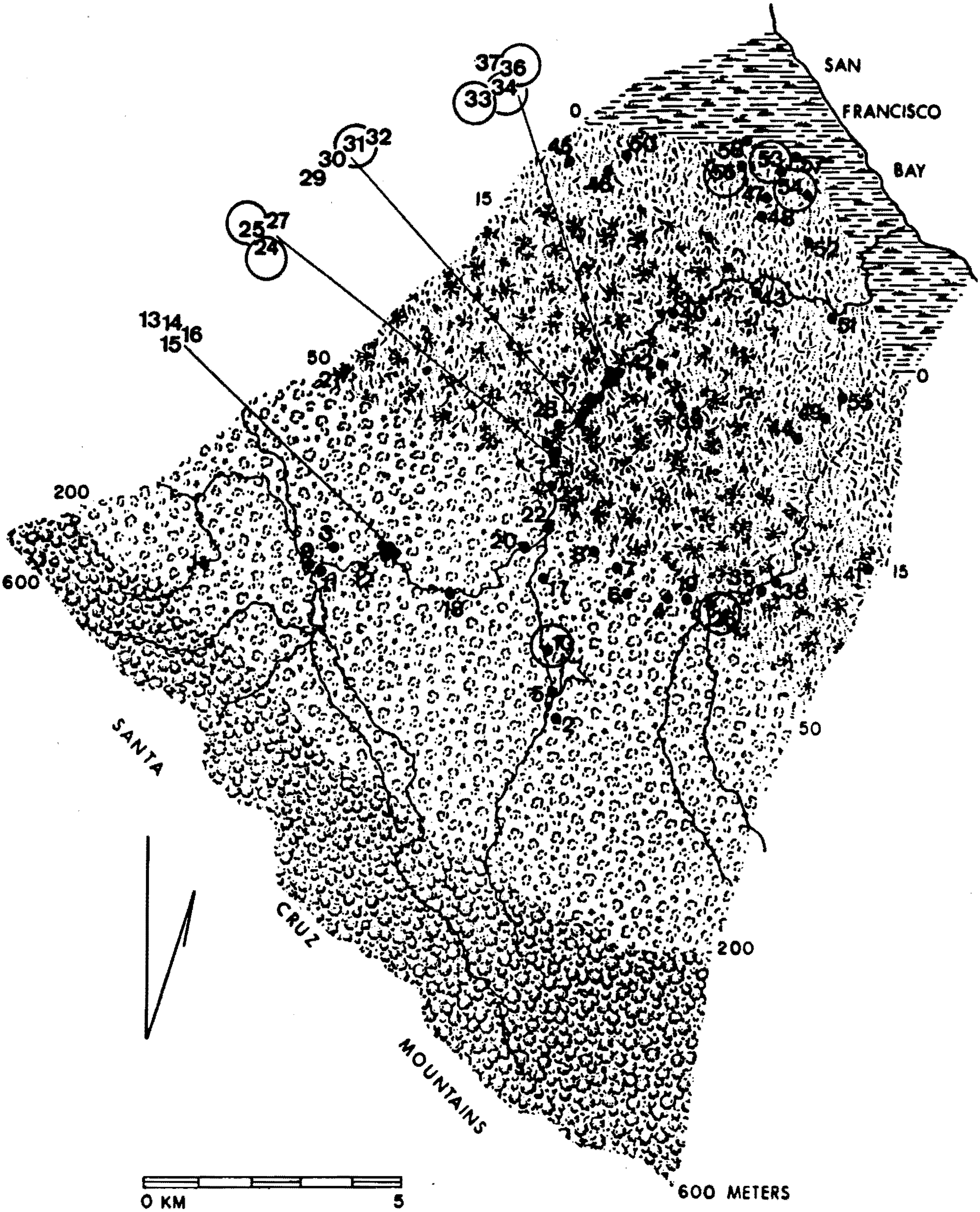

Figure 2. Site locations in the San Francisquito watershed, with Middle Period sites encircled.

A MIDDLE PERIOD CASE STUDY: STANFORD WEST

The ten Middle Period sites on San Francisquito Creek are surprisingly similar, considering their 1,250-year time span and the range of local environments. Most of these sites are easily recognizable as villages -- established locations where a multiple-family group either resided permanently, or returned for a significant period year after year. The Ronald McDonald site is an exception. It consists of one deeply buried rock layer with a 2500-year old hearth, and isolated shell and flake fragments. For the most part, Middle Period sites on San Francisquito Creek have nearly identical dietary remains, bone and stone tool types, and burial associations. San Francisquito Middle Period site contents are also similar to those reported from contemporaneous Bay Area sites.

In addition to similar contents, San Francisquito sites also share a distinctive structure, which is probably characteristic of other Bay Area deposits although few investigators have had the opportunity to study site structure systematically. Current work at Stanford West (SCL-464) provides a good illustration of this site structure, which I describe as "core-periphery" to convey a sense of interior as opposed to exterior village areas. A brief description of the work completed to date provides background for the following discussion.

The first work at Stanford West resulted from University plans to construct housing on a previously undeveloped 18-hectare parcel along San Francisquito Creek. Preliminary testing by Robert Cartier (see EIP 1981) identified one major deposit (SCL-464) and isolated finds farther upstream. In 1983, Stanford students conducted a systematic surface collection of the entire area and confirmed that the major deposit covered an area of 12,000 m^2. Soil augers and additional excavations, in 1985 and 1986, revealed several other sites on the 18-hectare parcel and 5 hectares were ultimately dedicated by the University as an archaeological preserve (Bocek and Rick 1986).

Meanwhile, research at SCL-464 started with the excavation of a random sample, using 1x2-meter units, in 1984 and 1985. We supplemented this with deep soil auger samples in peripheral areas of the site, and then, in 1986, we opened a 5x6-meter excavation in the site's "core" or central area. This project was continued in 1987 and will be expanded in 1988. As of this writing, we have reached a depth of 3.2 meters, with cultural materials still present.

Stanford West, as the most intensively studied San Francisquito site with a Middle Period component, provides considerable detail about lifeways during this period. Dietary remains indicate that immediately available, local resources were exploited most frequently. For example, elk predominate among large mammal remains, and elk, rather than deer, would have been the most abundant large mammal in the vicinity of the site. Deer predominate at foothill sites such as Jasper Ridge, where elk remains are extremely scarce (Bocek 1987). Turtle remains were common at Jasper Ridge, indicating that the creek at the 73-meter elevation was a permanent water source; turtle bone is very rare at Stanford West, where water was probably available only during winter and spring.

As at Jasper Ridge, the distribution of shellfish is highly localized within Stanford West, reaching very high densities only in the central part of the site. One important difference is in the proportion of crab claws, scarce at Jasper Ridge, but abundant at Stanford West, especially within deeply buried features where dozens of claws were recovered. Jasper Ridge is a Late Period Phase I site; differences in shellfish proportions probably reflect local environmental change due to creek down-cutting, channel-shifting, and alluvial deposition on the shore of the bay.

The large excavation surface suggests that at least some Middle Period village sites were intensively utilized and that relatively permanent structures were built. We excavated one house pit, nearly 2 meters in diameter, in the center of our 5x6-meter area, and we exposed part of a second, contemporaneous house in the northeast profile, 2 meters away. A round, straight-sided pit 70 cm in diameter and 20 cm deep was found outside the first house, about a meter to the east. Another round pit, a meter in diameter and more than a meter deep, was located inside the second house. The presence of black bear skeletal remains (skull, mandible, humerus, scapula, digits) in the fill of both houses suggests that their inhabitants were in some way related. The depth of the houses and pit features indicates that they were used during a lengthy continuous occupation, or else that facilities were re-used, or re-located at the same points year after year.

Future work will expand our 5x6-meter excavation towards the northeast and the northwest. We hope to see more of the site's core area -- which we think represents the village center -- including the remainder of the second house, now hidden behind the northeast profile.

Core areas, as identified at Stanford West and at other Middle Period San Francisquito sites, are centrally located within a site's deposits. Core areas have the greatest proportions of shell and bone artifacts; of certain kinds of stone tools; of shell, burned bone and fire-cracked rock. Core areas also contain numerous intact features, such as hearths, deep pits, and baked clay deposits, as well as human burials. Data available thus far suggest that core areas were reserved for dwellings, certain food-preparation and tool-making activities, and for burying the dead.

Peripheral areas are those surrounding a site's core area. These are distinguished by different soil color and texture, lower cultural material density, and different kinds of cultural materials. Data from Stanford West and other San Francisquito sites indicate that site peripheries contain one of the following assemblages: flakes and flake tools; flakes of large size; flakes and fire-cracked rock; fire-cracked rock and charcoal; large chunks of bone and rock. The areas containing these peripheral assemblages vary, and may extend from 25 to 100 meters beyond the core area boundary.

SITE CLUSTERS AND FORMATION PROCESSES

The core-periphery pattern is common in archaeological sites, and is not limited to the Bay Area or to the Middle Period. Most of us can easily imagine the processes that scatter materials outward from the central area of a village. A large body of literature, based on archaeological and ethnoarchaeological research, addresses hunter-gatherer occupation site structure and in particular the processes that displace cultural remains (for example, Binford 1978, 1980; Gould 1980; Meehan 1982; Yellen 1977). Some of these processes are foot traffic, housecleaning and waste disposal, and activity separation, with peripheral areas reserved for activities requiring privacy, involving safety hazards, or using large or permanent facilities. At sites like Stanford West, for example, the lithic debris found in peripheral assemblages might have been caused by off-site heat-treatment or primary reduction of stone tool material.

Natural processes such as creek flooding and rodent disturbance have also displaced cultural materials; effects vary according to artifact size and weight. Creek deposition can have three effects on archaeological sites. Erosion may carve away some deposits, or undercut the stream bank and cause it to cave in; flood waters may push surface remains farther downstream or away from the stream bank; alluvial deposition may bury a site's surface with a sterile layer of silt or clay (see Stein and Farrand 1985). Rodent activity displaces site contents more severely in a vertical than horizontal direction, but combined with creek flooding, rodents have disastrous effects on archaeological deposits (Bocek 1986). However, Middle Period sites vary in the size and the contents of peripheral areas. Neither foot traffic, house-cleaning, nor natural processes can be wholly responsible for core-periphery site structure; activity separation must be part of the cause.

In addition to having a core-periphery structure, many Middle Period sites are characterized by a clustered distribution. Sites are found in pairs or in groups of three or four, 50 or 100 meters apart, with patches or low-density continuous scatters of cultural material in the intervening areas. At least 80% of the San Francisquito occupation sites are found in clusters. If clusters are the archaeological correlate of a settlement adaptation common in Middle Period prehistory, the San Francisquito sites should not be unique. In fact they are typical; many Bay Area sites are found in clusters, although not formally described as such by most investigators (Anastasio and Cartier 1987; Bickel 1976; Cartier and Carrico 1987; see Moratto 1984:253-269).

Each cluster of occupation sites consists of multiple core-periphery deposits. As a result, identifying the processes that create site structure is only possible where an entire cluster is undisturbed and available for study. Isolated studies of single sites cannot explain the presence of multiple core areas within a site cluster, nor identify the processes displacing materials between core areas. It is possible, for example, that SCL-464's peripheral flake and fire-cracked rock deposits were created by people heat-treating chert on the far edge of the village. Alternatively, these flakes and rocks could be related to activities that took place when SCL-464 and the other Stanford West core areas were not inhabited. Such hypotheses can only be tested by investigating each core area within the Stanford West cluster.

Among possible explanations for site clusters are site re-occupation, village community subdivision, and post-depositional disturbance. First, adjacent sites within a cluster may not be contemporaneous. An obvious explanation is that certain locations were particularly favored for occupation, and dwellings were re-established in approximately, but not exactly the same place each time. Second, adjacent sites or components of sites within a cluster may be contemporaneous. If so, there are various ways in which central California village communities were subdivided: by sex and age, friendship, social status, and lineage or moiety membership. Third, one or two unrelated occupation sites could have suffered severe disturbance, making once-isolated deposits appear to be "clusters" of material.

Given the depth and extent of Stanford West, and of other Middle Period sites in the Bay Area, distributions created by all of the above processes may co-exist within a site cluster. It is unlikely that clusters are simply the result of serial occupation, of moiety residence, or of rodent disturbance. I suggest that systematic study of site clusters is necessary for understanding local adaptations during the Middle Period. To conclude this paper, I offer the following as possible research goals for archaeologists investigating site clusters:

First, good chronological control is necessary, including absolute and seasonal dates. This will allow us to determine whether clusters are real, and result from contemporaneous occupations, or whether clusters are coincidence, and result from repeated re-use of a favored area.

Second, to determine whether contemporaneous core areas represent occupation by subsets within a single community, we need to understand relationships between the inhabitants of each core area. Distinctive raw materials, ornament styles, and in particular, osteological data can be used to evaluate social relationships. Burial analysis can identify genetic relationships between individuals, and can establish whether these individuals reflect a normal population, or age- or sex-specific groups.

Third, in addition to testing areas of high artifact visibility or those with black midden soil, we need to expand our efforts to include the edges of apparent core deposits. The dispersed character of peripheral deposits requires a different type of sampling strategy -- broad enough to ensure that pockets of material are not overlooked, yet detailed enough to recover low density materials. This type of research requires hand excavation and screening, or significant soil contents will be overlooked.

Fourth, the natural processes contributing to site formation, such as rodent disturbance and creek deposition, are at least as important as traffic and activity separation in the creation of core-periphery site structure. Especially since many site clusters are located on creekbanks or former creekbanks, the interaction of creek flooding, erosion, and human behavior must be studied. To understand how creekside site clusters form, archaeologists need to pay more attention to soil profiles, and to collect soil samples for particle size and abrasion studies. Using these and other analyses, we will be able to determine how much of our archaeological deposits result from cultural or natural causes.

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