

PREHISTORIC LAND USE PATTERNS IN THE  
MORRO BAY WATERSHED,  
SAN LUIS OBISPO COUNTY, CALIFORNIA<sup>1</sup>

*Robert L. Hoover\**

Cultural, social, and ecological factors interact in ways that are extremely complex, even in the simplest of societies. In an archaeological study of settlement patterns, prehistoric sites should be viewed as survivals of portions of the original settlement pattern. The complete analytical reconstruction of this pattern will never be completely possible, as it is not possible to identify or classify all traces of past settlement, even if such component parts were entirely preserved. One must, therefore, use a synthetic approach, utilizing whatever information is available from pertinent archaeological and other sources to reconstruct a picture of these patterns of settlement. This is attempted in the following study.

*Procedures*

Intensive site surveys of the Chorro Valley, San Luis Obispo County, California, by Mr. Jay C. von Werlhof's Cuesta College archaeology classes in 1969 were designed to locate and identify as many sites as possible from visible surface features. One can assume that the majority, but not necessarily all, of the prehistoric sites in Chorro Valley have been recorded. Evidence of chert flaking, shells, ashy soil, and other unusual occurrences were frequent identifiers of sites.

Using Trigger's approach to the study of settlement patterns as a complex relationship between the natural

---

\*Dr. Hoover is Associate Professor of Anthropology at California Polytechnic State University, San Luis Obispo, California.

environment, the aboriginal technology, and the subsistence economy, three levels of analysis are utilized.<sup>2</sup> At the simplest level, individual structures are described as to size and form, method of construction, internal division, and activities occurring in or around the structure. The residential settlement layout as the primary locus of activity is analyzed at a secondary level. Some of the aspects of this level include the location of structures, the total number and density of inhabitants per dwelling, internal village organization and its spatial relationships, external demarcation of the settlement, and activities in and around the village. At the third level of analysis the distribution of settlements within the study area and the spatial relationships on a zonal scale are examined. The relationships among ecology, natural resources, and ease of communications to site locations were compared. The overall density and distribution of settlements, and the distribution of specialized loci--quarries, temporary camps, cemeteries, and food processing stations--are other factors which were analyzed. Other aspects of this level of analysis include population movement among loci on a seasonal or non-seasonal basis, the exchange of commodities between settlements by means of long or short term trade and between similar or complementary economies, the social and political relationships between settlements, and the differential exploitation of gross ecological zones.

#### *Individual Structures*

Numerous historic accounts of priests, soldiers, and travelers agree on the generally hemispheric shape of Chumash houses. These structures ranged in size from 15 to 60 feet in diameter, depending upon the size of the occupant family and on whether they were commoners, the family of a lineage headman, or the polygynous household of a chief. The best description of one of the larger houses comes from the original journals of Fr. Jan Crespi:

Some of these houses, round like half oranges, are extremely large; we entered for curiosity's sake within some of them and were struck with wonder at their size, for no doubt at all they must be able to lodge sixty people and more without hindrance.<sup>3</sup>

Each village had at least one sweathouse. One type was a large semi-subterranean structure which was entered through the roof. Another type was smaller and had a side entrance. Men normally slept together in the larger sweat-houses and used them as religious clubhouses.<sup>4</sup>

Information on construction methods can be derived partly from archaeological data and partly from historical accounts. The only structure excavated in the Morro Bay region was a dwelling with a floor diameter of about thirty feet.<sup>5</sup> The floor of transported earth was constructed in a shallow depression that had been prepared beforehand. It was roughly circular in shape and had acquired a saucer shape due to the compacting of the soil by heavy human traffic around the center of the dwelling. The outer raised edges of the floor reached a maximum thickness of two inches and had a characteristically rolled or rounded shape that sharply defined the floor from the exterior ground surface.

Such dwellings were made of poles, usually of peeled willow (*Salix spp.*), which were set into the ground around the edge of the circular floor to a depth of six inches.<sup>6</sup>

Tule was probably the favored material in the Chorro Valley, as it grows abundantly around the shores of Morro Bay and several nearby lakes. Student experiments in the reconstruction of such structures in 1971 and 1974 indicate that bundles of tules can be folded in half and rested over the horizontal pole, with both ends of the bundle being secured on the external side of the house by another layer of willow poles lashed to the frame. The thatching process would have to begin on the lowest course of horizontal poles and continue upward in overlapping layers. The resulting shingled effect sheds water very well.

The hearth, normally located in the center of the house, was the focus of household life. Smoke from this hearth escaped through an opening in the roof. The fire itself was utilized for heating the structure and for cooking. The interior of the houses, at least the larger examples, had internal compartmentation.<sup>7</sup>

*Location of Structures and  
Density of Inhabitants*

The Chumash residential settlement was the primary locus of activity in the prehistoric period. It is clear from excavations throughout the Chumash area that the various activities of the population were performed in discrete parts of the village set aside for specific purposes. There was little overlapping use of these areas. The residential area contained dwelling structures arranged relatively close to one another.

Brown utilizes baptismal records and statistical techniques to estimate an average of five to seven persons per each of the smaller houses. These would be the single-family dwellings of monogamous commoners, including husband, wife, children, and perhaps an older dependent relative. Heizer has shown that the canoe owners of the Santa Barbara Channel also occupied the larger houses containing several related monogamous families.<sup>8</sup> These men were heads of important lineages. Chiefs lived in even larger houses with even more relatives, multiple wives, and perhaps some retainers. This would tend to raise the average number of people per household and give a distorted view of intervillage population density. We might expect fewer chiefs and lineage heads as far north as the Morro Bay area, so that six or seven people to a dwelling structure would be an accurate estimate.

### *External Demarcation*

Resources collected from the land surrounding each village were communally owned. Thus, there was a zone around each village which was used by all village residents in common for hunting, fishing, and plant collecting activities. Mussel rocks, oak trees, and areas of *chia* sage were exploited in this way.

The boundaries of such villages were not clearly demarcated, as several neighboring villages might be subject to the authority of a single chief and share a common resource base. It was the chief's duty to provide for all his needy subjects out of the communal food stores, regardless of their village origin.

### *Activities Around Settlements*

Each village, including residential, mortuary, and manufacturing areas, may be seen as a nucleus of local activities. Around each of these centers was a roughly circular area which was intensively exploited by the villagers as a resource base and containing a number of special purpose sites--acorn grinding and leaching areas, hunting camps, quarries, and pictographs. The complex, perhaps a couple of miles in diameter, formed a complete settlement. The exact area, size, and shape of the complex was dependent on topography, the abundance of local resources, and the size of the human population it supported.

Women might travel out from the village during the day, collecting and processing acorns at sites like that on Pennington Creek. An area of exposed bedrock provided a place for bedrock mortars, while the nearby creek supplied water for the leaching process. Other plant resources--edible bulbs, islay, and chia--were available elsewhere. The optimal distance from the village which could be practically traveled each day for resource exploitation has been found to be about four miles.

Men probably traveled greater distances on hunting expeditions, establishing temporary camps, but would not be gone for more than two or three days at a time and would bring most of the wild game back to share with their families.

### *Site Distributions*

The distribution of prehistoric sites in the Morro Bay watershed (Figure 1) is certainly not random or evenly spaced. There are relationships to sources of fresh water, food resources, routes of travel, and even the presence or absence of certain kinds of dangerous animals. Settlement patterns in the study area can best be interpreted by examining the sub-areas individually. At first glance, it is clear that the coast and valleys were the selected areas for settlement, while mountain ridges were generally ignored as habitation sites.

The Chorro Valley contained a series of moderately small permanent villages, each two miles apart, along the banks of Chorro Creek. These villages were normally on the south bank of the creek and often near its confluence with subsidiary streams. Small special purpose satellite sites for gathering, quarrying, hunting, or ritual activities were clustered around the permanent villages. Such sites are also found along the northeastern shore of Morro Bay. SLO-569, near the confluence of Dairy and Chorro Creeks, was larger than average, perhaps representing a local political center or stopping point along a trade route connecting the Chorro Valley with the Salinan Indians northeast of the Santa Lucia Range. Dairy and Pennington Creeks were apparently routes used for this purpose, as they contain several temporary campsites. Perhaps, the Salinans were allowed to pass over the mountains to collect shellfish near Morro Bay, a practice found in other areas of California.

Los Osos Valley contained only a single known site in its upper portion. When the Spanish arrived in 1769, the

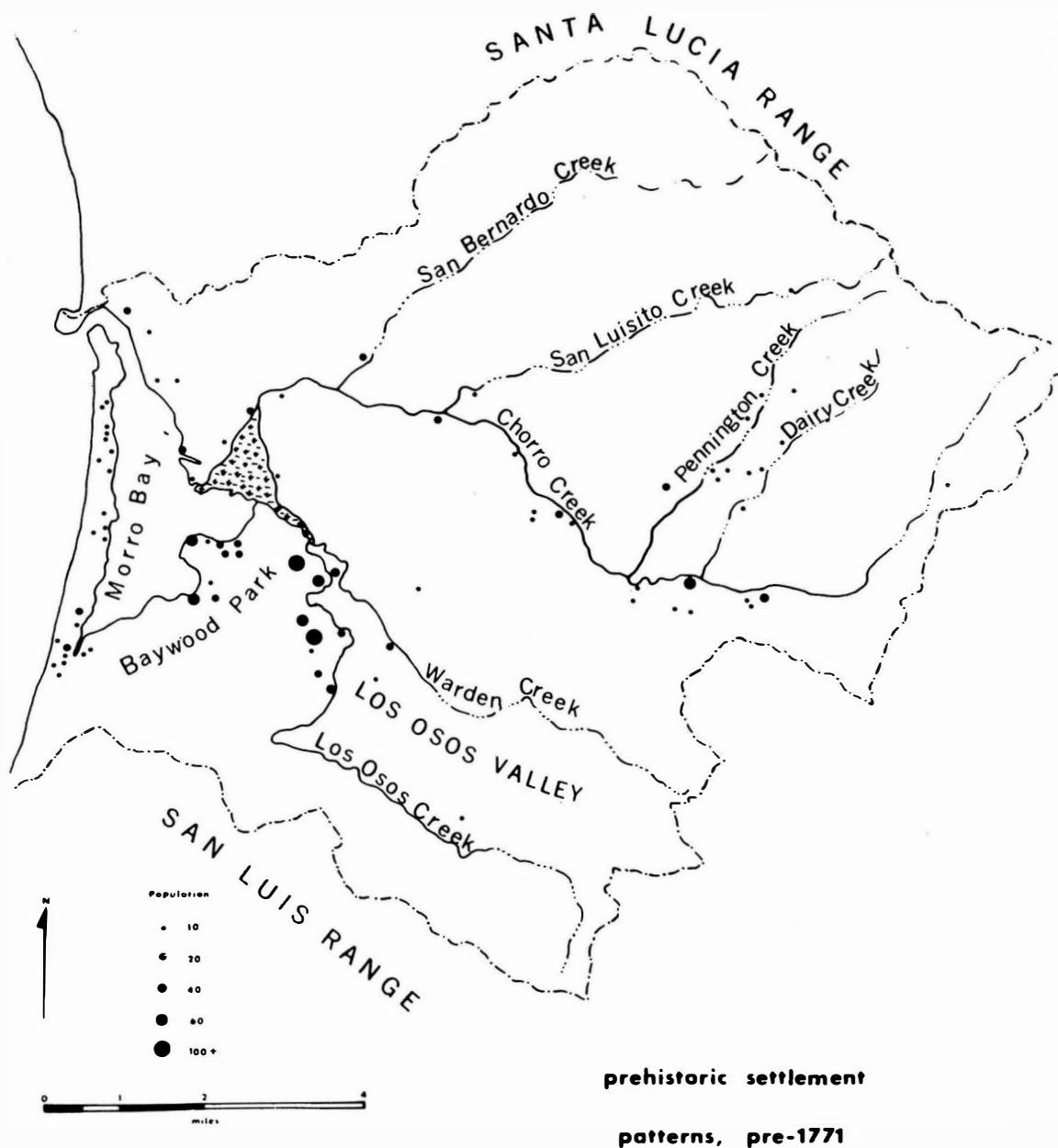


Figure 1. Study area and vicinity.

valley was the grassland habitat of numerous grizzly bears which the Indians feared and avoided. The presence of grizzlies in the area must have certainly made the area unsuitable for settlement. Not far away, the Los Osos-Baywood Park area contained the densest concentration of permanent prehistoric settlements in the entire study area. Most of these sites also were of large or medium size. Such sites were clustered around the lower portions of Los Osos Creek and the southeastern shore of Morro Bay. One of these, SLO-214, represents the largest archaeological site in San Luis Obispo County, though it is only of moderate depth. SLO-14, along the south shore of Morro Bay, is a smaller site but extends to a considerable depth and has a cemetery, indications of lengthy and intensive occupation. Many of these sites are concentrated around the present 40-foot contour level. This phenomenon can be explained if one assumes that Morro Bay was once much more extensive than today. It probably extended eastward as far as Warden Lake and included an area which is still flooded during local rainy years. The 40-foot contour may represent the old shoreline of the bay, which is still in the process of shrinking due to the deposition of silt from its tributary streams.

The sandspit of Morro Bay is the final sub-area examined. It contains numerous small shallow shell middens. These sites were all temporary camps without sources of fresh water or cemeteries. They were probably occupied only during certain seasons of the year, by Chumash from interior villages and perhaps by more distant groups of Indians for shellfish collecting purposes. Chert flakes used to pry open bivalve shells and thermal fractured rock which may have formed part of clam steaming ovens are additional features of these sites.

#### *Relationships to the Environment*

Fresh water and abundant plant resources were found in the lowland area. Anadromous fish filled the streams during the winter near the creekside villages. Smaller animals were

also available locally, but deer were probably hunted in the nearby mountains. Morro Bay was a rich source for rocky and sandy bottom shellfish, and the mountains of the San Luis range were sources of chert for flaked stone tools.

The Chumash combined hunting, fishing, and wild plant gathering techniques in their diverse and rich environment. The gathering of plants was a task primarily for women, while hunting and fishing was done mainly by men. Elaborate tools and processes were developed to obtain plant and animal foods and to make them edible or to preserve them.<sup>9</sup>

In spring, large pelagic fish entered the coastal waters of the Chumash. These were harpooned, hooked, or netted from remarkably constructed plank canoes outside the kelp beds. Seed and root plants began to appear. The agave, yucca, manzanita, goosefoot and chia sage were primary sources of plant food in the late spring.

Summer was the time of great abundance for the Chumash. Pelagic fish and plant resources reached their peak at that time. Sea mammals came ashore for breeding and could be harpooned on the beaches. Deer wandered down to lower altitudes in search of water and could be hunted more easily. Plants such as the tuna, chia, datil, goosefoot, islay, and other berries and seeds were available in great abundance in chaparral and grassland areas.

During the autumn, availability of food resources gradually tapered off. The large ocean fish and sea mammals migrated southward and plant resources died back. Stored seeds and dried fish were utilized as food. Pine nuts and acorns were harvested on the mountain slopes and were stored for the winter.

Winter was the leanest season for food resources. The population lived mainly on stored acorns and dried fish. Some river fishing provided a source of fresh protein.

There is a great deal of evidence that most California Indians practiced controlled burning to create more of the

desired vegetative communities.<sup>10</sup> Grassland and chaparral in the study area was probably burned in October to control the advance of brushy vegetation and to increase and concentrate the kinds of seed and bulb plants which served the Chumash economy.

#### *Distribution of Specialized Loci*

Special purpose sites tended to cluster around the village of those who utilized them in the Chorro Valley. Most of these sites were used for food processing activities, such as SL0-544. Cemeteries were not found at these locations but only at the permanent residential villages. The Morro Bay sandspit contains only special shell collecting sites without any residential villages nearby. Perhaps, the users of these sites lived in the large villages on the eastern shore of the bay.

Chert quarry sites, where the stone was broken off and roughly flaked, were found in the hills above the alluvial valleys. One of these exists on the south side of Bishop's Peak. Several Chumash sites in areas of less resource variability have been identified as specialty manufacturing centers for chert blades, shell beads and serpentine bowls, though these have not yet been noted in the Morro Bay watershed.

Promontories and peaks were traditionally used by the Chumash as religious shrines. SL0-212, a huge volcanic outcrop near the Tomasini Ranch in Chorro Valley, is a very noticeable example of such a site which contains numerous red pictographs that are now barely visible. The sites along Pennington and Dairy creeks may also represent specialized loci connected with trade and travel.

#### *Population Movement Among Loci*

Population movement among the prehistoric Chumash of the study area can best be distinguished as seasonal and non-seasonal. There was a great deal of short range seasonal

movement associated with various subsistence activities. There is evidence of population concentrations during the winter along the major streams, where large quantities of anadromous fish (steelhead, chinook and cojo salmon, etc.) were speared and trapped.<sup>11</sup> Pelagic fish were utilized primarily in the summer months. Both kinds of fish were dried for use in off-season periods. The Portola expedition of 1769 noted prosperous coastal villages along the Santa Barbara Channel during the warmer months while the pelagic fish and shellfish were being used. On his return trip during the following winter, many of the coastal villages were largely abandoned, as the bulk of the population had relocated along the Santa Ynez River to take advantage of anadromous fish resources.

Late summer was the optimal time for men to form deer hunting parties, as the animals were attracted to the lower elevations where water was available. This was also the time when goosefoot, chia, and other berries, seeds, and bulbs were available for collecting by the women in the valley and slopes around each village. In autumn, acorns were available on the lower slopes, while pinon pines produced nuts on the higher interior mountains. Such unequal distribution of food resources geographically and seasonally necessitated a great deal of movement on the part of the food collecting population. The residential village seems to have formed a permanent base for these kinds of activities, where elderly persons and small children remained throughout the year.

#### *Economic Exchange Between Settlements*

Trade develops because resources are unequally distributed, sometimes even within limited areas. This was certainly true of the diverse Chumash region. Chumash coastal communities were able to obtain surpluses of such items as fish bone, shell, and coral beads, baskets, dried fish, and sea otter pelts. These were exchanged with interior

communities for river fish, game, seeds and fruits, skin and fiber blankets, furs, and bows and arrows.

The Chumash cultural system was a self-maintaining unit, drawing its energy from the resources of the environment. By exchanging goods between different areas, the Chumash shared resources more effectively. Specialist occupations reduced the total energy required by the Chumash to obtain resources, reduced wastage of energy to competition, and increased the chances of Chumash survival against competing tribes.

#### NOTES

<sup>1</sup>I wish to express my thanks to Mr. J. von Werlhof, Dr. Charles E. Dills, Dr. Calvin E. Wilvert, and others who provided information on sources for the following data. I am also grateful to my wife, Christine, for her proofreading and encouragement.

<sup>2</sup>Trigger, Bruce G. "Settlement Archaeology: Its Goals and Promise," *American Antiquity*, No. 32 (1967), pp. 140-155.

<sup>3</sup>Brown, Alan K. "The Aboriginal Population of the Santa Barbara Channel," *University of California Archaeological Survey Report*, No. 69, Berkeley (1967).

<sup>4</sup>Priestly, Herbert I. (ed.) *A Historical, Political, and Natural Description of California by Pedro Fages*. Ballena Press, Ramona, California (1972).

<sup>5</sup>Clemmer, John S. *Archaeological Notes on a Chumash House Floor at Morro Bay*, Central California Archaeological Foundation, Sacramento (1962).

<sup>6</sup>Lathrop, Donald, and Robert L. Hoover. "Excavations at Shilimaqshtush: SBa-205," *San Luis Obispo County Archaeological Society Occasional Paper*, No. 10 (1975).

<sup>7</sup>Harrington, Mark Raymond. "Not All of Dome Shape," *The Masterkey*, Vol. 28, p. 232. Southwest Museum, Los Angeles, 1954.

<sup>8</sup>Heizer, Robert F. "The Plank Canoe of the Santa Barbara Region, California," *Etnologiska Studier*, Vol. 7, pp. 193-229. Goteborg (1938).

<sup>9</sup>Landberg, Lief C. W. *The Chumash Indians of Southern California*. Southwest Museum Papers, No. 19, Los Angeles (1965).

<sup>10</sup>Lewis, Henry T. "Patterns of Indian Burning in California: Ecology and Ethnohistory," *Ballena Press Anthropological Papers*, No. 1, pp. 3-101. Ramona, California (1973).

<sup>11</sup>Spanne, L. W. "An Explanatory Model for Seasonal Variability in the Population of Coastal Barbareno Chumash Villages," *Occasional Paper*, No. 9, San Luis Obispo County Archaeological Society (1975).

#### *Additional References*

Angel, Myron. *The History of San Luis Obispo County* (1883).

Avina, Rose Hollenbaugh. *Spanish and Mexican Land Grants in California*. Master's Thesis, University of California, Berkeley (1932).

Baldwin, Mary Alice. *Archaeological Evidence of Cultural Community from Chumash to Salinan Indians in California*. San Luis Obispo County Archaeological Society Occasional Paper No. 6 (1972).

Bancroft, Hubert Howe. *California Pastoralism, 1769-1848*. The History Company, San Francisco (1974).

Bean, Lowell J. Social Organization in Native California. In: *Antap: California Indian Political and Economic Organization*, Lowell J. Bean and Thomas F. King, eds. Ballena Press Anthropological Papers, No. 2, pp. 11-34. Ramona (1974).

Combs, Gary and Fred Plog. Chumash Baptism: An Ecological Perspective. In: *Antap: California Indian Political and Economic Organization*, Lowell J. Bean and Thomas F. King, eds. Ballena Press Anthropological Papers, No. 2, pp. 137-154. Ramona (1974).

Cooper, William S. Coastal Dunes of California. *Memoir* No. 104. Geological Society of America (1967).

Coulter, John Wesley. San Luis Obispo, California. *Economic Geography*, Vol. 7, no. 3, pp. 308-318 (1931).

Davis, James T. Trade Routes and Economic Exchange Among the Indians of California. *University of California Archaeological Survey Reports*, No. 54. Berkeley (1961).

Deetz, James F. Archaeological Investigations at La Purisima Mission. *Archaeological Survey Annual Report*, No. 5, pp. 163-243. University of California, Los Angeles (1963).

Englehardt, Zephyrin. *Mission San Luis Obispo in the Valley of the Bears*. W. T. Genns, Santa Barbara (1963).