LATE PREHISTORIC USE OF THE RECESSIONAL SHORELINES OF LAKE CAHUILLA

Andrew York
KEA Environmental, Inc.
1420 Kettner Boulevard, Suite 620
San Diego, California 92101

ABSTRACT

Recent archeological survey of a roughly 10-square-mile area near the southwestern edge of the Salton Sea revealed an unexpectedly high density of late prehistoric habitation areas marked by rock rings, hearths, artifact scatters, and occasionally substantial deposits of faunal remains. Several lines of evidence from these and other sites within the project area suggest a pattern of short-term visits to the receding shorelines of Lake Cahuilla from the surrounding uplands, probably for the main purpose of procuring fish. Data relating to the structure, formation, and distribution of these sites are considered in light of current models for the late prehistoric settlement of the Salton Basin and Peninsular Ranges, and some possible avenues for future research are explored.

INTRODUCTION

To archaeologists who consider environmental variation to be an important factor in cultural change, the Salton Trough is a very interesting place. Climatically one of the most arid regions of North America, this region was subject throughout the Holocene to massive environmental fluctuations with the repeated infillings and recessions of Lake Cahuilla. That the cycles of this 5,700-square-km freshwater lake were extremely important events to hunter-gatherers throughout southern California is beyond question; but the fundamental effect on prehistoric settlement systems has been debated. Some researchers believe that the lake attracted large populations that established stable settlements along the lakeshore (Aschmann 1958; Wilke 1978), while others see little evidence that the lake's cycles significantly altered existing settlement and mobility strategies (Schaefer 1986, 1994). It is important to resolve these issues since patterns of prehistoric population movement throughout southern California have been attributed to the cycles of Lake Cahuilla. In a larger sense, this question also addresses the ongoing debate about the influence of the environment in general on the nature of cultural systems.

In considering the prehistoric settlement of Lake Cahuilla, low-elevation areas well below sea level are of some importance because they chronicle the immediate human response to the drying of the lake. With this in mind, we posed several questions in approaching our survey and testing on the Salton Sea Test Base (SSTB): How intensive was the use of these areas, and how stable were the occupations? What were the major activities in this area? What resources were being exploited, and to what extent was the lake contributing to the resource base? And, finally, was there any change in site use as the lake receded to lower and lower elevations?

THE HYDROLOGY OF LAKE CAHUILLA

Before exploring some of these questions, a few aspects of the regional hydrology that are relevant to prehistoric use of the area should be considered. Prior to modern flood control measures, Lake Cahuilla would form when the Colorado River diverted its flow into the Salton Trough from its normal course into the Gulf of California. This occurred when channels along the north side of the river's delta occasionally cut through their natural levees and flowed down the steeper gradient to the north, causing rapid head-cutting and enlargement of the channel, and

eventually capturing the entire flow of the river. Once initiated, there was little to stop this flow until the entire basin filled to a depth of 40 feet above sea level. At this point the lake stabilized by flowing back into the Gulf through an outlet channel at Cerro Prieto. Eventually the channels at the delta would meander back to the south and the lake would begin to evaporate. In such an arid environment, this evaporation was very rapid, and the lake apparently receded at a rate of about 5 to 6 vertical feet per year.

This process of evaporation has a number of implications for human use of areas below the maximum shoreline of the lake. First, it means that when the sites in the project area were occupied, the shoreline was probably moving very rapidly, at a rate of up to perhaps 200 meters laterally per year during recessions, and perhaps three times as fast during infillings. Clearly, this would not favor long-term occupation or even seasonal reuse of individual sites; instead, the tendency would probably be to disperse settlement as camps followed the receding shorelines. Second, shoreline plant communities were probably immature and may have been of limited use to humans; certainly, major plant resources such as mesquite did not reappear until years after the lake receded. A third factor which may have limited the use of the low-elevation shorelines is the lake's increasing salinity. It has long been recognized that the lake became more saline as it receded, and it is thought that native fish populations would not survive after the lake receded to certain elevations. It is likely that the continuing evaporation of the lake, together with the dissolution of salts already on the playa from previous lakes rendered the water too salty to drink when most of these sites were occupied. This would have required people using the lake to rely on alternative sources.

THE SSTB DATA

These potential limitations to settlement along the lower shorelines of the lake led us to expect relatively limited evidence for prehistoric habitation in the project area. However, that turned out not to be the case. The survey revealed 166 prehistoric sites in the project area, in densities of up to 30 per square mile. Of these, nearly half contain hearths, rock enclosures, and artifact assemblages suggesting that they were habitation sites. It is these sites that provide us with the best clues for assessing prehistoric land use along the lake's submaximum shorelines.

Sites identified as habitation areas are found at virtually all elevations of the base, ranging between 20 and 220 feet below sea level. The most prominent features of the habitation sites are the rock enclosures; we found nearly 200 of these features on the base, occurring either singly or in clusters of up to a dozen or so. By far the highest concentrations of habitation areas with enclosures are found on the north-central portion of the facility, between about -90 and -170 feet elevation, and appear to be associated with a low, narrow ridgeline that trends north through the central portion of the facility. Well over half of the rock enclosures recorded on the base are found along this ridgeline, with another, less well defined cluster on a lower ridge to the west. Along the main ridge, the rock enclosures, which are the best indicators of individual camps, occur in clusters spaced at fairly regular intervals. These intervals are generally consistent with the estimated yearly drops in the lake's shoreline during recessional episodes, and one might suspect that they represent successive seasons of occupation during recessions.

Overall, the importance of these ridgelines as habitation areas may be related to the probable configuration of the lake's shoreline here: between -90 and -170 feet, these ridges would have enclosed a small embayment that may have provided a productive resource area. Subsurface testing at these sites indicated pretty strongly that the resource that drew people to this location was fish. Eighteen of 20 enclosures tested with 1 x 1 m units yielded fish bone, sometimes in very substantial amounts. Well over 4,000 identifiable elements of fish bone were recovered, along with a roughly comparable amount of unidentifiable fish bone. In all, the fish bone accounts for about 95% by weight of the entire faunal assemblage. Nearly all of the fish bone was from bonytail and razorback sucker, which tend to co-occur in most sites. Although the relative frequencies of razorback and bonytail vary considerably from site to site, there are no clear trends with respect to elevation, except that the recovery of fish bone drops

dramatically below about -170 feet. This is about the elevation at which this embayment would have disappeared.

The use of subsistence resources aside from fish appears to have been minimal; evidence for the use of terrestrial mammals is nearly absent, and even the waterfowl so well represented at sites along the maximum shoreline appear not to have been taken in any quantity. Groundstone, to the extent that it represents vegetal food processing, is distinctly uncommon, suggesting that the processing of plant foods was not a major activity in the project area.

Overall, the results of our investigations at the SSTB are consistent with limited, focused occupations directed primarily at fishing. The densest cultural deposits in the sites typically occurred within single, rather thin lenses within the rock enclosures, suggesting single episodes of use for each of these features. Even at sites with substantial habitation features, artifact scatters are very sparse and suggest limited activities. Lithic debitage, the most common artifact at the sites, is dominated by raw materials that are available on the base, and predictably is characterized by high frequencies of cortical and early-stage reduction flakes. The rock enclosures contain higher frequencies of later stage flakes than were observed on non-habitation sites, suggesting that these materials were transported to the habitation areas for further reduction. Even so, observed debitage frequencies rarely exceed 50 items per site and surface densities are very low at nearly all of the sites. Lithic tools at all sites almost uniformly indicate expedient manufacture and use, again reflecting the availability of raw materials in the immediate vicinity. Even with the presumably frequent discard of these tools, however, few were observed within the study area, suggesting that their use was relatively limited.

The evidence for short-term, focused use of the SSTB during the late prehistoric leads to the question of this area's place in the larger settlement system. Analysis of the ceramic assemblage from the base suggests that the assemblage includes both buffwares made from lacustrine clays and brownware made from residual clays originating in the Peninsular Range to the west. The brownwares appear to be the most abundant, and provide a solid link to upland areas in the Peninsular Range. Further evidence is provided by Cahuilla and Kumeyaay oral traditions, which include references to the lake but do not seem to suggest major settlement of the shorelines (Laylander 1994). Instead, these accounts indicate that when the lake was present these groups made fishing and hunting trips to it from villages or base camps in the mountains. These accounts imply that, even at its maximum stand, the lake shore was not permanently occupied, but rather was visited intermittently by groups that lived primarily in the uplands to the west. Even less intensive occupation would be expected when the lake was receding, and the environment was in constant flux due to the rapid movement of the shoreline.

CONCLUSIONS AND DIRECTIONS FOR FUTURE RESEARCH

Our investigations at the SSTB have provided important evidence for continued and intensive use of Lake Cahuilla's resources well into its recessional phases. But clearly there is much more work that needs to be done, and perhaps our most significant contribution here is to provide some directions for future research in this area. For example, the nature of the deposits within the features and the density and distributions of cultural materials surrounding them may be applied to existing models relating to site structure and mobility; and these data may in turn be used to infer the nature and durations of the occupations and their role in the overall settlement and mobility system. Future researchers, for example, may wish to investigate in more detail the distributions of artifacts and faunal material around the hearths and rock enclosures, and explore their implications with respect to discard patterns, site maintenance, and group structure and mobility.

Clearly, geoarchaeology would be a key component of any detailed investigations of site structure and formation in this area, and would help to assess the effects of repeated inundations on archaeological deposits.

As another example, the late prehistoric settlement and mobility strategies in this region will

be further clarified by determining whether the fish represented in the habitation areas were generally procured for consumption on-site, or for drying and storage elsewhere, implying primarily logistical use of this area. Our preliminary estimates of the numbers of individual fish suggest that while most enclosures contain the remains of perhaps a few dozen fish, some may contain the bones of 300 or 400 fish. While the presence of smaller numbers of fish would be consistent with on-site consumption, the processing of several hundred during a single, short occupation would be consistent with consumption elsewhere. This, in turn, would support the notion that much of the late prehistoric use of the recessional shorelines of the lake was directed specifically at the procurement of fish for transport to upland residential bases in the Peninsular Range, as other researchers have suggested (Sutton and Wilke 1988).

In addition, various attributes of the assemblages of the habitation and resource processing sites on the SSTB may also be used to refine reconstructions of settlement and mobility. A key element of these studies will be detailed analysis of ceramics from the region. Our preliminary results, for example, indicate that many of the vessels were brought from the Peninsular Range, suggesting a pattern of regular movement between the uplands and the lakeshore. Ceramics are common enough within the area that a large and systematically collected sample will clarify the ratios of locally made versus imported sherds, and provide important information on group movements in the region.

Finally, with good chronological control of archaeological components in this area, we may ultimately be able to trace longer-term changes in land use during successive stands of Lake Cahuilla. The most intensive prehistoric use both of the maximum and recessional shorelines of the lake appears to be primarily a late period phenomenon, and this, we believe, is a key area for future research throughout the region. We suspect that this is not completely a result of successive flooding episodes obliterating earlier components, but rather that it manifests the general processes of late period population increase and subsistence intensification seen throughout California during this time. And as our research on the SSTB shows, the low-elevation shorelines of Lake Cahuilla can provide a key aspect of this research.

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