Collecting and Residing Near the Shore: The Role of Small and Large Sites in Settlement Reconstruction

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Abstract

This paper addresses the nature of diachronic change in littoral adaptive strategies by examining one of the few detailed coastal data bases available for San Diego County and placing new results in the context of broader regional research issues. Settlement and subsistence trends are summarized for a 6,740 acre area in the central coastal portion of Camp Pendleton. These archaeological data are derived from a 100 per cent pedestrian survey, ground-cover clearance in low visibility areas, and test excavations at 61 per cent of the 41 prehistoric sites documented (including a range of site types). The results reveal that land use patterns change dramatically over time with a diachronic trend toward an increase in specialized smaller sites and the pace of change accelerates during the Late Holocene. In particular, smaller, often specialized sites, become an integral aspect of the archaeological landscape primarily during the last 500 years, and they represent compelling evidence of a long term trend toward hunter-gatherer intensification.

Introduction

In coastal California, a large body of literature exists regarding the nature of long term trends in settlement and subsistence practices (e.g., Basgall 1987; Erlandson and Colton 1991; Erlandson and Glassow 1997; Jones 1992a). In particular, diachronic arguments have been put forward regarding the relationship between cultural complexity, population densities, and resource change (e.g., Arnold 1995; Erlandson 1988; Glassow 1996; Glassow and Wilcoxon 1988; Jones 1991, 1992b; Raab 1992). At present, there is an ongoing debate on whether the pace and direction of cultural change can best be explained by population pressure and declining foraging efficiency or by socially driven models entailing developing social hierarchies, trade and exchange (e.g., Arnold et al. 1997; Raab 1996; Raab and Bradford 1997). The archaeological research that forms the basis of these interpretations has centered on the Channel Islands, the Santa Barbara coastal area, and the central California coastline.

The coastline of San Diego County and Camp Pendleton, in particular, has not been the venue of major problem-oriented studies examining these issues, despite the area's closeness to the southern Channel islands and its similar coastal habitat to areas further north. Indeed, normative reconstructions of San Diego County coastal adaptations assert that there was a fluorescence of coastal occupation in the early and middle Holocene that was focused around lagoons (e.g., Masters and Gallegos 1997; Warren 1968). In contrast, the late Holocene–the last 3000 to 4000 years–was a period of only sporadic and seasonal exploitation of the San Diego County littoral zone as populations were focused further inland and any adaptive changes

were related to inland terrestrial resources (see Byrd 1998 for review and critique of this model).

This paper utilizes one of the few detailed coastal data bases available for San Diego County to address the nature of diachronic change in littoral adaptive strategies and places new results in the context of broader regional research issues. Our intensive study of settlement and subsistence trends is focused on the central coastal area of Camp Pendleton and integrates the results of a series of projects that we have conducted over the last few years. These include 100 per cent pedestrian survey, ground-cover clearance in low visibility areas, and archaeological test excavations at a wide range of sites. Notably, test excavations included a number of small-size sites which are often given less importance in interpreting archaeological settlement patterns despite their ubiquity across the landscape (yet see Glassow 1985; Ward 1978). Furthermore, by focusing our attention on a tightly defined study area that has been subjected to geomorphological and palynological investigations, inventorying of all archaeological sites, and test excavations at 60 per cent of the sites in the study area, we are able to make more robust and refined interpretations about prehistoric settlement patterns. Although a considerable body of data is now available with which to discuss emerging patterns, the results should be considered preliminary and subject to change and refinement as additional sites are excavated.

We make two major points that are tied to archaeological trends discerned through our research in the central coastal area of Camp Pendleton. First, land use patterns change dramatically over time. Although large residential camps occur throughout the sequence, there is a diachronic trend toward an increase in specialized smaller-size sites, and the pace of change accelerates at the end of the Holocene. Second, the specific character of different types of smaller sites provides crucial insight into understanding the archaeological record, particularly since their function within settlement systems varies over time and across the landscape. We argue that smaller, often specialized sites become an integral aspect of the archaeological landscape primarily during the last 500 years, and they represent compelling evidence of a long term trend toward hunter-gatherer intensification.

The paper consists of four sections. First, the study area setting is described, and then the archaeological fieldwork summarized. Third, key patterns derived from the archaeological data are presented. Finally, the results are interpreted with respect to diachronic trends in foraging behavior.

Project Setting and Archaeological Fieldwork

Camp Pendleton falls within the coastal area physiographic province and is characterized by a coastal plain formed of ancient marine terraces and adjacent inland mountain ranges. Streams traverse and incise the coastal marine terraces while draining the northwest trending southern hills of the Santa Margarita Mountains. These mountains have a fairly low relief, with the

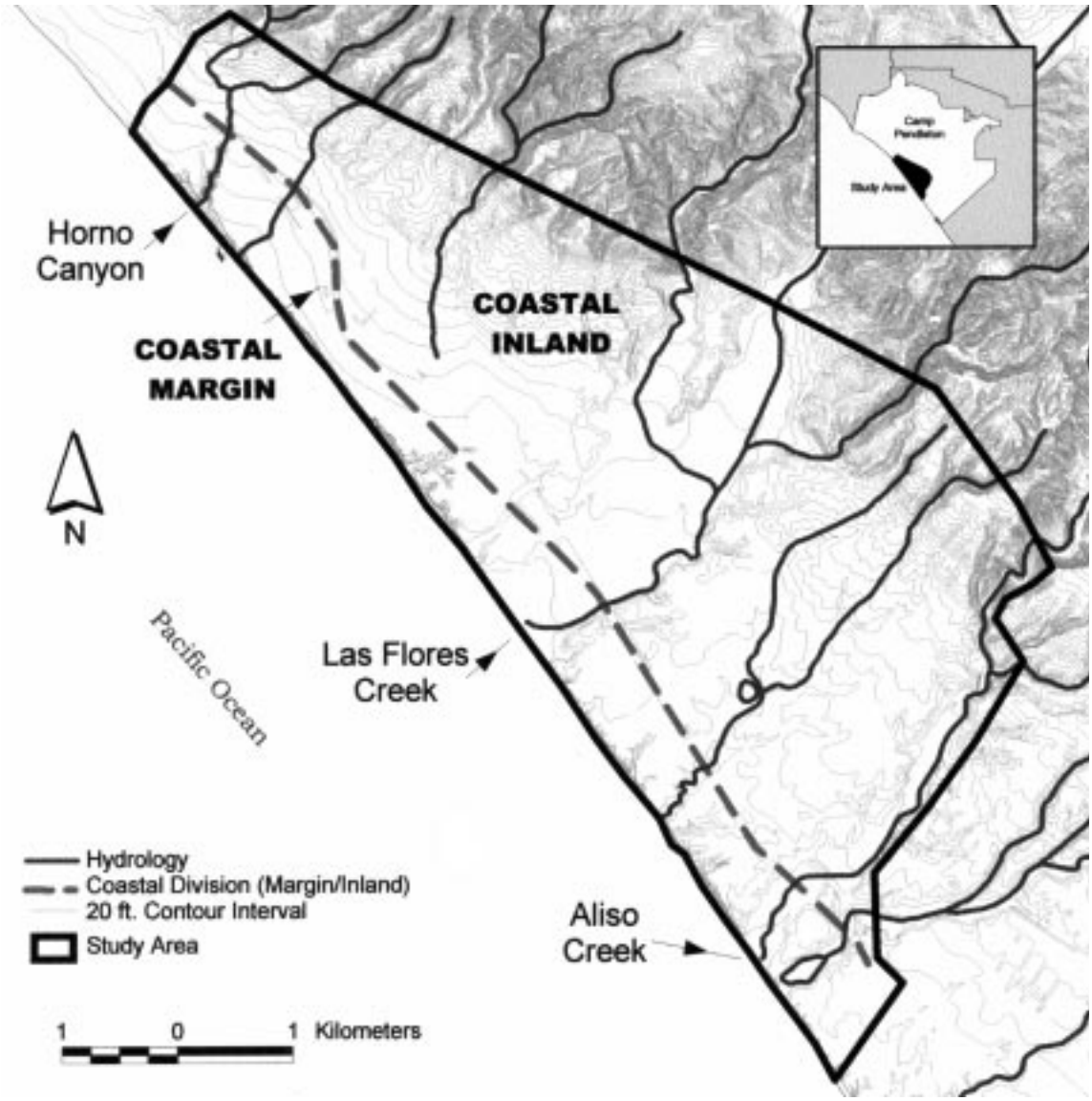

Figure 1. Map of study area in central coastal Camp Pendleton showing boundary, topography and major drainages.

highest peak on Camp Pendleton having an elevation of 972 meters above sea level. At the ocean, cliffs have been cut by transgressive wave action. The coastal plain is quite narrow, typically from 2 to 5 km in width, and it widens at the southern end of the base. This contrasts with the southern part of San Diego County where the coastal plain is up to 16 km wide.

The study area covers a 9 km stretch of the Camp Pendleton coast line, extends from 1.5 km to 4 km inland, and includes 27.4 sq km (6740 acres) (Figure 1). The study area is primarily comprised of Pleistocene marine terraces along with Holocene alluvial stream deposits at the

foothills of the Santa Margarita Mountains. A series of small and moderate size drainage are present. The primary ones are Horno Canyon on the north, Las Flores Creek in the center, and Aliso Creek at the south.

At the north end of the study area, Horno Canyon is dominated by a large alluvial fan at the canyon mouth (Waters 1996). These Holocene fan sediments rest on truncated Pleistocene alluvial fan sediments and interfinger with Holocene colluvium on the fan edges. An arroyo that extends from the ocean into the hills has entrenched this fan. The canyon appears to be of recent origin, and during prehistoric occupation, the canyon mouth was an aggrading alluvial fan.

Las Flores Creek in the center of the study area is formed in part by the junction of Las Pulgas Canyon and Piedra del Lumbre Canyon. This braided stream with multiple channels and bars is the largest drainage catchment in the study area. Stream flow is perennial and usually confined to a single narrow channel. However, during floods, water will inundate the lower terrace. Today, Las Flores empties directly into a small lagoon which is cut off from the ocean by a beach berm. During floods this berm is breached and the creek then flows directly into the ocean. Once flow diminishes, the berm and lagoon are reestablished. Although most of the surface sediments in the drainage are young, our research has revealed Holocene deposits dating back to 4000 BP exposed in terrace cuts (Byrd 1996a; Waters et al. 1999).

At the southern end of the study area, Aliso Creek follows Aliso Canyon through the foothills to the ocean. It is dominated by modern streambed alluvium with late Pleistocene and Holocene stream terraces comprising a much smaller percentage of the alluvium visible at the surface (Pearl and Waters 1998). There is also significant portions of colluvium along its banks and forming fans from smaller tributaries.

For the purposes of this archaeological study, we examine spatial patterning in the distribution of sites with respect to drainages systems and whether sites are situated within alluvial stream bed deposits or on the coastal terraces and foothills. In examining spatial patterning in the distribution of archaeological sites, we define two areas based on distance to the coast. The first, termed the coastal margin, extends from the coast to approximately 0.5 km inland. The second, termed the coastal inland area, extends from 0.5 km to 4 km inland. Both areas are within daily foraging range of the ocean.

Archaeological Fieldwork

Our archaeological fieldwork within the study area has included geomorphic, geoarchaeological, and palynological investigations of Holocene alluvial sediments (Anderson and Byrd 1998; Byrd 1996a; Pearl and Waters 1998; Waters et al. 1999); archaeological survey (Reddy 1998a, 1999), enhanced survey using ground cover clearance (Reddy 1998a), and test excavations (Byrd 1996a, 1997; Reddy 1998b, 1999). These studies are part of a

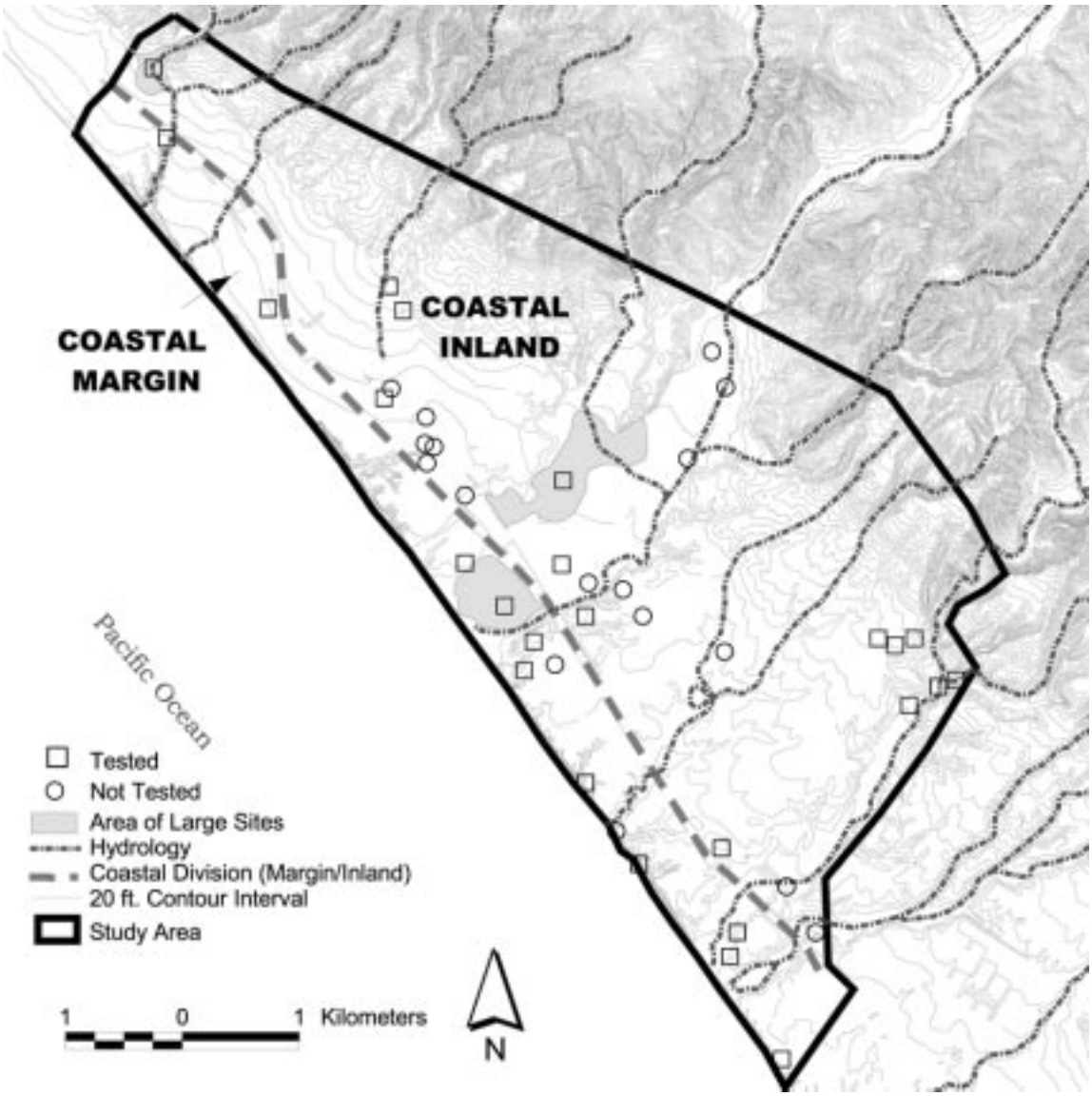

Fig. 2. Map of prehistoric sites in central coastal Camp Pendleton study area indicating which sites have been test excavated.

broader set of recent archaeological investigations we have conducted in the coastal and inland portions of Camp Pendleton (Byrd 1996b, 1998; Byrd et al. 1995; Reddy 1997a, 1997b; Reddy et al. 1996; Reddy and Byrd 1997).

The study area has been fully surveyed and subjected to ground cover clearance, and this exhaustive inventory includes 41 prehistoric sites (Fig. 2, Table 1) (see Reddy and Brewster, this volume). Over two thirds of these sites are located in the coastal inland area (n=28, 68 per cent), with the other third in the coastal margin (n=13, 32 per cent). In addition, almost three

quarters of the sites are located on coastal terraces (n=29, 70.7 per cent) and the remainder situated in alluvial deposits (n=11, 24.4 per cent), most typically along Las Flores Creek. Most sites are within a kilometer of either Las Flores Creek (n=18) or Aliso Creek (n=11). The remainder fall primarily between these two areas. Notably, only a single site lies near Horno Canyon.

Twenty-five sites have been subjected to test excavations, and between the authors, we have directed excavations at all but two of these sites (Byrd 1996a, 1997; Reddy 1998b, 1999; Foster, this issue, Woodman 1996a, 1996b). This 61 per cent sample of tested sites includes a representative sample of different environmental settings and site types. It consists of six large shell middens and a range of small to medium sized shell scatters. Of the 25, eleven occur in the coastal margin and the remainder further inland. Five are situated near Aliso Creek, seven near Las Flores Creek, one in Horno Canyon, and the remaining twelve in the intervening areas. When combined with the survey data, these data provide a rare opportunity to gain refined insights into regional settlement patterns.

Archaeological Results

This section examines four issues to facilitate examination of diachronic trends in settlement and subsistence events: site size, site type, site function, and temporal distribution. No attempt has been made to fully characterize the nature of these sites; that is beyond the scope of this paper and is presented in the appropriate technical reports. Instead selective aspects of the results have been presented in order to characterize the dynamics of settlement variability in the region. We utilize the data derived from both the survey and the test excavations, and for some categories of data only the excavation results are utilized.

Site Size

To aid in elucidating settlement patterns, site sizes were categorized as small (less than 2000 m^2), medium (2000 - 20,000 m^2) and large (>20,000 m^2). The main purpose of the categorization is to elucidate the relationship between site size, site type, and spatial distribution. The strongest patterning correlates site size with distance from the coast (Fig. 3). The coastal margin landscape is characterized by numerous small sites and a few large and medium sized sites. In contrast, the coastal inland zone has an even distribution of medium and small-size sites, with large sites also representing a quarter of the sample.

Site size also correlates with drainage catchment size, with the largest sites clustered along Las Flores Creek and a single example at Horno Canyon (Fig. 4). Medium-sized sites occur in most drainages including Aliso Creek and the more ephemeral systems. In contrast, small sites are widely distributed outside the immediate area of Las Flores Creek and are situated primarily on the coastal terraces.

Table 1. Summary of prehistoric sites in the Camp Pendleton central coast study area.

CA-SDI-	Location	Site Type	Site Func.	Age	Size (m2)	Depth (cms)	Artifact Categories	Dominant Invertebrate	Vertebrate Remains	Floral Remains
811*	CM	SM	MRB	A/LP	L (311,225)	70	bt, fs, gs, so	*Donax*	High	Present
812/H*	CIn	SM	MRB	E/LP?	L (525,600)	80	c, fs, gs, so	*Donax*	High	Present
4536*	CIn	SM	MRB	A/LP?	M (4125)	50	fs, gs, so	*Donax*	Low	?
4538*	CIn	SM	MRB	LP	L (125,000)	70	bt, fs, gs, so	*Donax*	High	Present
4540*	CIn	SS	DC	E/LP	S (1,000)	10-20	fs	*Donax*	Absent	?
10,723	CM	SM	?	?	M (4980)	50?	fs, gs	*Donax*	Absent	?
10,724	CM	S & LS	?	?	S (380)	25?	gs	*Donax*, *Chione*	Absent	?
10,725	CM	S & LS	?	?	S (450)	?	fs	*Chione*	Absent	?
10,726*	CM	SM	MRB	EA & LP	L (25,640)	95	bt, fs, gs, so	*Chione*	High	Present
10,728*	CIn	SM	MRB	EA & LP	L (30,270)	100	bt, c, fs, gs, so	*Donax*, *Chione*	High	Present
10,731	CIn	SM	?	?	L (50,820)	50?	fs	*Donax*	Absent	?
13,320	CIn	S & LS	?	?	L (31,350)	?	fs	*Donax*	Absent	?
13,321	CIn	S & LS	?	?	M (3,000)	?	fs	*Donax*	Absent	?
14,490	CIn	S & LS	?	?	M (19,780)	30?	gs	*Donax*	?	?
14,491	CIn	SS	?	?	L (33,600)	?	-	*Donax*	?	?
14,492	CIn	SS	?	?	M (2,860)	?	-	*Donax*	?	?
14,493	CIn	SS	?	?	S (570)	?	-	*Donax*	?	?
14,494*	CIn	S & LS	DC	LP/A	S (1,640)	50-80	fs	*Donax*	Low	?
14,495*	CIn	S & LS	DC	E	S (1,620)	0-30	c, fs	*Donax*	Low	?
14,496*	CIn	S & LS	DC	LP (?)	M (14,840)	70-80	fs	*Donax*	Medium	?
14,497*	CIn	S & LS	DC	LP	S (1,100)	25-50	fs	*Donax*	Low	?
14,498*	CIn	SS	LAL	LP (?)	S (1,540)	0-10	-	*Donax*	Absent	?

Key: * site tested; CM:coastal margin, CIn: coastal inland; MRB: major residential base, DC: dinner camp, LAL: limited activity locale, SM: shell midden, SS: shell scatter, S & LS=shell & lithic scatter; A: Archaic, LP:Late Prehistoric, EH: Ethnohistoric; L: large, M: medium, S: small; c: ceramics, bt: bone tools, fs: flaked stone, gs: ground stone, so: shell ornaments

Table 1 (continued). Summary of prehistoric sites in the Camp Pendleton central coast study area.

CA-SDI-	Location	Site Type	Site Func.	Age	Size (m2)	Depth (cms)	Artifact Categories	Dominant Invertebrate	Vertebrate Remains	Floral Remains
14,499*	CIn	SS	LAL	LP (?)	S (620)	none	-	*Tivela*; *Donax*	Absent	?
14,500	CIn	SS	?	LP (?)	M (6,520)	?	-	*Donax*	?	?
14,501	CIn	SS	?	LP (?)	S (450)	?	-	*Donax*	?	?
14,503*	CM	S & LS	LAL	E	S (1030)	?	fs		?	?
14,504*	CM	S & LS	LAL	LP	M (3480)	?	fs		?	?
14,505*	CIn	S & LS	DC	LP (?)	M (13,070)	40-70	fs	*Donax*	Low	?
14,506*	CIn	SS	LAL	LP	M (6,290)	0-30	-	*Donax*	Low	?
14,508*	CIn	SS	LAL	LP (?)	M (4,440)	0-30	-	*Donax*	Low	?
14,509	CIn	SS	?	?	M (6,610)	?	-	*Donax*	?	?
14,510	CIn	SS	?	?	S (1,210)	0-30?	-	*Donax*	?	?
14,511	CIn	SS	?	?	S (860)	?	-	*Donax*	?	?
14,513	CIn	SS	?	?	S (170)	?	-	*Donax*	?	?
14,514	CIn	S & LS	?	?	M (24,870)	?	fs	*Donax*	?	?
14,516*	CM	SS	LAL	LP	S (1920)	?	-	*Donax*	?	?
14,518*	CM	S & LS	LAL	LP (?)	S (90)	?	fs	*Donax*	?	?
14,519*	CM	S & LS	DC	E	S (1350)	?	fs	*Donax*	?	?
14,520*	CM	S & LS	DC	LP	S (640)	?	fs, gs	*Donax*	?	?
14,521*	CM	S & LS	DC	LP	S (1430)	?	fs, gs	*Donax*	?	?
14,522*	CM	S & LS	DC	A	S (1820)	?	fs	*Donax*	?	?

Key: * site tested; CM:coastal margin, CIn: coastal inland; MRB: major residential base, DC: dinner camp, LAL: limited activity locale, SM: shell midden, SS: shell scatter, S & LS=shell & lithic scatter; A: Archaic, LP: Late Prehistoric, EH: Ethnohistoric; L: large, M: medium, S: small; c: ceramics, bt: bone tools, fs: flaked stone, gs: ground stone, so: shell ornaments

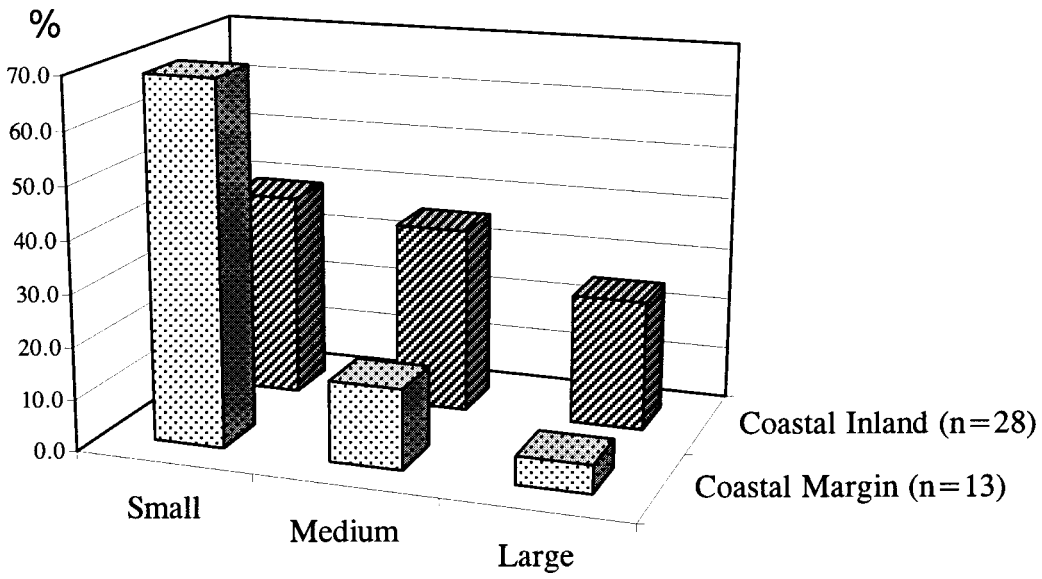

Fig. 3. Distribution of prehistoric sites with respect to location and size in the central coastal Camp Pendleton study area.

Site Type

With respect to site type (based on the material remains associated with individual sites), shellfish deposits are the predominant remains at all sites in the study area. Thus, three-quarters of the sites are classified as shell scatters (with and without flaked stone lithics and ground stone artifacts) and the rest are shell middens. The shellfish from all sites, with two certain exceptions, are almost completely dominated by the sandy beach species *Donax gouldii* or bean clam. No other site types, such as lithic scatters, are present.

The shell middens have thick anthropogenic sediments (sediments largely formed by human activities), features, occasional burials, and a diverse range of cultural material. This typically includes robust assemblages of fish and terrestrial faunal, archaeobotanical remains, ground stone, flaked stone tools, and shell beads.

In contrast, shell scatters have little or no anthropogenic sediment and a much more restricted range and density of cultural remains. Almost a third of the shell scatters are comprised primarily of shellfish remains along with occasional, very low frequencies of vertebrate faunal remains and debitage. The other two thirds of the shell scatters have slightly higher and varying quantities of other ecofacts and artifacts–most commonly moderate to low quantities of flaked stone artifacts. The shellfish at all of these sites is dominated by *Donax*.

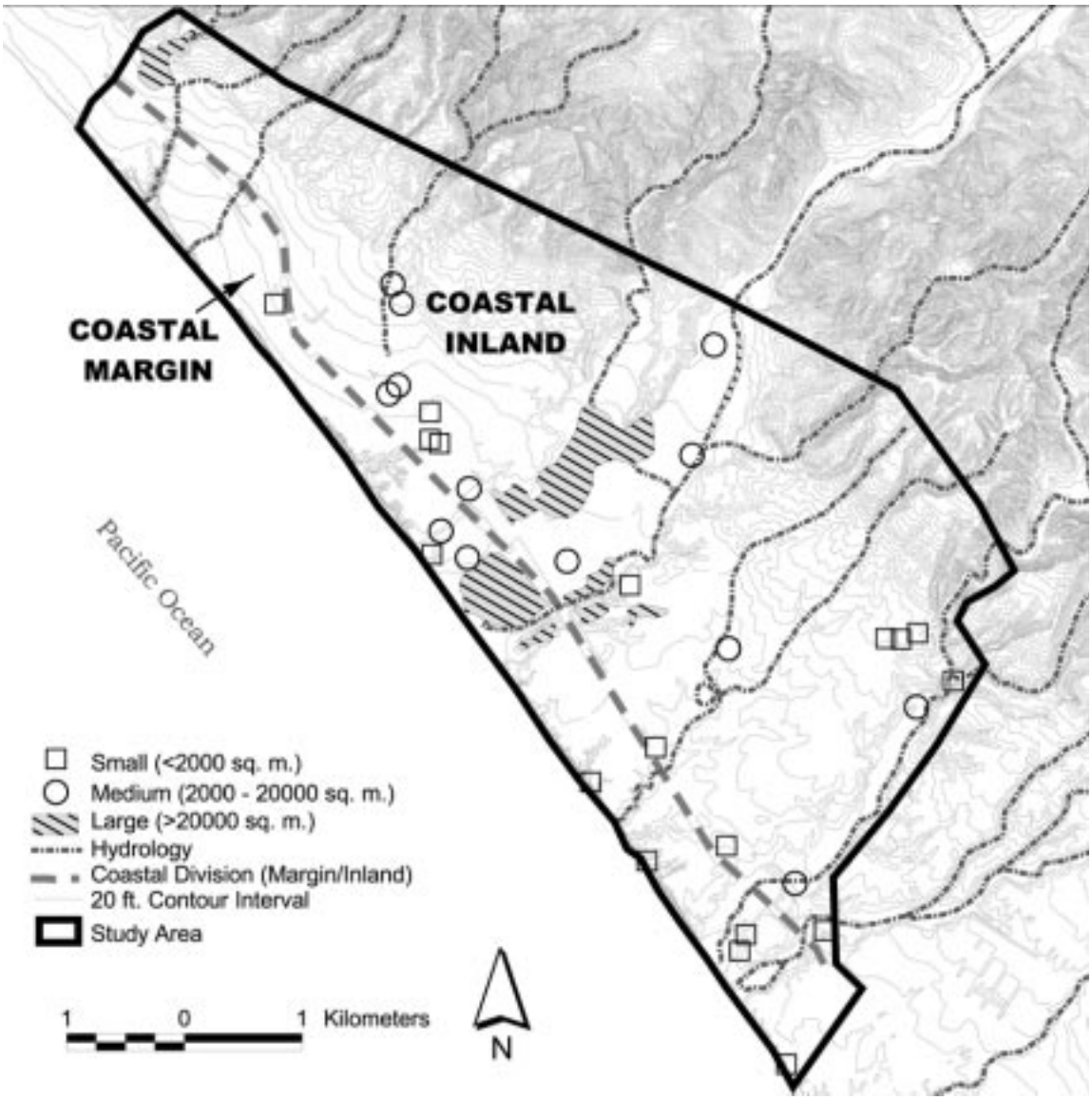

Fig. 4. Spatial distribution of different size classes of prehistoric sites in the central coastal Camp Pendleton study area.

Regardless of the distance from coast, shell scatters with and without lithics dominate the inventory (77 per cent), and shell middens occur in moderate frequencies (23 per cent). Most of the shell middens are large sites along with a few medium-sized sites, while shell scatters are either medium or small-sized sites. Thus, there is a dichotomy between small and medium shell scatters and the large shell middens.

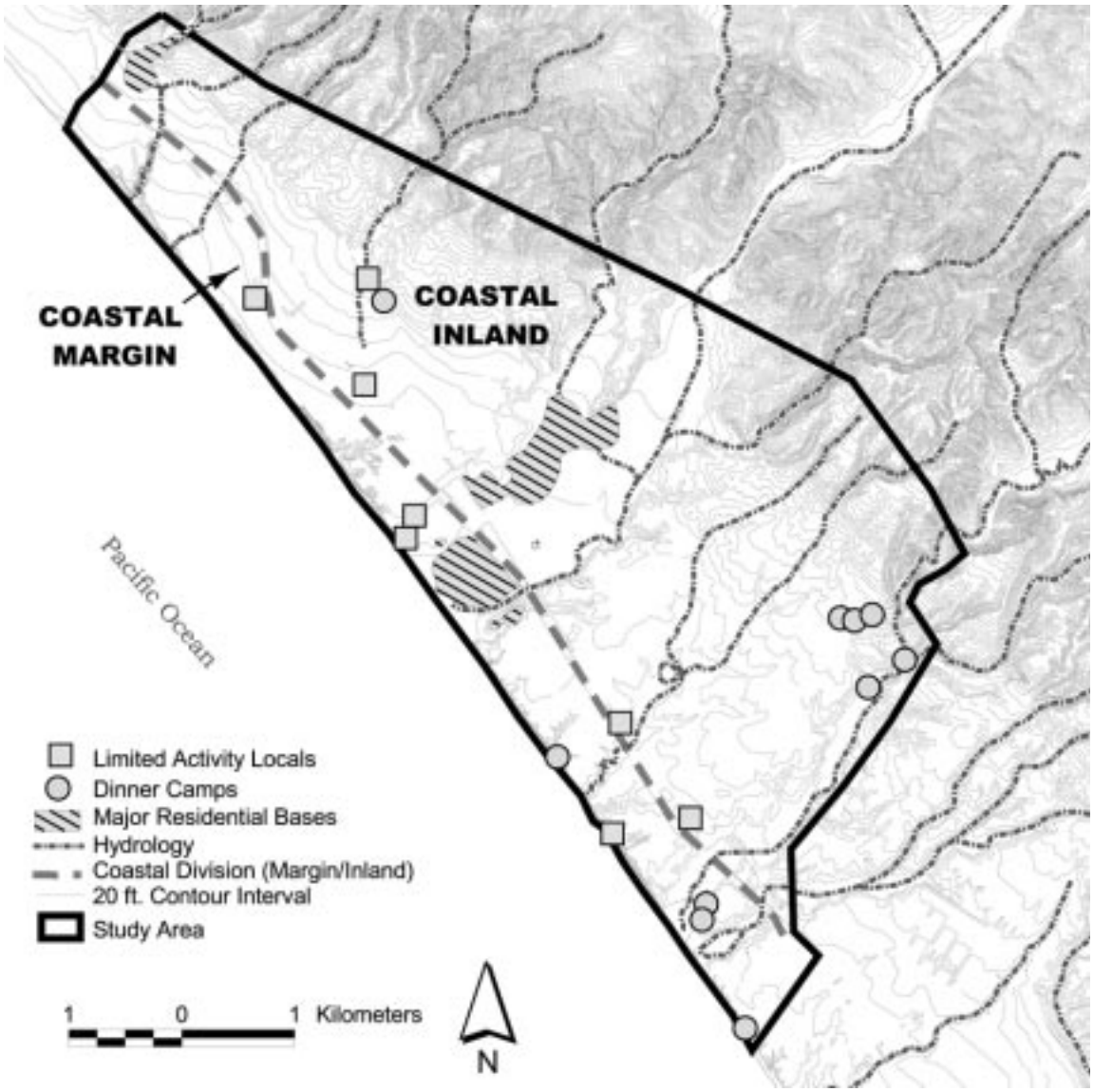

Fig. 5. Spatial distribution of different functional types of prehistoric sites in the central coastal Camp Pendleton study area.

Site Function

Site function within settlement systems is a difficult issue to elucidate particularly when dealing with smaller sites with low densities and restricted ranges of cultural material. For the purposes of this project, we have classified the tested sites into the three categories. These consist of major residential bases, limited activity locales, and dinner camps (Fig. 5). These terms are specific to this project, although they have parallels with other site type classifications (e.g., Binford 1980; Meehan 1982).

Major residential bases are those sites that were repeatedly occupied for multiple seasons, and they are exclusively represented by shell middens. Summary characteristics for these sites were previously discussed. In addition, multiple lines of evidence were used to assess variation between sites with respect to seasonality and yearly length of occupation (Byrd 1996a:316-328; Byrd 1997:140-142). These include archaeobotanical remains, fish otoliths, and seasonally available fish.

The medium and small-size shell scatters are classified as either limited activity locales or dinner camps. Limited activity locales are interpreted as briefly occupied special function sites. These sites have sparse shell densities, limited terrestrial faunal remains, no fish remains, and few or no artifacts. They typically have shallow deposits and low to moderate artifact dispersal. Based on these attributes, we infer that the occupants were almost exclusively involved in shellfish processing and consumption, and rarely conducted other activities.

We further postulate that most of the limited activity locale sites appear to have been created by a restricted number of individuals making multiple returns to a locale, along with a few sites that probably represent single, occupational episodes. Importantly, we believe that absence of fish remains at these sites strengthens the specialized function interpretation and argues against these sites being short-term residences of family groups coming to the coast area to exploit shellfish and fish during inland lean seasons as predicted by Ethnohistoric reconstructions (e.g., Bean and Shipek 1978).

Dinner camps differ from limited activity locales by having higher shell densities, several artifact types represented, occasional fish remains, and higher frequencies of lithics and terrestrial vertebrate remains. They also have a greater range of artifact dispersal, ranging from low to high magnitude. Finally, unlike limited activity locales, these sites are strongly correlated with potential sources of drinking water. Based on these archaeological patterns we interpret theses sites as locations where individuals most likely camped overnight, at times for multiple days. We argue that the greater variation between sites within the dinner camp category as opposed to the limited activity locale category is because they were formed by a wider range of functions. As such, dinner camps include short-term coastal encampments (which often include fish remains), overnight hunting and plant procurement forays, and possible resting camps along transportation routes.

Dinner camps are the most common of the three categories representing 40 per cent of the sample, with limited activity locales and major residential base camps occurring in slightly lower frequencies. When different drainage catchments are examined, the major residential bases are clustered around Las Flores Creek, the dinner camps are most prevalent along Aliso Creek, and limited activity locales are widely distributed on the coastal terraces.

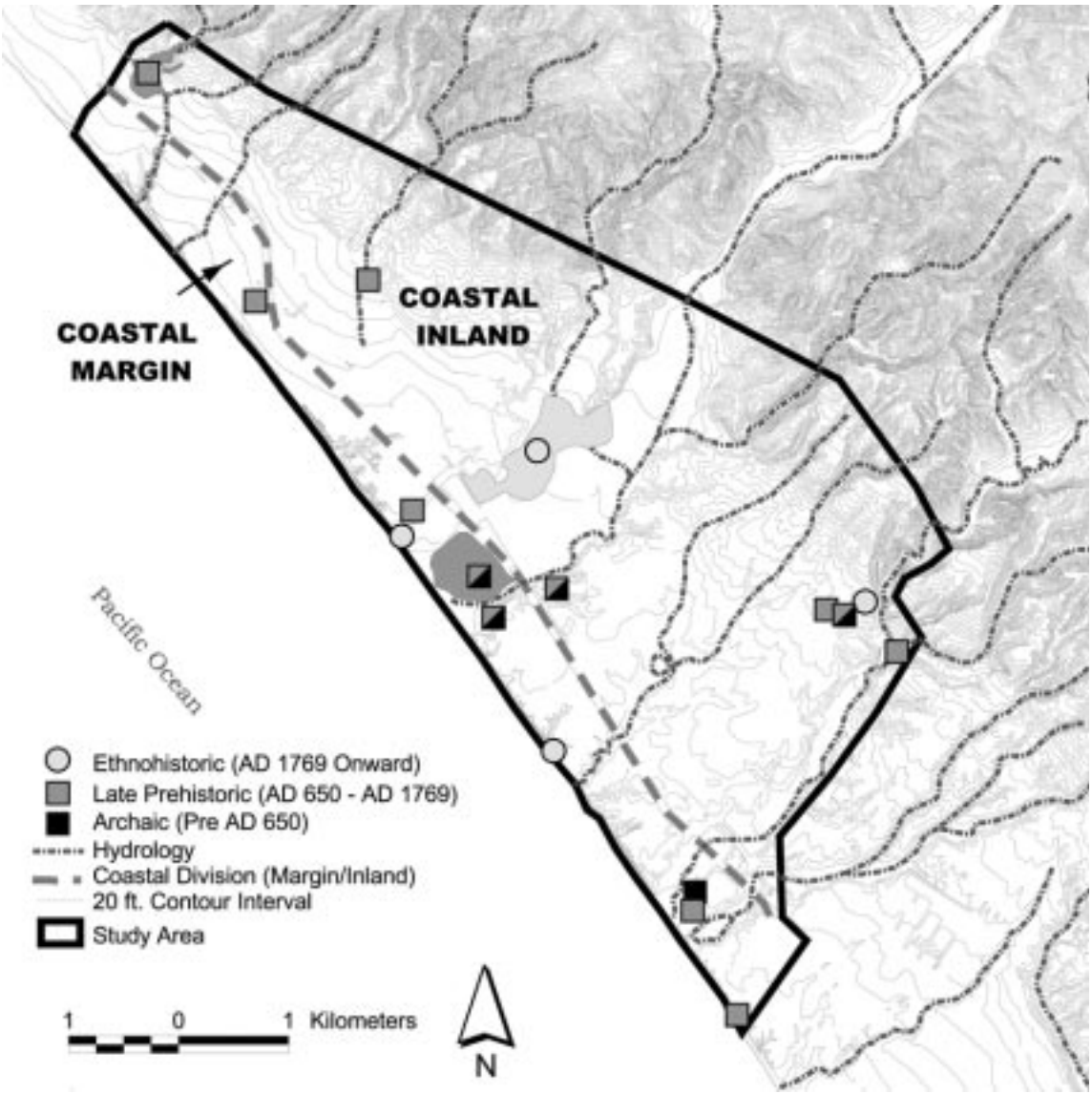

Fig. 6. Spatial distribution of prehistoric sites in central coastal Camp Pendleton study area by cultural period (only excavated sites are presented).

Temporal Patterns

Turning to temporal trends in occupation, two-thirds of the tested sites have been radiocarbon dated (Fig. 6, Table 2). Only four sites reveal Archaic occupation (6500 B.P. - 1300/800 B.P.) (Moratto 1984: Fig. 4.17). These include two early Archaic occupations which date to between 6500-5200 B.C. calibrated along Las Flores Creek, one late Archaic occupation along Aliso Creek, and one site that extends from the Late Archaic into the Late Prehistoric period

Table 2. Radiocarbon dating results for prehistoric sites in the Camp Pendleton central coast study area.

CA-SDI-	Site Type	Provenience	Beta-	Sample Type	C13 Adjusted B.P. ± 1 sigma (B.P.)	Calibrated date + 1 sigma (68% probability)*	Reference
811	MRB	Unit 1, 40-80 cm	84170	*D. gouldii* shell	1725 ± 70	A.D. 635-740	Byrd 1996
811	-	Unit 1, 70-80 cm	76211	*D. gouldii* shell	1560 ± 50	A.D. 790-905	Byrd 1996
811	-	Unit 2, 80-90 cm	76212	*D. gouldii* shell	1740 ± 80	A.D. 615-730	Byrd 1996
811	-	114/60-70, FAR I	?	Charcoal	2850 ± 130	B.C. 1200-835	Rasmussen & Woodman 1998
811	-	116/60-70, FAR	?	*Chione* shell	2670 ± 70	B.C. 210-20	Rasmussen & Woodman 1998
811	-	122/0-20	?	*D. gouldii* shell	1830 ± 60	A.D. 710-875	Rasmussen & Woodman 1998
811	-	122/50-60	?	*D. gouldii* shell	1810 ± 70	A.D. 720-905	Rasmussen & Woodman 1998
811	-	122/60-70	?	*D. gouldii* shell	1820 ± 60	A.D. 720-885	Rasmussen & Woodman 1998
811	-	122/80-90	?	*D. gouldii* shell	2230 ± 80	A.D. 280-495	Rasmussen & Woodman 1998
811	-	109/100-110	?	Pectinidae shell	2510 ± 70	B.C. 20-A.D.150	Rasmussen & Woodman 1998
811	-	115/240 cm, buried AB	?	Pseudochama spp. shell	4290 ± 80	B.C. 2270-2005	Rasmussen & Woodman 1998
812	MRB	Locus A, STP 43, 20-40 cm	86597	*D. gouldii* shell	580 ± 60	na (2 sigma: A.D. 1845-1950)	Woodman 1996
812	-	Locus A, STP 44, 20-40 cm	86598	*D. gouldii* shell	680 ± 50	A.D. 1825-1950	Woodman 1996
812	-	Locus C, Unit 13, 20-30 cm	89382	*D. gouldii* shell	630 ± 60	A.D. 1875-1950	Woodman 1996
812	-	Locus C, Unit 13, 50-60 cm	89379	*D. gouldii* shell	720 ± 60	A.D. 1715-1950	Woodman 1996
812	-	Locus C, Unit 14, 70-80 cm	89378	*D. gouldii* shell	750 ± 60	A.D. 1695-1950	Woodman 1996
812	-	Locus C, STP Unit 14, 90-100 cm	89374	*D. gouldii* shell	640 ± 50	A.D. 1875-1950	Woodman 1996
812	-	Locus C, Unit 15, 30-40 cm	89384	*D. gouldii* shell	730 ± 60	A.D. 1705-1950	Woodman 1996

MRB: major residential base, DC: dinner camp, LAL: Limited activity locale *Beta Analytic Inc. calibrated all dates using the Pretoria Calibration Procedure (Vogel et. al. 1993) and local geographic reservoir effect followed Stuirver et. al. (1993)

Table 2 (cont.). Radiocarbon dating results for prehistoric sites in the Camp Pendleton central coast study area.

CA-SDI-	Site Type	Provenience	Beta-	Sample Type	C13 Adjusted B.P. + 1 sigma (B.P.)	Calibrated date + 1 sigma (68% probability)*	Reference
812	-	Locus C, Unit 17, 60-70 cm	89381	*D. gouldii* shell	630 ± 60	A.D. 1875-1950	Woodman 1996
812	-	Locus C, Unit 19, 140-150 cm	89385	*D. gouldii* shell	830 ± 60	A.D. 1655-1800	Woodman 1996
812	-	Locus C, Unit 19, 170-180 cm	89380	*D. gouldii* shell	870 ± 60	A.D. 1620-1705	Woodman 1996
812	-	Locus C, Unit 19, 190-200 cm	89333	*D. gouldii* shell	910 ± 70	A.D. 1530-1690	Woodman 1996
812	-	Locus D, Unit 38, 20-30 cm	89376	*D. gouldii* shell	800 ± 60	A.D. 1670-1835	Woodman 1996
812	-	Locus D, Unit 38, 40-50 cm	89377	*D. gouldii* shell	820 ± 60	A.D. 1660-1820	Woodman 1996
812	-	Locus E, Unit 24, 90-100 cm	89375	*D. gouldii* shell	660 ± 60	A.D. 1835-1950	Woodman 1996
4538	MRB	Unit 1, 40-50 cm	76213	*D. gouldii* shell	910 ± 60	A.D. 1410-1475	Byrd 1996
4538	-	Unit 1, 40-50 cm	84168	Charcoal	570 ± 70	A.D. 1310-1365, A.D. 1375-1425	Byrd 1996
4538	-	Unit 5, 40-50 cm	84169	Charcoal	940 ± 70	A.D. 1020-1195	Byrd 1996
4538	-	Unit 5, 40-50 cm	76214	*D. gouldii* shell	1120 ± 70	A.D. 1240-1325	Byrd 1996
4540	DC	Unit 1, 10-20 cm	106338	*D. gouldii* shell	860 ± 40	A.D. 1645-1705	Reddy 1997
4540	-	Unit 1, 20-30 cm	106339	*D. gouldii* shell	78 ± 40	A.D. 1690-1835	Reddy 1997
10,726 Locus A	MRB	Unit 1, 70-80 cm	76215	*D. gouldii* shell	1270 ± 70	A.D. 1055-1230	Byrd 1996
10,726 Locus A	-	Unit 1, 70-80 cm	84167	Charcoal	290 ± 70	A.D. 1505-1595, A.D. 1620-1665	Byrd 1996
10,726 Locus B Upper	-	Unit 5, 10-20 cm	76216	*D. gouldii* shell	810 ± 70	A.D. 1455-1565	Byrd 1996
10,726 Locus B Lower	-	Unit 5, 60-70 cm	76217	*Chione* shell	6750 ± 90	B.C. 5360-5215	Byrd 1996
10,726 Locus B Upper	-	Unit 5, 60-70 cm	76218	Charcoal	1090 ± 50	A.D. 895-1005	Byrd 1996

MRB: major residential base, DC: dinner camp, LAL: Limited activity locale *Beta Analytic Inc. calibrated all dates using the Pretoria Calibration Procedure (Vogel et. al. 1993) and local geographic reservoir effect followed Stuirver et. al. (1993)

Table 2 (cont.). Radiocarbon dating results for prehistoric sites in the Camp Pendleton central coast study area.

CA-SDI-	Site Type	Provenience	Beta-	Sample Type	C13 Adjusted B.P. + 1 sigma (B.P.)	Calibrated date + 1 sigma (68% probability)*	Reference
10,726 Locus B Lower	-	Unit 5, 90-100 cm	84166	*Chione* shell	6870 ± 80	B.C. 5445-5305	Byrd 1996
10,728 Locus A Lower	MRB	Unit 3, Dep. 1, 0-10 cm	92913	*Chione* shells	7500 ± 60	B.C. 6000-5915	Byrd 1997
10,728 Locus A Lower	-	Unit 3, Dep. 1, 30-40 cm	91243	*Chione* shells	7200 ± 90	B.C. 5740-5585	Byrd 1997
10,728 Locus A Lower	-	Unit 3, Dep. 4, 60-77 cm	91244	*Chione* shells	7760 ± 100	B.C. 6345-6120	Byrd 1997
10,728 Locus A Lower	-	Unit 3, Dep. 5, 70-93 cm	92914	*Chione* shells	7365 ± 85	B.C. 5925-5730	Byrd 1997
10,728 Locus A Upper	-	Unit 5, Dep. 1, 0-10 cm	92915	*D. gouldii* shells	1060 ± 70	A.D. 1285-1395	Byrd 1997
10,728 Locus A Upper	-	Unit 5, Dep. 1, 40-50 cm	92917	*D. gouldii* shells	1020 ± 70	B.C. 4940-4755	Byrd 1997
10,728 Locus A Lower	-	Unit 5, Dep. 1, 40-50 cm	92916	*Chione* shells	6350 ± 90	A.D. 1305-1420	Byrd 1997
10,728 Locus B	-	Unit 1, Dep. 1, 20-30 cm	91245	*D. gouldii* shells	780 ± 70	A.D. 1475-1635	Byrd 1997
10,728 Locus B	-	Unit 2, Dep. 1, 20-30 cm	91246	*D. gouldii* shells	870 ± 70	A.D. 1425-1505	Byrd 1997
14,494	DC	Unit 1, 40-50 cm	106340	*D. gouldii* shell	1590 ± 60	A.D. 990-1105	Reddy 1997
14,494	-	Unit 1, 70-80 cm	106341	*D. gouldii* shell	1660 ± 60	A.D. 905-1035	Byrd 1997
14,495	DC	Unit 1, 20-30 cm	106342	*D. gouldii* shell	770 ± 60	A.D. 1685-1875	Reddy 1997
14,495	-	Unit 1, 50-60 cm	106343	*D. gouldii* shell	730 ± 50	A.D. 1710-1950	Reddy 1997
14,497	DC	Unit 1, 10-20 cm	106344	*D. gouldii* shell	890 ± 60	A.D. 1565-1695	Reddy 1997
14,497	-	Unit 1, 30-40 cm	106345	*D. gouldii* shell	1000 ± 60	A.D. 1475-1635	Reddy 1997
14,503	LAL	Unit 1, 20-30 cm	115028	*D. gouldii* shell	800 ± 50	A.D. 1675-1825	Reddy 1998c
14,504	LAL	STP 4, 30-40 cm	115029	*D. gouldii* shell	1070 ± 50	A.D. 1440-1515	Reddy 1998c

MRB: major residential base, DC: dinner camp, LAL: Limited activity locale *Beta Analytic Inc. calibrated all dates using the Pretoria Calibration Procedure (Vogel et. al. 1993) and local geographic reservoir effect followed Stuirver et. al. (1993)

Table 2 (cont.). Radiocarbon dating results for prehistoric sites in the Camp Pendleton central coast study area.

CA-SDI-	Site Type	Provenience	Beta-	Sample Type	C13 Adjusted B.P. + 1 sigma (B.P.)	Calibrated date + 1 sigma (68% probability)*	Reference
14,506	LAL	Unit 1, 10-20 cm	106337	*D. gouldii* shell	970 ± 70	A.D. 1485 -1660	Reddy 1997
14,516	LAL	Unit 1, 40-50cm	115030	*D. gouldii* shell	1030 ± 60	A.D. 1455-1565	Reddy 1998c
14,519	DC	Unit 1, 20-26 cm	115031	*D. gouldii* shell	790 ± 40	A.D. 1685-1825	Reddy 1998c
14,520	DC	Unit 1, 20-30 cm	115032	*D. gouldii* shell	1080 ± 60	A.D. 1430-1515	Reddy 1998c
14,521	DC	Unit 1, 20-30 cm	115033	*D. gouldii* shell	1100 ± 60	A.D. 1420-1500	Reddy 1998c
14,522	DC	Unit 1, 80-90 cm	115034	*D. gouldii* shell	2760 ± 60	A.D. 350-155	Reddy 1998c

MRB: major residential base, DC: dinner camp, LAL: Limited activity locale *Beta Analytic Inc. calibrated all dates using the Pretoria Calibration Procedure (Vogel et. al. 1993) and local geographic reservoir effect followed Stuirver et. al. (1993)

along Las Flores Creek. In contrast, 16 sites post-date A.D. 600 calibrated, and most of these sites are dated to the last 500 years. These include five sites with dates in the Ethnohistoric period.

When temporal patterns between settlement types are examined (Fig. 7), three points can be made. First, major residential bases (shell middens) are present throughout the sequence including the early Archaic (which is not shown in Fig. 7) and from at least A.D. 1 onward. Second, dinner camps are currently dated only to the last 2000 years, and most occur during the last 500 years. Third, all the limited activity locales post-date A.D. 1400. Thus, in this coastal region, there is a diachronic trend towards an increase in specialized small and medium-sized sites–both limited activity locales and dinner camps.

Conclusions

To summarize, very different land-use patterns are evident over time, and one can contrast the early and middle Holocene with the late Holocene and the final Holocene. In the early to middle Holocene, only large residential sites are present, and they occur only along Las Flores Creek. No other site types are documented as part of this settlement system. The absence of specialized sites may be a result of a prehistoric focus on lagoonal resources such as appears to have been present at Las Flores Creek during the early-middle Holocene (see Wake next issue). In this context, collecting coastline areas within a daily foraging radius may have been

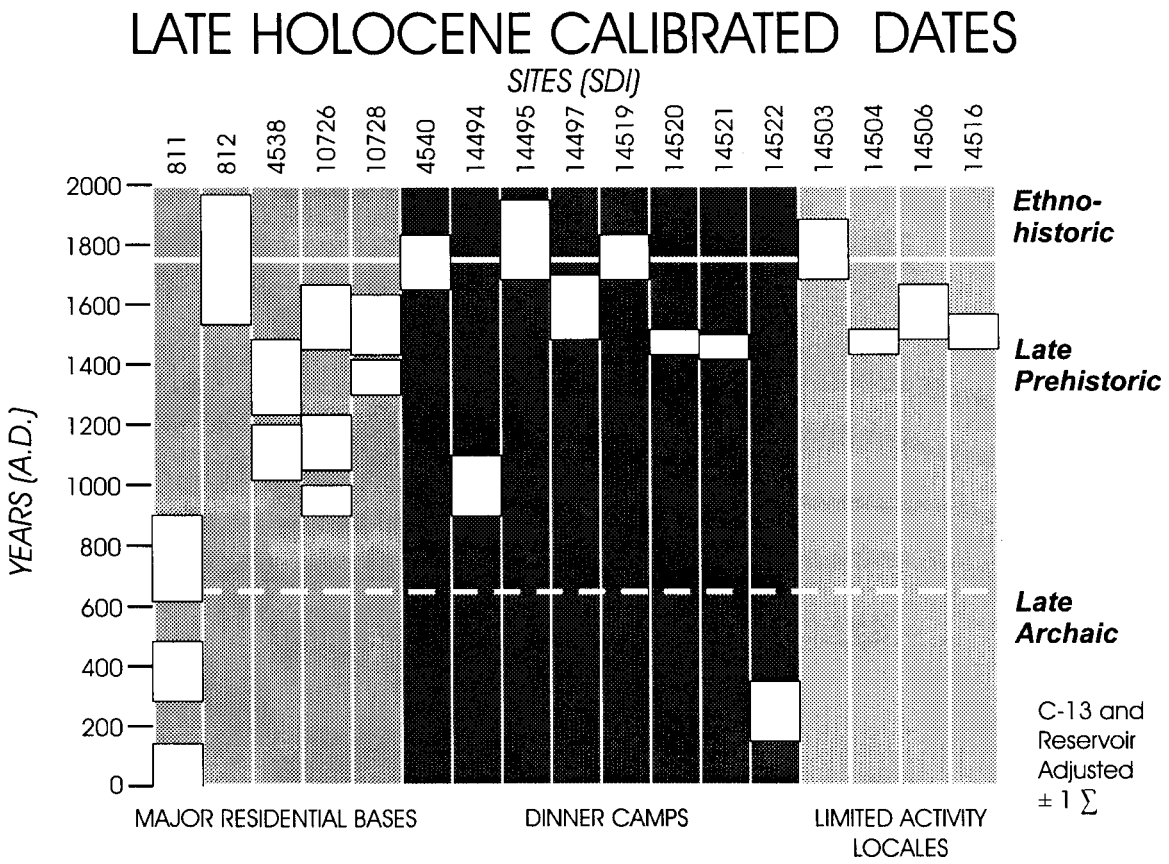

Fig. 7. Late Holocene calibrated dates for prehistoric sites in central coastal Camp Pendleton study area.

a low-ranked option. Of course, sites along the early Archaic coastal margin, particularly limited activity locales, may have eroded away since the 7000 BP coastline was situated a considerable distance further to the west.

In addition, if rocky shoreline species such as mussels were collected during such daily forays, then they may have been subject to some processing at the collection point to reduce transport costs. Hence, any “snacking” at limited activity locales prior to returning to major residential bases would have occurred at these shoreline locations that are long since eroded (see Bettinger et al. 1997; Jones and Richman 1995). It would not have occurred on the coastal terraces as documented during the late Holocene. Of course, it should be reiterated that our perceptions of early-middle Holocene litoral adaptations are limited.

The late Holocene also includes major residential bases, and these sites are larger that those documented for the early and middle Holocene. The late Holocene archaeological landscape also has a higher site density dominated by shorter-term sites of more limited function. The

dinner camps occur initially in the late Holocene. They were created by a series of activities and include short-term residences of small groups exploiting resources from several local niches and probably overnights camps while in route to more distant inland areas.

Limited activity locales are only documented in the late Holocene after AD 1400. These sites are interpreted as locations where task groups or individuals on daily foraging ventures collecting sandy beach shellfish and possibly other resources stopped and consumed a small portion of their collected foods. The remainder of the food was then carried back to base camps such as those at Las Flores Creek and Horno Canyon. Similar patterns have been noted in coastal ethnographic contexts (e.g., Bird and Bliege Bird 1997; Meehan 1982).

We argue that these patterns are compelling evidence of a long-term trend toward greater resource intensification along the coast. This pattern is discernible over the entire time depth documented for the region, and its pace appears to increase dramatically around 500 years ago. In other words, hunter-gatherer populations during the latter portion of the late Holocene were organizing themselves in such a manner as to maximize resource exploitation throughout the area. This included daily forays from central locales (major residential bases such as large shell midden sites) to target collection of specific resources dominated by *Donax*. It also included slightly longer stays at overnight camps away from the residential base that may have capitalized on the seasonal availability of specific resources. The latter sites tend to occur in ecotonal contexts. These results indicate that the late Holocene was a period when coastal populations coped with smaller foraging ranges by increasing intensification of specific resources thus creating a greater range of site types.

Overall, these trends, albeit from a limited data base, suggest lower population densities in the early to middle Holocene and less need for more specialized sites within daily foraging range of major residential bases. The results further suggest that the late Holocene witnessed increased population pressure (either the result of larger populations or a more restricted subsistence base), decreased foraging territory, and more intensive use of the littoral landscape. In conclusion, this reconstruction is in concert with recent results emerging from other areas of coastal California which reveal resource intensification during the late Holocene (e.g., Basgall 1987; Broughton and O'Connell 1999; Raab 1996; Wohlgemuth 1996).

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