THE WHELAN LAKE SITE (SDI-6010): AN EARLY LA JOLLAN CAMPSITE ALONG THE SAN LUIS REY RIVER

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ABSTRACT

Whelan Lake (SDI-6010) is an early La Jollan site, dating between 6500 and 7400 B.P. The site is situated on a knoll overlooking the San Luis Rey River about 7 km from the coast. Excavations revealed a coastal marine adaptation, whereas the geomorphic evidence suggests a freshwater marsh surrounded the site. Reconciling these disparate data leads to a model of early coastal adaptation that is then placed in a regional context.

INTRODUCTION

The San Luis Rey River basin is one of a number of east-west trending river valleys extending from the Peninsular Range to the Pacific Coast between Long Beach and San Diego (Figure 1). Although relatively small, these physiographic units host a diverse set of environmental resources, ranging from oak forests to lagoons and ocean beaches. People have found these basins attractive for thousands of years. For archaeologists, such river basins provide a context from which human adaptation to coastal and inland resources can be studied. The interplay between these diverse sets of resources has been the source of much debate. Some archaeologists interpret sites in different parts of the basin as members of different cultures, whereas others view them as different aspects of an integrated adaptation to the whole.

The San Luis Rey River basin has been a major focus of this debate. Systematic archaeological research has been conducted in the basin since the 1950s. Interpretations concerning chronology and culture that have affected all archaeologists working along the southern coast of California have derived from work in this river basin. Yet, our knowledge of prehistoric settlement along the San Luis Rey River is far from complete. Several key problems need to be resolved. First, the nature of the relationship between La Jolla and Pauma (ca. 6000-1000 B.C.), the earliest full-fledged archaeological complexes in the basin, needs to be better understood. Pauman sites occur inland and demonstrate a terrestrial adaptation, whereas La Jollan sites focused on lagoonal and coastal resources near the river's mouth. Whether these sites were part of one large settlement system, or represent distinct systems, and how these trends may have changed over time are major questions to be addressed. For the lower basin, these issues are interwoven with the need for an accurate reconstruction of the paleoenvironment of this area. Foremost, we need to know the maximum extent and changes over time of the river's ancient lagoon. A second major problem is posed by the enigmatic long hiatus between La Jolla/Pauma and the subsequent archaeological complex found in the basin, San Luis Rey I/II (A.D. 1400 - 1850). Did a hiatus in occupation really occur, or is the current record simply a reflection of the paucity of archaeological research? Solving this problem is hampered by the near-absence of absolute dates for the area. Obviously, we need more data from sites throughout the basin.

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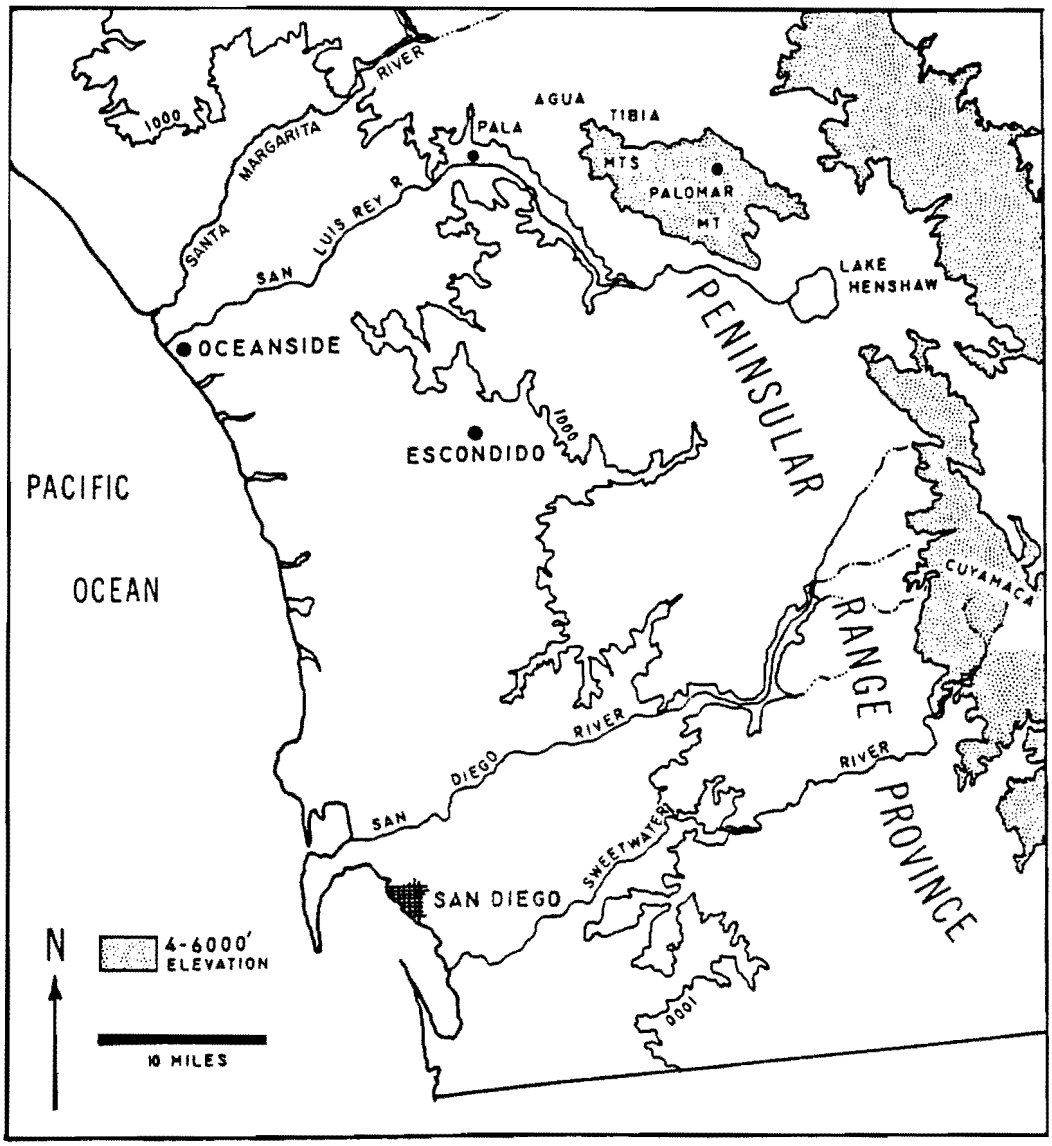

Figure 1. The southern California Coastal Region (after True et al. 1974).

THE WHELAN LAKE SITE

Much needed new information has recently come to light from investigations at the Whelan Lake site (SDI-6010) (Vanderpot et al. 1993). In 1991, the Los Angeles District of the U.S. Army Corps of Engineers contracted with Statistical Research, Inc., to conduct test excavations at this site. SDI-6010 is a shell midden located on a prominent knoll overlooking the north bank of the San Luis Rey River. The site is about 7 km from the current coastline (Figure 2). The knoll forms part of a Late Pleistocene river terrace. Safely located at 20 m AMSL, the site has not been impacted by river floodings. Radiocarbon dates from marine shell (Chione sp.) samples indicate that the midden was occupied between 7400 and 6500 B.P. This age corresponds to the La Jolla I period. The presence of a few Tizon Brownware sherds on or near the midden surface implies some minor, additional use of the site during the San Luis Rey II period.

The midden has a roughly oval shape and measures 90 m by 60 m (Figure 3). Over 200 m of backhoe trenches and 17 sq m of test pits were excavated in this area. The cultural fill is up to 1 m thick at the center, thinning rapidly towards the margins of the site. The east-central portion of the midden has the highest shell density. Here, trenches exposed 4 hearths, 2 of which (Features 1 and 2) were excavated. All 4 hearths are interpreted as food processing features, associated with land animal, marine shellfish, and/or plant preparation.

Within the midden, 4 areas were found where the soil has a high clay content and is organically enriched. In the trenches these clayey pockets were exposed over lengths ranging between 6 and 12 m. The areas are characterized by intensified shell densities and the occurrence of small charcoal fragments. Two of the hearths occur in such clayey areas. High shell content and associated hearths suggest that these areas are cultural. Clay may have been brought in adhering to imported shell, or suspended in water for food processing. More than likely, these clayey areas represent shell processing locales.

Inquiry into the vertical distribution of invertebrate remains indicates that occupation, or at least shellfish exploitation, tended to be episodic. Stratigraphically, we were able to isolate 3 episodes of relatively intense shellfish procurement that were sandwiched between periods of lesser activity. Of the 27 shell species identified at the Whelan Lake site, Chione sp., Argopecten sp., and Donax sp. are most abundant, accounting for 83 percent, 6 percent, and 1 percent of total shell weight, respectively. Chione sp. favors sand and mudflats of shallow bays and lagoons. Argopecten sp. is similarly found on sand and mudflats of bays and lagoons, but prefers deeper (3-46 m) water. Donax sp. occurs along sandy beaches of the open coast. Apparently, the residents of SDI-6010 focused their shellfish procurement activities on the mudflats of the lagoon at the mouth of the San Luis Rey River.

The vertical distribution of animal bone does not show the tripartite layering noted for shellfish remains. Instead, faunal bone NISP ("number of individual specimens") peaks vary across the site. These shifts may reflect locational changes in activity areas over time, or they may be a result of post-depositional processes. Not surprisingly, the test pit placed in the site center has the greatest diversity and density of cultural material. The high frequency of terrestrial animal bone in this test pit is dramatic, with an NISP count exceeding that of shell. Shellfish is most abundant in test pits dug in the clayey areas, supporting the argument that clay was brought in with the shell.

The animals represented in the faunal assemblage lived in a variety of ecozones, ranging from near shore aquatic environments, grasslands, and chaparral to lusher, low valleys. The majority are small terrestrial mammals, primarily hares and rabbits (Table 1). The few fish recovered all inhabit lagoon or near shore environments. Only a small number of bird species were identified, most of which are year-round resident waterfowl.

In volume, shellfish comprises the bulk of faunal remains present in the midden. Yet, shellfish NISP is only 3.5 times larger than the NISP for small terrestrial animals.

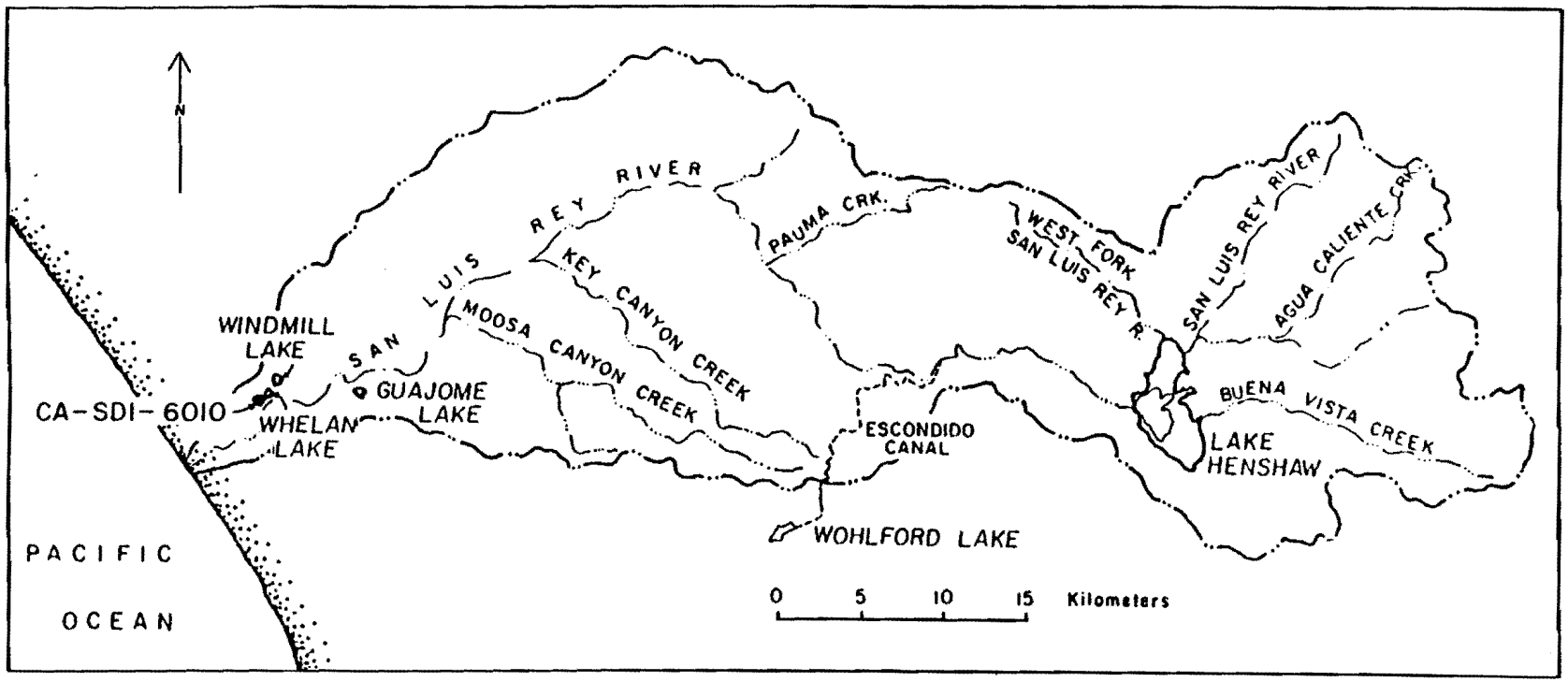

Figure 2. The San Luis Rey River Basin.

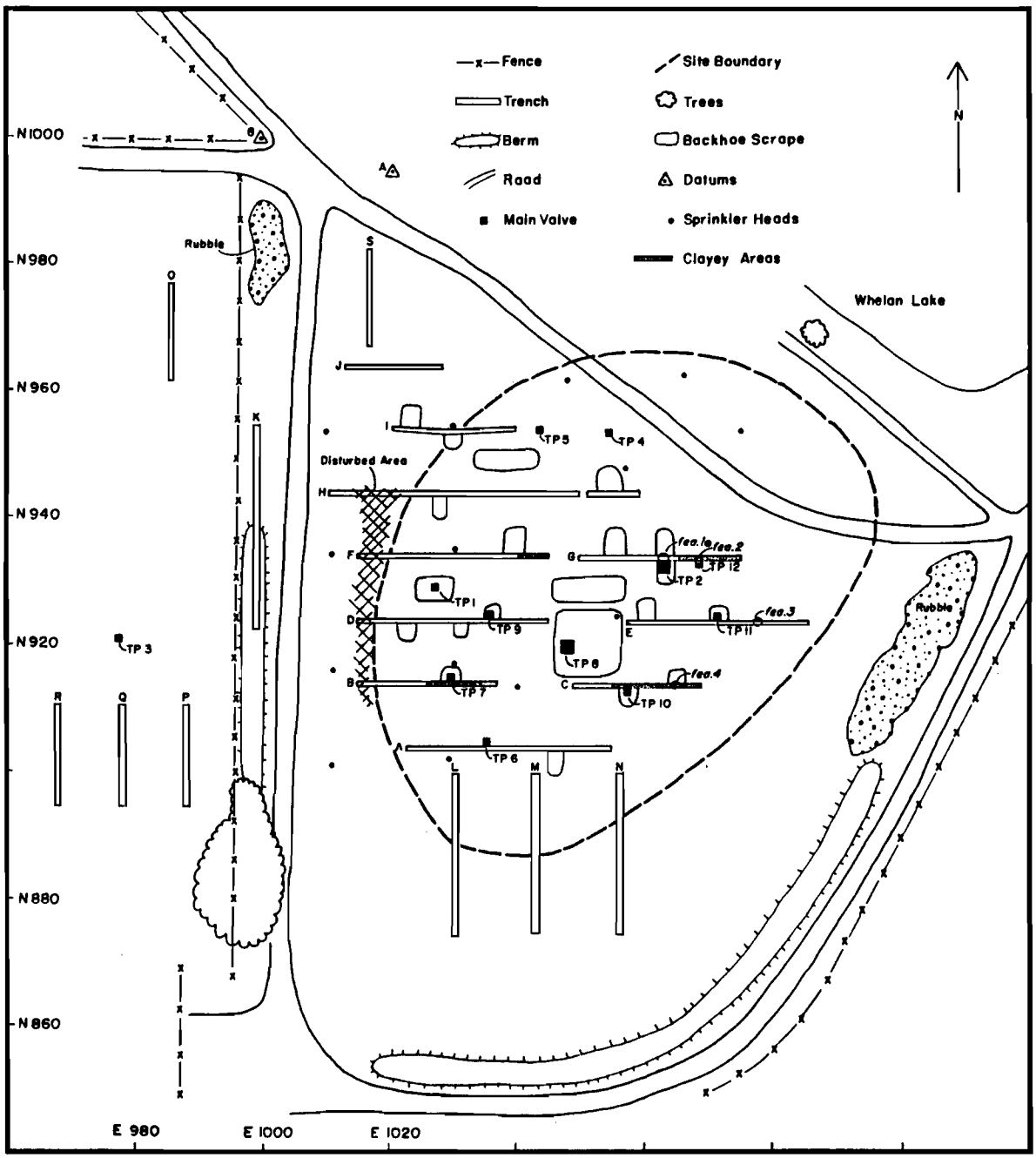

Figure 3. Map of SDI-6010, the Whelan Lake Site.

Table 1. NISP Percentages and Frequencies of Ecofacts Recovered from the Whelan Lake Site

	N	%
Terrestrial Fauna	1385	22.06
Waterfowl	5	0.08
Fish	8	0.13
Shellfish	4880	77.73

Taking into account the better preservation of shell, combined with the fact that bone was often crushed into a pulp, the mammal/shellfish ratio is probably even higher. This highlights the importance of non-aquatic sources for meat in the diet of the site's La Jollan occupants.

Micro and macrobotanical analyses provide information on subsistence, seasonality, and paleoenvironment. The presence of sedge and cattail in pollen and flotation samples suggests that freshwater marshland occurred close to the site (Davis 1993; Miksicek 1993). Neither analysis yielded evidence for the occurrence of a nearby brackish lagoon, however. A high percentage of wood charcoal recovered is from willow and cottonwood. Interestingly, pollens of these 2 riparian species are absent in the samples. Perhaps willow and cottonwood did not occur close by. In that case, firewood from these trees was collected from further away or found near the site as driftwood.

The archaeobotanical assemblage of SDI-6010 is dominated by a similar mixture of edible grasses, legumes, and small seeds found at many other sites in southern California. Possibly, rather than being "wild" plants, some of these species may have been deliberately encouraged to grow in disturbed areas (Miksicek 1993). Most of the plant remains from the Whelan Lake site could be gathered from early spring through midsummer, whereas fall remains (e.g., nuts) are absent.

Cultural material recovered from SDI-6010 consists primarily of lithics. Groundstone is fairly rare in the collections, being most abundant in the 2 excavated hearths. Chipped stone is most profuse in the central and southwestern portion of the midden, away from the hearths. In all units, an increase of chipped stone is accompanied by an increase in faunal bone, but not necessarily by an increase in shell. Most (96.28%) of the chipped stone consists of small debitage, with the remainder composed of cores (0.43%) and tools (3.28%). For comparison with other sites, the tool category is the most critical. Ratios between the various tool types from SDI-6010 are presented in Table 2.

Table 2. Lithic Tool Ratios for the Whelan Lake Site

	N	%
Milling stones	15	39.47
Scrapers, planers, and choppers	9	23.68
Hammerstones	10	26.32
Bifaces	4	10.53

Lithic materials were, for the most part, brought to the site as previously reduced cores and blanks or as finished tools. Examination of the debitage in the assemblage indicates that manufacture and modification of biface tools was the primary object of lithic reduction at the site. Emphasis on a curated, bifacial technology suggests that the site was utilized in part as a "gearing up" area associated with a hunting economy.

THE LOWER SAN LUIS REY RIVER BASIN

How does the Whelan Lake site relate to the rest of the San Luis Rey River basin? To help answer this question, ecology and settlement along the drainage will be summarized. Topographically, the basin can be divided in a lower, middle, and upper section. As defined here, the lower basin consists of the low gradient (2 m/km), 13 km stretch from Oceanside to the Guajome Lake area. Currently this wide, alluviated valley is surrounded by low, gently sloping hills and ridges above a Late Pleistocene river terrace. Sandy beach occurs at the open coast, and some minor estuary and freshwater marshland near the river mouth. Since the Early Holocene, dramatic ecologi-

cal changes have occurred in the lower river valley. After the last glacial (during the Late Pleistocene and Early Holocene) accelerated sea level rise altered the California littoral zone significantly. In San Diego County, between a 5 and 17 km width of coastal shelf was submerged (Bloom 1983; Inman 1983). In addition, during the latter half of this period (between 8000 and 5000 years ago) an efflorescence of estuary and lagoon development occurred (Carbone 1991).

The Estuarine Zone

Under the right circumstances an estuary will host a wealth of marine fauna, creating a rich subsistence base. The ecological balance of this milieu is in constant flux, however, and a number of crucial environmental variables are easily disturbed (Kennish 1986; Ketchum 1983). Consequently, a saltwater lagoon is ecologically quite fragile. In the long run estuaries do not provide a stable food source (Jones and Wolff 1980). In the short run, however, they can be among the most productive economies along the coast (Erlandson 1991).

The maximum extent of the estuarine zone during the Early Holocene heyday of lagoon development is unknown for the San Luis Rey River. Orme (1992) suggests that a relatively stable estuary or brackish lagoon once extended 2 km inland. Formation of a more extensive inlet was prevented by the particular make-up of the stream channel just above the river mouth. This lower stretch of the river (aptly named Oceanside Narrows) is a fjord-like strait, incised in Tertiary bedrock. At a point 2 km from the mouth, this restriction is at its narrowest, with the floodplain little more than 150 m wide. With such a narrow constriction between ocean and estuary, a sea water lagoon, even if it penetrated further upstream, would soon become obstructed by tidal and fluvial sediment. Saltwater would soon turn brackish and then fresh, with freshwater marshes forming upstream from the Narrows as waters backed up behind the estuary. The furthest inland extent of a saltwater marsh may have been about 4 km. This more substantial estuary, if it ever occurred, would have been short-lived, soon becoming brackish and within a few hundred years freshwater.

In contrast with Orme's findings, another recent geomorphic assessment of the lower San Luis Rey River basin suggests that an estuary once extended as far as 11 km upriver (Masters 1992). This study used sediment profiles from well logs and test borings. Two types of information were collected. First, the maximum depth of the valley cut was investigated and then correlated with sea level changes to calculate the potentially maximum upstream extent of the lagoon. Second, well profiles showing mud or clay deposits were used to provide estimates of the locations of the early lagoons and their fringing marshes. The results of the study, however, are problematic, as it remains unknown whether the marshy deposits were of marine or freshwater origin. Most importantly, the reconstruction largely ignores the fact that the Narrows worked as a choking point, hampering the upstream development of a tidally flushed lagoon. Not until we have radiocarbon dated soil samples from new test borings can we accurately determine the areal extent of the lagoon.

Our investigations at SDI-6010 yielded no evidence for a prehistoric saltwater marsh in the Whelan Lake vicinity. Presence of sedge and cattail pollen in microbotanical samples from the site indicates that during the La Jolla period the immediate area supported aquatic vegetation. Neither pollen nor flotation samples from the site contained plant species associated with a saltwater environment. Apparently, the Whelan Lake basin was a freshwater lake or marsh.

LOWER BASIN SETTLEMENT

A substantial portion of the lower San Luis Rey River has been subjected to archaeological survey. Thus far, 66 records of prehistoric and protohistoric sites have been filed in the repositories of the San Diego Museum of Man and the San Diego State University. Of course, an undetermined number of early littoral sites were flooded, whereas many sites in the lower valley have been covered by thick layers of sediment. From site files and published and unpublished reports enough information can be

gathered to attempt a tentative categorization of the known lower basin sites according to site location, composition, function, and age.

Site Location

Most sites are found on the Late Pleistocene river terrace flanking the floodplain. Second in abundance are sites located on Tertiary bedrock above the terrace. Mostly located along small tributaries, they are some distance away from the river channel. A number of sites occur on Holocene alluvium in the floodplain. Much of this alluvium was deposited long after 5000 B.P., and it is obvious that these sites are relatively recent. One site was recorded on Pleistocene Marine terrace. At 1.5 km, this site is closest to the coast.

Site Composition and Function

The majority of the recorded sites are shell middens with artifacts. A number of these middens are clustered along the north bank of the San Luis Rey River, below Whelan Lake. All are interpreted as campsites associated with a mixed marine/terrestrial subsistence base. Many are small surface scatters, reflecting limited and highly seasonal use. Others have formed thick midden deposits (e.g., SDI-5130, SDI-6010, and SDI-1246), indicating repeated use over a longer period of time. The larger middens contain subsurface hearths or clusters of fire-cracked rock on the surface. Chipped stone tools, milling stones, and varying densities of animal bone exemplify a diverse subsistence base. The shell middens occur either on Pleistocene river terrace or on Holocene alluvium.

Several shell scatters without (or with only incidental) artifacts have been recorded. They occur either close to the coast or along Pilgrim Creek (just above Whelan Lake). The coastal scatters are dominated by Donax sp., whereas the others consist predominantly of Chione sp. and Argopecten sp. These sites appear to be procurement locations where shellfish was cleaned and then consumed "on the spot". The Pilgrim Creek sites may represent activities of inland groups who cleaned and ate their catch from a coastal expedition.

Artifact scatters without shell are common. None occur on alluvium and none were recorded north of the lower San Luis Rey River. Almost all assemblages are dominated by milling stones. A number of the sites include ceramics, milling features, or pictographs. All are interpreted as terrestrial resource procurement and/or processing camps.

Cultural/Temporal Affiliation

Absolute dates are known for only 2 of the sites. For many of the others, diagnostic artifacts or specific features determine cultural affiliation and allow temporal placement. Age of an additional group can tentatively be established by (1) evaluation of patina present on lithics, (2) predominance of Chione/Argopecten spp. or Donax sp. in the assemblages, or (3) location of sites on Holocene alluvium.

In the lower basin inventory, only 3 unequivocal La Jollan sites have been identified: SDI-5130, SDI-6010, and SDI-1246. All are substantial shell middens located on knolls overlooking the San Luis Rey River. Age of the first 2 was determined through radiocarbon dating. For the last named, La Jollan affiliation was indicated by diagnostic artifacts (e.g., discoidals and heavily patinated lithics) on the surface. Six shell scatters are probably La Jollan, because they are dominated by Chione sp. and Argopecten sp. Both species favor lagoonal mudflats and became rare after sedimentation of the estuarine zone around 3000 B.P. Eleven artifact scatters without shell have been designated Pauman, on account of diagnostic artifacts in the assemblages. Location of these Pauman sites varies, but all are located somewhat further inland, above 30 m elevation.

San Luis Rey forms the largest temporal site class. Presence of diagnostic artifacts and features or location on recent alluvium was decisive in the San Luis Rey designation. At a number of the larger La Jollan or Pauman sites, San Luis Rey formed a later component. For the San Luis Rey sites no terminological distinction is made between sites emphasizing coastal subsistence and those focusing on terrestrial resources. In many ways this period reflects the same adaptational pattern noted for the La

Jolla/Pauma. Sites are associated either with a mixed marine/terrestrial or unmixed terrestrial economy. Some gradation between these 2 functional categories is noticeable, however. All San Luis Rey shell assemblages are dominated by Donax sp., instead of by Chione sp. as earlier. More than likely this reflects a deterioration of the estuarine habitat due to siltation of the lagoon.

The La Jolla/Pauman Relationship

Seasonality may be the key in clarifying the puzzling relationship between lower basin La Jollan and Pauman groups. La Jollan assemblages are characterized by the presence of shell, combined with an emphasis on bifacial lithic technology. In contrast, Pauma sites have practically no shell and have assemblages dominated by milling stones. Perhaps the difference reflects cyclical exploitation of multiple ecozones by 1 people, rather than a disparate economic emphasis by 2 separate groups existing side by side. It is possible that the shell deposits in the La Jollan middens represent only seasonal activity. Why would the nearby Pauma components not be associated with the same groups responsible for the shell deposits? Possibly, the larger shell middens were semi-annually used base camps. The occupants focused on shellfish collecting in the winter when tides were low, hunting-gathering in the freshwater marsh and adjacent foothills through much of the year, and hard seed collecting in the fall.

The Place of the Whelan Lake Site in the Lower Basin

SDI-6010 occupies a unique place in the lower basin, as it lies near the juncture of the middle and lower basin. Above the lake, the ridges rise quickly from the river. Below, the floodplain flattens out as the river makes its way to the sea. Around 7000 B.P., the floodplain below SDI-6010 probably hosted a freshwater lagoon and marsh. At that time, the vicinity of Whelan Lake would have represented the first block of dry land as one moved inland from the coast. Moreover, located at the junction of Pilgrim Creek and the San Luis Rey River, the site is well placed to monitor the 2 routes along which collected shell appears to have been transported further inland. More than likely, this location was very desirable, representing an optimal balance between estuarine, freshwater, and terrestrial resources. Possibly, the site was a major hub of early La Jollan activities in the San Luis Rey River basin.

Sometime after 6500 B.P., the Whelan Lake site was abandoned. SDI-5130, a large La Jollan village site located 2 km closer to the coast, was occupied from about 6300 to 4000 B.P. (Quillen et al. 1984; Gibson et al. 1990). If, as assumed, these sites were located optimally so as to have well-balanced access to freshwater marsh and estuary, the temporal difference between the 2 locations may reflect an ecological change. The increasing siltation of the lagoon and sedimentation of the freshwater marsh above it, may have forced La Jollan hunter-gatherers to move their camp downstream. The end of La Jollan occupation in the basin coincides with increased alluviation of the estuary, and, as elsewhere on the coast, the archaeological record becomes silent. Not until A.D. 1400 with the advent of the San Luis Rey sequence is large scale reuse of the area apparent. The larger shell middens and plant processing camps of the La Jolla/Pauma period are reused, and a great number of new sites appear. Several shell middens appear on alluvium in the sheltered lower valley. A changed environment is apparent from the dominant species in these new middens: Donax sp., a species found along sandy beaches of the open coast. The plant processing sites also contain a new element: bedrock mortars, implying an intensified use of acorns.

THE CENTRAL AND UPPER BASIN

A brief look at ecology and sites along the central and upper drainage will set the stage for the construction of a tentative adaptation model for the entire river. The middle basin covers the 60 km long stretch from Guajome Lake to the Lake Henshaw dam. Here, the river descends from the mountains of the Peninsular Range. The upper valley includes the Lake Henshaw Basin and the 25 km stretch to the headwaters of the river, just below the crest of Bucksnort Mountain. Upstream from Pala the gradient increases rapidly. Along the southwestern flank of Palomar Mountain

(6000 ft), just north of the drainage, a series of flats mark the location of the Elsinore fault line. The majority of prehistoric sites are concentrated on these flats. A varied topography hosts a wide range of potential resources, most importantly, a variety of oak species. As a norm, Pauman sites are located on older soils and higher ground than the San Luis Rey sites (True 1980). For this area, a bipolar subsistence-settlement model has been proposed (True 1966; True and Waugh 1982). This model, largely based on ethnographic (Luiseño) evidence, involves seasonal relocation of villages or camps along a vertical route following diverse plant procurement zones. Luiseño villages, each with specific hunting, collecting, and fishing areas, were located in diverse ecological zones. Each year for the acorn harvest (October-November) most of the village population would settle in the mountain groves to collect acorns, hunt game animals, and collect whatever else was available. Most inland groups also had fishing and gathering sites on the coast that they visited annually when tides were low or when inland foods were scarce from January to March (Bean and Shipek 1978).

How valid is this model for prehistoric groups? Abundant milling features at San Luis Rey sites throughout the basin indicate a focus on processing of hard seeds for this earlier period. For much of southern California, beginning at around 8500 B.P., a slow shift to an acorn dominated economy is evident in the archaeological record (Baumhoff 1963; Chartkoff and Chartkoff 1984). No doubt, the Pauma of the central basin were at least partially involved in acorn procurement. Acorns are not always stable and predictable food providers, however. Oak trees are subject to cyclical productivity independent of the environment (Basgall 1987). Areas with multiple oak taxa may provide a larger buffer against total crop failure than areas with only 1 species. Environmental fluctuations form an additional constraining factor. The uncertain nature of these forces may have required the inland populations to construct social mechanisms to provide a buffer against the environment. One of these mechanisms may have consisted of exploitation of coastal resources.

A SETTLEMENT-SUBSISTENCE MODEL

Viewing the entire basin as 1 unit, several observations can be made. Concentrations of groups around the estuarine zone and in the mountainous inland zone may be seen as 2 poles of 1 adaptation system. The adaptational balance shifted through time due to environmental constraints. It seems likely that when the coastal lagoon silted up, some 3500 years ago, La Jolla groups gradually moved inland to exploit a more varied resource zone. It is generally assumed that economies relying on acorns are a relatively late adaptation. If further investigations determine that the earliest settlements are located along the coast, then the possibility of lagoon siltation causing pressure on local populations and forcing them to focus on other ecozones to relieve the stress should be investigated.

In contrast to the bipolar model of the mountain area, the lower basin appears to conform to a bilateral subsistence-settlement model. Sites demonstrate either a mixed marine/terrestrial economy or a terrestrial economy. The nature of the relationship between populations of the lower and central/upper basin is far from clear and awaits further research. As shown by sparse shellfish remains found at sites in the lower portion of the central basin, goods moved up (and possibly down) the river. More than likely, the basin witnessed more movement of people than we perceive in the archaeological record.

CONCLUSIONS

Results from our excavations at the Whelan Lake site indicate that La Jollan reliance on estuarine sustenance was not always as strong as assumed. At this site, the dominant economic focus appears to have been on the freshwater marshland just above the estuary. In addition, we see no evidence for viewing the lower basin La Jolla and Pauma complexes as being associated with separate groups. Instead, the different assemblages reflect seasonal use of disparate ecological zones by the same people.

Our understanding of settlement in the San Luis Rey River basin still has many gaps. Much more data are needed to test the model. We urgently need more absolute dates. With radiocarbon dates for only 2 La Jollan sites and 1 Pauma component little can be surmised about settlement shifts in the basin. The apparent hiatus between La Jolla/Pauma and San Luis Rey complexes is enigmatic. More dates from a wide variety of sites are needed to assess whether an actual lacuna occurs in the archaeological record. It is likely that this time represents a period of lower populations rather than depopulation of the area. Intrabasin adaptation strategies of La Jolla/Pauma and San Luis Rey groups are strikingly similar. Clearly, the possibility of a continuum between these 2 complexes needs to be further investigated.

NOTES

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