The Red Beach Site and 3,000 Years of Coastal Settlement Change

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Abstract

The Red Beach site, consisting of an extensive Archaic/Late Prehistoric archaeological deposit, provides information to explore the changing role of coastal sites in the Las Flores Creek region of Camp Pendleton. The site has been occupied, abandoned, and then re-occupied over a long period of time from B.C. 2200 to A.D. 900. Various portions of the site were used during different time periods, and some specific locations were re-occupied. Other Las Flores Creek drainage sites are reviewed and compared with the Red Beach site to form a better understanding of local settlement patterns through time.

Introduction

Various models have been proposed that attempt to outline the structure of settlement and subsistence strategies of hunter/gatherers living in the Camp Pendleton region. Most are based on ethnographic reconstructions of Luiseño or Juaneño patterns and involve the establishment of sedentary or semi-sedentary bases along the coast (e.g., Bean and Shipek 1978; Koerper 1981; Shipek 1977). One problem with many of these models is that little ethnohistoric information exists about coastal occupations because coastal regions were the first affected by the Spanish (e.g., Kroeber 1925; Sparkman 1908). Even if there was a clear understanding of coastal settlement by the Luiseño during the ethnohistoric period, it would explain little about how settlement dynamics have changed over time.

Recent excavations at the Red Beach site in the Las Flores Drainage of Camp Pendleton offer a glimpse of how a single large site was used over a 3,000 year period (Rasmussen et al. 1998). The site was a short-term residential base occupied during various seasons of the year from approximately 2200 B.C. to A.D. 900. Excavations at the site recovered a wide range of artifacts and faunal material, and exposed the presence of features and distinct activity areas. The site, therefore, has been defined as a residential base camp, following Binford's (1980) definition. The chronological and seasonality data suggest that the site was not a year-round base camp but was occupied for relatively short periods of time during different seasons of the year (Rasmussen et al. 1998).

The individual components of the Red Beach site are highlighted below, followed by a brief review of other archaeological sites located in the same coastal drainage. Information from the Red Beach site, in conjunction with its neighboring sites, provides a basis for the exploration of how coastal settlement systems have changed through time along coastal Camp Pendleton.

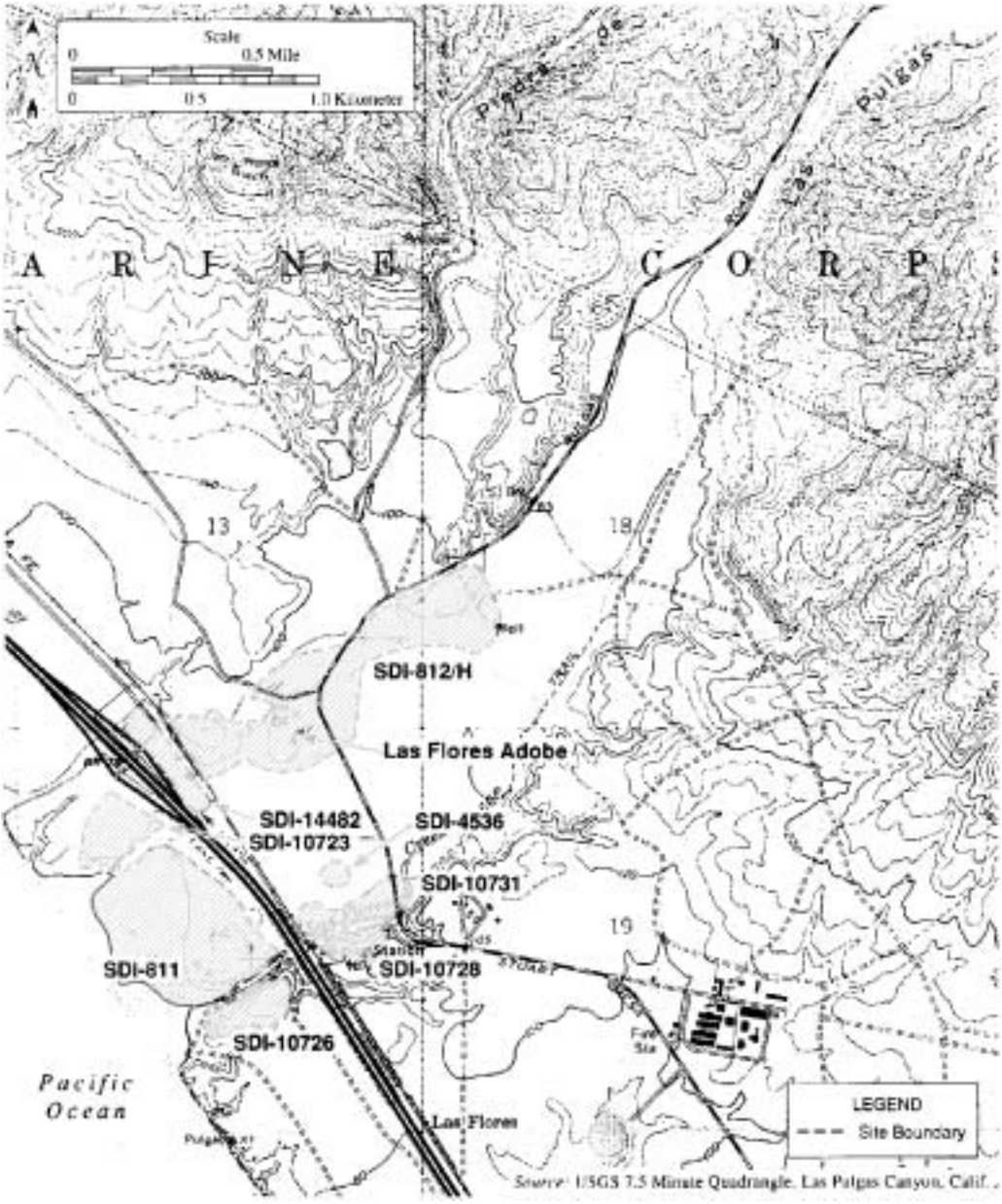

Figure 1. Location of Archaeological Sites in the Las Flores Creek Area.

The Red Beach Site

Background

The Red Beach site (CA-SDI-811) consists of an extensive Archaic/Late Prehistoric archaeological deposit within an alluvial fan formed at the mouth of Las Flores Creek (Fig. 1). The site was originally recorded as a scatter of three metates, 12 manos, and six domed scrapers observed on the surface approximately 100 meters from the shoreline along the north bank of the creek near a lagoon (California Parks and Recreation 1961). Subsequent archaeological investigations consisted of site visits during two surveys (Kaldenberg 1982; Glenn and Crawford 1994); excavation of 53 shovel test pits (STPs) and four units concentrated in the southeastern portion of the site (Byrd 1996); and excavation of ten backhoe trenches in the northern portion of the site along the centerline of a proposed sewage pipeline (Cagle et al. 1995). Byrd (1996) focused on evaluating the *National Register of Historic Places* (NRHP) eligibility of the site while Cagle et al.'s (1995) work was conducted to determine whether previously untested portions of the site contained significant archaeological deposits. The former investigation was located in the southern portion of the site and centered in an area with a high density intact midden based upon the artifact and shellfish densities. Cagle et al.'s (1995) investigation took place in the northern portion of the site, in an area with low density surface and subsurface materials.

These investigations indicated some intra-site spatial variability in material discard patterns. The material densities do not drop off steadily as one moves away from the dense midden area. Patchy distributions of flaked stone debitage, shell, and other faunal remains suggest possible activity areas or temporally discrete occupations. On the basis of these investigations, the site has been determined to be eligible for listing on the NRHP based on criterion "d" of 36 CFR 60.4.

Rasmussen et al. (1998) excavated an additional twenty-four units and thirteen backhoe trenches (Fig. 2), totaling a volume of 172 cubic meters in 1997. This 1997 investigation was conducted as part of a data recovery program for the mitigation of impacts from the construction of a sewage pipeline project on the Marine Corps Base, Camp Pendleton. This paper provides a brief summary of the results of that project (see Rasmussen et al. 1998 for complete details).

Site Stratigraphy

The 1997 investigations revealed cultural deposits ranging in age from 2200 B.C. to A.D. 900 (Table 1, Fig. 3). The main deposit lies within the upper portion of an alluvial fan that had a very active depositional history. The surface soil consists of a dark, organically rich A horizon, followed by a culturally-sterile C horizon composed of fluvial sediments. There was also a

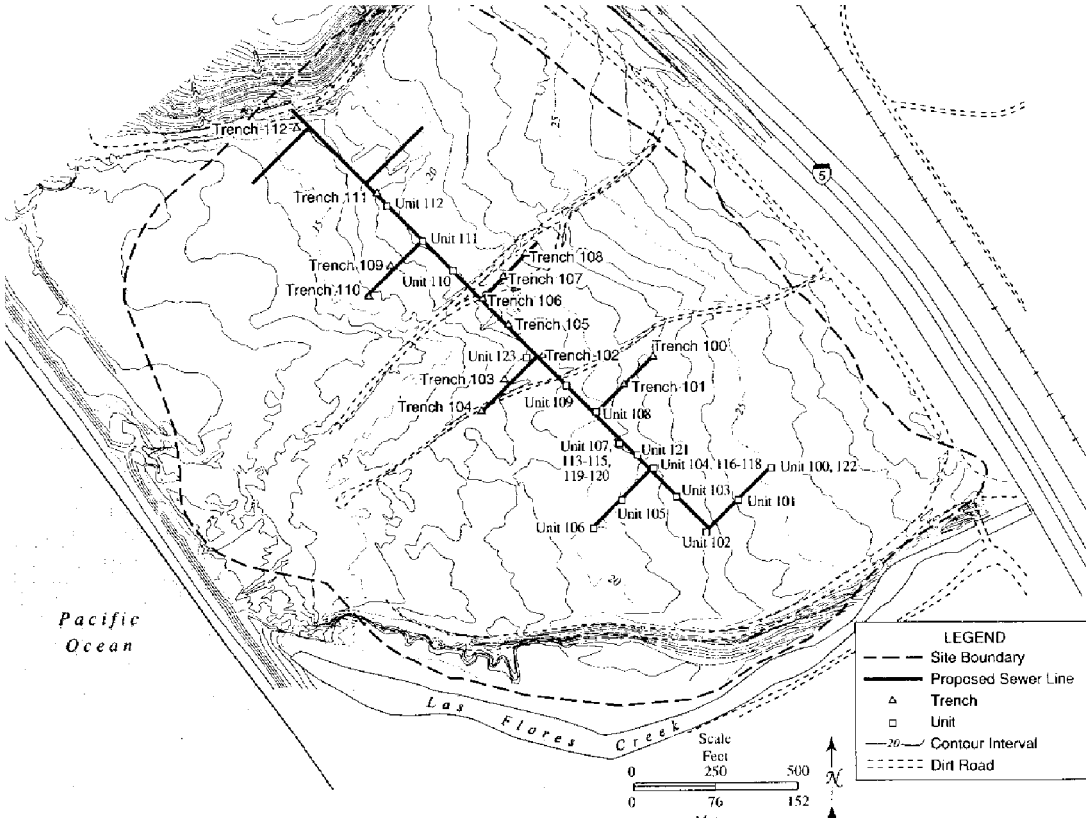

Fig. 2. Location of the Excavation Units and Backhoe Trenches at CA-SDI-811.

transitional AC stratigraphic layer between the surface A horizon and the C horizon soils, representing a mixed deposit of the two horizons probably due to bioturbation.

An approximately 10-meter high cut bank adjacent to Las Flores Creek provides an exposure of a sequence of three to four buried soil profiles representing a number of potential occupation surfaces at this locality (Byrd 1996). Signs of a buried A horizon soil beneath the culturally-sterile C horizon strata was seen in several of the 1997 excavation exposures, including Units 100-103, 109, 115, 116 and Trenches 102, 103, 110 (Fig. 2). In addition, a buried A horizon was observed during the 1995 test excavations in Trench 1 at 80-165 centimeters (cm), in Trench 4 at 114-148 cm, and in Trench 6 at 128-137 cm below the surface (Cagle et al. 1995).

Historic farming activities created a plowzone that correlates roughly with the top 40 cm of soil. The bulk of the archaeological material, however, was recovered within intact soil deposits located beneath the plowzone 40 to 150 cm below the surface.

Table 1. Radiocarbon Dates from CA-SDI-811.

Unit/ Level (cm)	Material	Conventional C-14 Age*	Calibrated Results (1 Sigma)	Calibrated Results (2 Sigma)	Context	Reference
114/60-70	Charcoal	2850 + 130 B.P.	B.C. 1200 - 835	B.C. 1395 - 795	FAR I	SAIC 1998
116/60-70	Shell (*Chione* spp.)	2670 + 70 B.P.	B.C. 210 - 20	B.C. 350 - A.D. 70	FAR II	SAIC 1998
122/0-20	Shell (*Donax* spp.)	1830 + 60 B.P.	A.D. 710 - 875	A.D. 665 - 960	Dense midden	SAIC 1998
122/50-60	Shell (*Donax* spp.)	1810 + 70 B.P.	A.D. 720 - 905	A.D. 665 - 1000	Dense midden	SAIC 1998
122/60-70	Shell (*Donax* spp.)	1820 + 60 B.P.	A.D. 720 - 885	A.D. 670 - 970	Dense midden	SAIC 1998
122/80-90	Shell (*Donax* spp.)	2230 + 80 B.P.	A.D. 280 - 495	A.D. 175 - 605	Dense midden	SAIC 1998
109/100-110	Shell (Pectinidae)	2510 + 70 B.P.	B.C. 20 - A.D. 150	B.C. 130 - A.D.250	Midden area	SAIC 1998
115/240 cm	Shell (*Pseudochama* spp.)	4290 + 80 B.P.	B.C. 2270 - 2005	B.C. 2405 - 1890	Buried Ab horizon	SAIC 1998
1/40-80	Shell (*Donax* spp.)	1725 + 70 B.P.	A.D. 635 - 740	A.D. 565 - 815	Midden area	Byrd 1996
1/70-80	Shell (*Donax* spp.)	1560 + 50 B.P.	A.D. 790 - 905	A.D. 730 - 970	Feature B	Byrd 1996
2/80-90	Shell (*Donax* spp.)	1740 + 80 B.P.	A.D. 615 - 730	A.D. 530 - 820	Midden area	Byrd 1996

*Notes:

1. Conventional radiocarbon age adjusted for 13C/12C correction; marine carbonate samples have also been corrected for both global and local geographic reservoir effects as published in *Radiocarbon*, v. 35(1), 1993.

2. Samples calibrated based on the Pretoria Calibration Procedure, as reported by Beta Analytic, Inc. (see Appendix G of Rasmussen, et. al. 1998 or Beta Analytic's general procedures for more details).

3. All samples dated by standard counting methods.

Overview of Cultural Material

The majority of the recovered material consisted of animal bone, shellfish, flaked stone, and fire-affected rock (Table 2). Tizon Brownware pottery, ground stone, shell and bone beads, botanical remains, and tarring pebbles were also recovered, but only in small amounts and

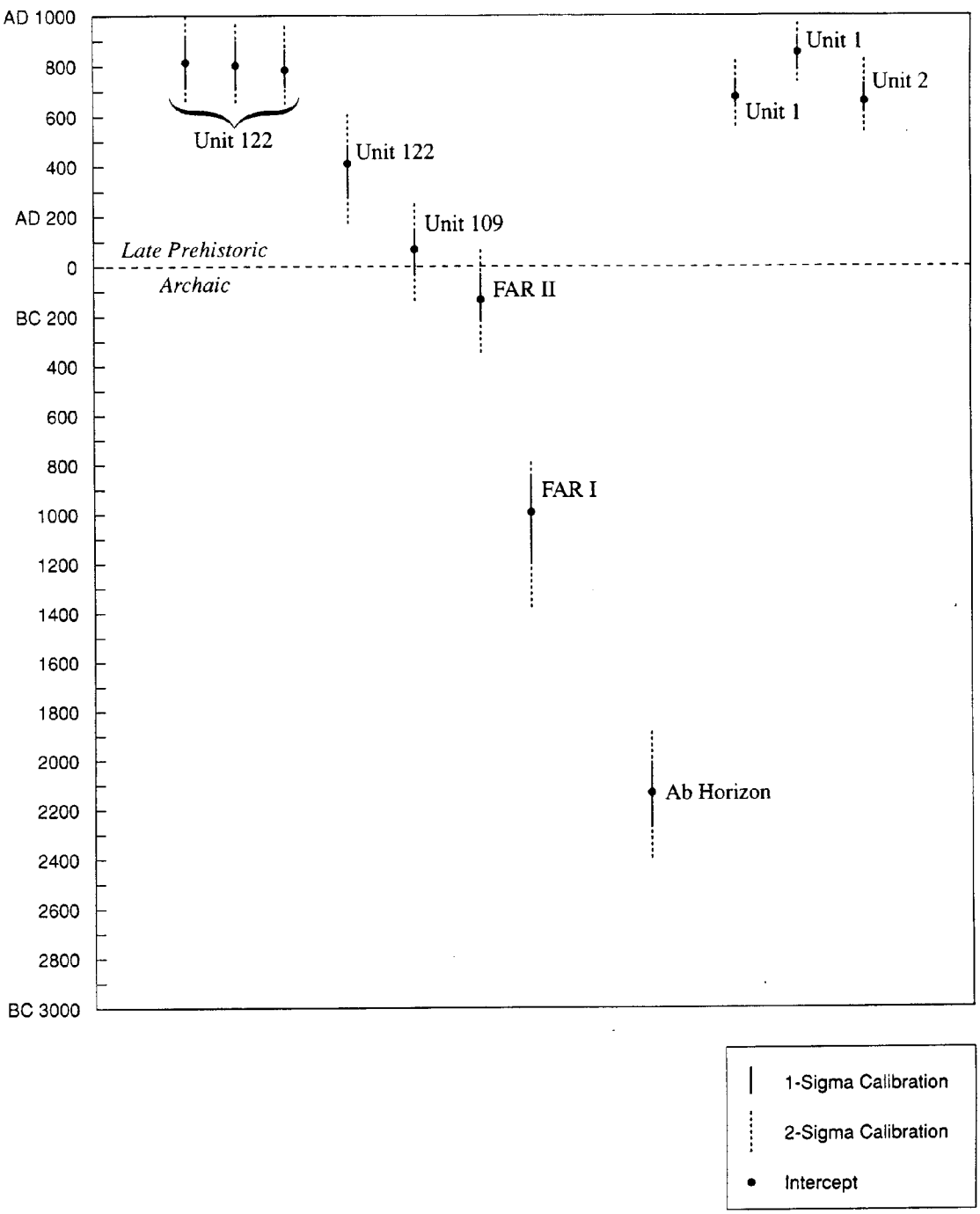

Fig. 3. Distribution of Radiocarbon Dates from CA-SDI-811.

Table 2. Density of Cultural Material at CA-SDI-811.

Unit	Excavated Volume (m3)	Flaked Stone (ct/m3)	Bone (g/m3)	Shell (g/m3)	FAR (g/m3)
100	1.1	82.73	22.55	1986.30	4691.09
101	0.8	30.00	1.25	53.65	461.75
102	0.8	8.75	5.38	14.66	102.88
103	0.7	28.57	2.14	486.20	523.29
104	0.5	198.00	46.00	143.72	6308.60
105	0.7	30.00	2.00	16.36	1303.14
106	0.7	10.00	0.00	12.40	397.00
107	0.7	292.86	81.00	8.60	27768.57
108	1.0	125.00	7.70	6.97	1580.30
109	1.5	172.00	109.87	55.03	1225.40
110	0.7	0.29	15.29	143.21	1681.86
111	0.7	27.14	2.71	8.04	81.57
112	0.3	13.33	1.67	16.37	22.67
113	0.6	216.67	18.50	2.98	16086.50
114	0.9	245.56	73.00	1.43	10314.78
115	1.3	173.85	120.54	4.52	16846.69
116	1.5	121.33	106.40	217.07	27974.20
117	1.1	143.64	76.09	169.97	25863.55
118	0.5	100.00	12.20	33.18	10310.80
119	0.5	100.00	17.60	0.00	12775.60
120	0.5	138.00	39.20	8.44	23316.60
121	1.5	175.33	45.87	225.08	5776.80
122	1.1	63.64	43.09	1792.15	5396.27
123	0.8	38.75	9.50	4.50	641.75

were often scattered throughout the site instead of clustered in discrete areas. The latter material, therefore, provides little information about changes in material use or techniques of manufacture over time.

The vertebrate assemblage represents a diversified subsistence strategy that used a wide range of resources from the immediate and nearby areas. The site assemblage displayed a fair amount of diversity for its sample size and included marine (fish, sea otter, pinniped), freshwater (pond turtle), and terrestrial resources (deer, coyote or dog, jackrabbit, cottontail or brush rabbit, ground squirrel, pocket gopher, woodrat). The fish assemblage consists of at least 13 mutually exclusive taxa from sandy bottom, rocky bottom, and open water habitats.

The highly diversified invertebrate assemblage consists of 18 mutually exclusive taxa from a wide range of habitats. Despite the high diversity, only a few species (Little Bean clam, Venus clams, scallops) dominate the assemblage in terms of abundance. The overall assemblage indicates a pronounced emphasis on the exploitation of sandy shores with a moderate exploitation of bays and/or marine estuaries. Rocky shore species are present but only in low numbers.

The flaked stone assemblage consists of 3,311 artifacts. Over 98 per cent of the assemblage was composed of debitage, while the remaining 2 per cent include 26 cores, 17 utilized flakes, 12 unifacially retouched flakes, and 9 percussion tools. No projectile points or bifaces were recovered from the site. The lithic raw material—volcanic cobbles, quartz, quartzite, granitic material, chert, and metamorphic rock—came primarily from local sources. Analysis of both the cores and debitage suggest that the primary tool manufacturing technique used was cobble core reduction of water-worn volcanic and quartz cobbles. The goal of most manufacturing sequences represented at the site appear to have been the production of large flakes, not formal tools. Intra-site analysis of the flaked stone assemblage suggests that this basic pattern of tool production remained constant throughout the history of occupation at SDI-811 (Rasmussen et al. 1998:121).

The distribution of cultural material displays strong horizontal, vertical, and temporal patterns. The southeast portion of the site contains higher densities of material, in general, than those further to the northwest. In addition, the deposits within the southeast portion display strong localized spatial patterns, including discrete midden areas, scatters of fire-affected rock, and a buried cultural component. Although intra-site analysis suggests there was little variation in stone tool production over time, the faunal material appears to reflect some dietary change over time, especially in the exploitation of *Donax*.

Midden Areas

Scatters of midden appear throughout the site; however, the highest densities of shell and animal bone were encountered in two excavation areas: Unit 100/122 and Unit 109. Despite

superficial similarities in appearance, the two midden deposits yielded very different faunal assemblages and were not contemporaneous.

Units 100 and 122 (Fig. 2) form a 1 m x 2 m excavation area and contain a dense midden deposit dominated by *Donax* remains (Table 3). The deposit dates to the Late Prehistoric period, approximately A.D. 700-900 (Table 1, Fig. 3). Most of the cultural material was recovered from the A horizon stratum (0 to 70 cm in depth), which was composed of a dark grayish-brown, very fine sandy loam.

Units 100 and 122 have the highest density of shell remains from the entire site but contain relatively low densities of animal bone (Table 2). Sixty-nine per cent of the shell assemblage was composed of *Donax* (Table 3). No other portion of the site contained such high quantities of *Donax* remains. Despite the low density of the vertebrate remains, the assemblage was composed of at least thirteen types of animals, including pinniped, turtle, bird, four types of fish, and various-sized terrestrial mammals (Table 4). Fish comprised approximately 16 per cent of the assemblage (by NISP).

The composition of cultural material from Unit 109 differs significantly from Units 100 and 122. The majority of the cultural material was recovered between 40 and 110 cm in depth. The top 60 cm of soil correlated with the A horizon, which was composed of a dark grayish-brown, fine-grained sandy loam. The soil stratum from 60 to 110 cm in depth was composed of a mottling of the dark brown sandy loam from the A horizon and the lighter colored, coarse-grained loamy sand from the lower C horizon stratum.

Unit 109 has a much higher density of animal bone than Units 100 and 122 but a much lower density of shell and very little *Donax* (Tables 3 and 5). The vertebrate assemblage contains sixteen mutually exclusive taxa, eight of which belong to various types of fish. The faunal remains contain both small and large terrestrial game as well as a higher percentage of fish remains than other portions of the site (47 per cent by NISP). The deposit in Unit 109 dates to the transitional period between the Archaic and Late Prehistoric, approximately 20 B.C. to A.D. 150 (Table 1, Fig. 3).

Based on the two discrete midden deposits, there appears to have been some changes in the exploitation of specific marine resources over time. Fish appears to be more important during the transitional period between the Archaic and Late Prehistoric, while shellfish, especially *Donax*, increases in importance during the Late Prehistoric period. Both deposits, however, demonstrate that the site's inhabitants were exploiting a wide range of resources during both the Archaic and Late Prehistoric time periods. The high diversity of animal species as well as the presence of deer and rabbit (see Table 4) suggest that the site was not used as a specialized processing base for exploiting local marine resources during either time period but instead represents a short-term residential base.

Table 3. Invertebrate Taxa for CA-SDI-811.

Taxon	Units 100/122 Wt (g)	Units 100/122 Per cent	Unit 109 Wt (g)	Unit 109 Per cent	FAR I Wt (g)	FAR I Per cent	FAR II Wt (g)	FAR II Per cent
Gastropoda								
Gastropoda, undif. (Univalve)	0.9	0.02	0.1	0.12	-	-	2.0	0.33
Crepidula spp. (Slipper Shell)	0.2	0.00	0.1	0.12	-	-	-	-
Haliotis spp. (Abalone)	-	-	2.6	3.14	-	-	7.2	1.20
Olivella biplicata (Purple Olive)	0.2	0.00	-	-	-	-	-	-
Tegula spp. (Top Shell)	-	-	1.5	1.81	-	-	3.1	0.52
Trivia spp. (Coffee Bean/Sea Button)	-	-	-	-	-	-	0.2	0.03
Pelecypoda								
Chione spp. (Venus Clam)	296.1	7.12	-	-	0.7	3.32	116.3	19.34
Donax gouldii (Little Bean Clam)	2,872.0	69.09	3.6	4.35	6.9	32.70	36.5	6.07
Mytilus spp. (California Mussel)	0.6	0.01	4.5	5.44	2.0	9.48	19.3	3.21
Ostrea lurida (California Oyster	29.9	0.72	1.6	1.93	-	-	61.2	10.18
Pectinidae (Scallop)	177.1	4.26	48.1	58.16	0.7	3.32	223.0	37.09
Protothaca spp. (Littleneck Clam)	50.4	1.21	2.2	2.66	1.2	5.69	4.0	0.67
Septifer bifurcatus (Platform Mussel)	-	-	-	-	-	-	1.2	0.20
Tagelus californianus (Jackknife Clam)	2.6	0.06	1.2	1.45	-	-	0.4	0.07
Tivela stultorum (Pismo Clam)	277.4	6.67	-	-	-	-	3.1	0.52
Veneridae (Venus Clams)	446.2	10.73	9.8	11.85	8.2	38.86	107.2	17.83
Other Invertebrates								
Polyplacophora (Chiton)	-	-	1.7	2.06	-	-	2.3	0.38
Balanus spp. (Barnacle)	-	-	1.2	1.45	-	-	0.5	0.08
Decapoda (Crab)	-	-	-	-	-	-	3.1	0.52
Shell, undif.	3.2	0.08	4.5	5.44	1.4	6.64	10.6	1.76
Total	4,156.8	100	82.7	100	21.1	100	601.2	100

Table 4. Vertebrate Taxa for CA-SDI-811.

Taxon	Units 100/122 NISP	Unit s 100/122 Wt (g)	Unit 109 NISP	Unit 109 Wt (g)	FAR I NISP	FAR I Wt (g)	FAR II NISP	FAR II Wt (g)
Marine Resources								
Teleostei, undif. (Bony Fish)	15	1.7	113	36.0	71	15.5	133	25.6
Carangidae (Jacks)	-	-	-	-	1	1.2	-	-
Embiotocidae (Surfperch)	-	-	-	-	-	-	1	0.2
Semicossyphus pulcher (CA Sheephead)	2	0.4	1	0.5	8	3.4	19	6.9
Sciaenidae (Croakers)	-	-	2	0.2	-	-	5	3.5
Scombridae (Mackerels & Tunas)	-	-	1	0.1	-	-	-	-
Scomber japonicus (Pacific Mackerel)	-	-	8	1.0	1	0.2	2	0.1
Paralabrax spp. (Bass)	2	0.4	3	1.3	1	0.1	2	0.3
Pleuronectiformes (Flounders)	-	-	1	0.9	-	-	-	-
Bothidae (Lefteye Flounders)	-	-	5	6.3	3	1.2	-	-
Elasmobranchii, undif. (Cartilaginous Fish)	1	0.1	7	2.1	19	3.2	11	2.8
Triakididae (Smoothhounds)	2	0.6	3	11.1	2	0.9	4	1.6
Galeorhinus galeus (Soupfin Shark)	-	-	2	2.4	2	3.9	3	4.0
Rhinobatiformes/Myliobatidiformes (Ray)	-	-	3	1.2	3	0.7	-	-
Rhinobatos productus (Shovelnose Guitarfish)	1	0.2	12	5.8	4	0.7	5	0.9
Myliobatidiformes (Eagle Rays)	-	-	4	0.6	2	0.3	-	-
Myliobatis californica (Bat Ray)	-	-	2	0.6	4	1.3	3	0.7
Pinnipedia (Seals & Sea Lions)	1	1.5	-	-	3	2.6	7	22.0

Table 4 (cont.). Vertebrate Taxa for CA-SDI-811.

Taxon	Units 100/122 NISP	Unit s 100/122 Wt (g)	Unit 109 NISP	Unit 109 Wt (g)	FAR I NISP	FAR I Wt (g)	FAR II NISP	FAR II Wt (g)
Otariidae (Sea Lion & Fur Seal)	-	-	-	-		-	2	8.5
Enhydra lutris (Sea Otter)	-	-	-	-	8	5.8	1	2.6
Marine Mammal, undif.	-	-	-	-	6	3.5	3	3.2
Terrestrial Resources								
Odocoileus hemionus (Mule Deer)	2	18.0	3	17.0	12	46.0	11	28.0
Artiodactyla (Even-toed Hoofed Mammal)	1	0.5	-	-	4	7.8	-	-
Large Mammal, undif.	12	7.2	17	24.1	53	62.4	31	42.2
Canis spp. (Coyote or Dog)	15	8.1	-	-	2	17.9	2	11.9
Carnivora (Carnivore)	-	-	1	0.1	3	1.9	1	0.2
Medium Mammal, undif.	3	2.1	5	2.0	13	6.4	14	9.1
Medium-Large Mammal, undif.	17	8.6	24	18.9	101	41.5	56	28.1
Lepus spp. (Jackrabbit)	3	0.5	3	0.7	18	5.5	5	1.7
Sylvilagus spp. (Cottontail or Brush Rabbit)	4	0.8	1	0.2	37	9.3	41	10.9
Leporidae (Rabbits & Hares)	2	0.3	-	-	-	-	1	0.3
Spermophilus beecheyi (CA Ground Squirrel)	-	-	1	0.3	-	-	1	0.4
Sciuridae (Squirrels)	-	-	1	0.2	-	-	-	-
Thomomys bottae (Pocket Gopher)	2	0.7	6	2.8	1	0.2	10	2.2
Neotoma spp. (Woodrat)	1	0.2	-	-	-	-	-	-
Rodentia (Rodents)	1	0.1	-	-	1	0.3	-	-
Small Mammal, undif.	16	2.0	32	3.7	45	6.6	40	6.6
Small-Medium Mammal, undif.	2	0.7	7	2.0	17	5.1	11	2.5

Table 4 (cont.). Vertebrate Taxa for CA-SDI-811.

Taxon	Units 100/122 NISP	Unit s 100/122 Wt (g)	Unit 109 NISP	Unit 109 Wt (g)	FAR I NISP	FAR I Wt (g)	FAR II NISP	FAR II Wt (g)
Mammal, undif.	-	-	-	-	1	0.2	3	0.4
Serpentes (Snake)	-	-	1	0.1	-	-	1	0.2
Freshwater Resources								
Clemmys marmorata (Pond turtle)	1	0.2	1	0.4	6	2.0	6	1.4
Bird, undif.	1	0.5	2	0.3	7	1.8	17	4.6
Vertebrate, undif.	41	5.5	83	18.8	142	30.7	157	30.3
Total	148	60.9	355	161.7	601	290.1	609	263.9

Fire-Affected Rock Areas

Two excavation areas encountered distinct fire-affected rock scatters. The first excavation area (Fire Affected Rock Area I or FAR I) included Units 107, 113-115, and 119-120, and the second (FAR II) included Units 104 and 116-118 (Fig. 2). The fire-affected rock was composed of small to medium-sized cobble fragments. The cobbles were primarily granitic, metamorphic, volcanic, and quartzite rocks, which are the types of cobbles found naturally in the local region. The placement of the rocks (Figs. 4-6) does not form any recognizable pattern, such as a circular impression of a hearth, nor do they appear to be part of a pit feature. The scattered patterns of fire-affected rock probably represent the clean-out of hearths or roasting pits within the general vicinity.

Although the most obvious characteristic of the two areas were the broad scatters of burnt rock recovered primarily between 40 and 80 cm in depth, there was also a considerable amount of stone tools and faunal material mixed in with the fire-affected rock (Table 2). Although the two areas differ in the amount of shellfish recovered (see Table 5), both areas had relatively high densities of mammal bone, representing a mixed marine/terrestrial resource base. FAR I dates to the Archaic period, around B.C. 1200-835, while FAR II dates to the transitional period between the Archaic and the Late Prehistoric, around B.C. 210-20 (Table 1, Fig. 3).

It is interesting to note that Unit 109 and FAR II are roughly contemporaneous, according to the radiocarbon dates (Fig. 3). The differences between the cultural material present in the two

Table 5. Summary of Faunal Material from CA-SDI-811.

	Cultural Period	Total Weight (g)	Excavated Volume (m3)	Density (g/m3)	Number of Mutually Exclusive Taxa
Vertebrate Remains					
Units 100/122	Late Prehistoric (LP)	60.9	2.2	27.7	13
Unit 109	Transition between LP & Archaic	161.7	1.5	107.8	16
FAR I	Archaic	290.1	4.5	64.5	17
FAR II	Transition between LP & Archaic	263.9	3.6	73.3	19
Invertebrate Remains					
Units 100/122	Late Prehistoric (LP)	4,156.8	2.2	1,889.5	10
Unit 109	Transition between LP & Archaic	82.7	1.5	55.1	11
FAR I	Archaic	21.1	4.5	4.7	5
FAR II	Transition between LP & Archaic	601.2	3.6	167.0	15

excavation areas, especially the high density of fire-affected rock in FAR II, suggests that different parts of the site had been used for different purposes.

A Buried Cultural Component

A deeply buried cultural deposit was discovered during the last three days of the field project. An auger probe placed into the floor of Unit 115 (Fig. 2) recovered cultural material from a buried A horizon (labeled Ab) beginning around 2 meters below the surface. A backhoe excavated below the floor of Unit 115 in order to expose the buried deposit, but excavations halted

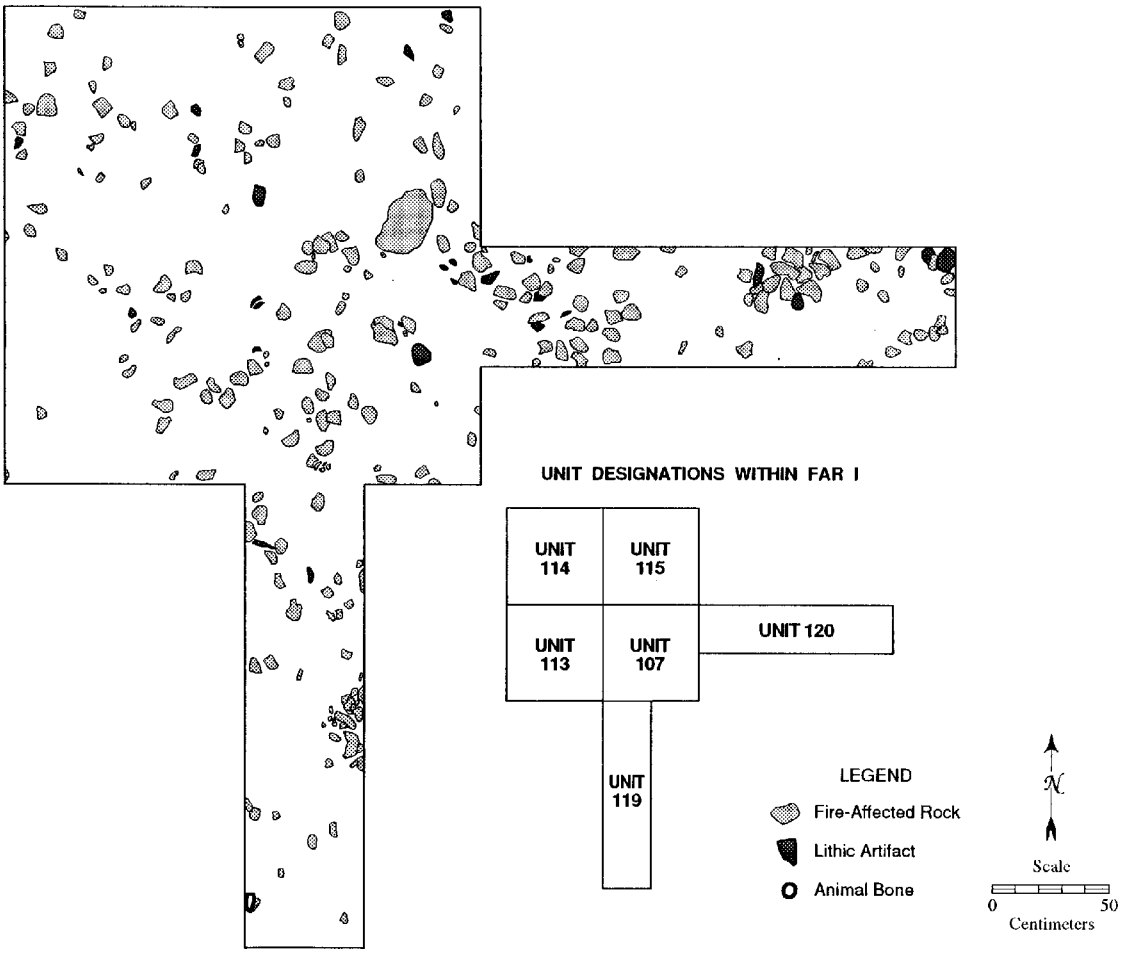

Fig. 4. Planview of Fire Affected Rock Area I (FAR I) at 50 cm Below the Surface

around 2.5 meters below the surface when the water table was encountered. The buried deposit was located below the area being affected by the pipeline project and was considered beyond the scope of the project; it was, therefore, possible to collect only a few small samples from the buried component before the unit flooded with water. Various shell species were recovered as well as some mammal bone and a few rock fragments.

A sample of shell recovered from 240 cm below the surface of Unit 115 yielded a 1-sigma calibrated date of B.C. 2270 to 2005 (Table 1, Fig. 3). The deeply buried cultural deposit in Unit 115 is the oldest yet discovered at the Red Beach site.

Approximately 72 grams of shellfish were recovered from the Ab horizon of Unit 115. Over 92 per cent of the specimens, by weight, were Reversed Jewel Box (*Pseudochama exogyra*), a rocky shore inhabitant. This species was not encountered in the upper deposits of the site. Geoarchaeological evidence indicates that the rapid sea level rise during the Late Pleistocene

Fig. 5. FAR I at 50 cm Below the Surface.

and Early Holocene created mainly rocky shorelines along the coastal zone of Camp Pendleton (Inman 1983; Byrd 1996). When the rate of the rising ocean slowed during the last 4,000 years, large expanses of sandy beach replaced most of the rocky shorelines (Inman 1983). The presence of rocky-shore species from the buried component suggests that rocky-shore conditions still prevailed in the Las Flores drainage around 4,000 years ago.

Site Summary

The Red Beach site has been occupied, abandoned, and then re-occupied over an extensive period of time from 2200 B.C. to A.D. 900. Not only were different portions of the site occupied during different time periods, different parts of the site were used for different purposes. The site, however, appears to have been used primarily as a short-term residential base that was frequently re-occupied over a long period of time during various seasons of the year. The range of animal species exploited, especially the presence of deer and rabbit from all time periods, demonstrates that the site was used for more than just collecting nearby fish and shellfish. The density of bone, diversity of animal taxa, range of local habitats exploited, spatial patterning of bone remains, moderate density and diversity of flaked stone material, and seasonal evidence based on isotopic analysis are consistent with short-term residential use of the site (see Rasmussen et al. 1998 for more details).

Fig. 6. FAR II at 60 cm Below the Surface.

Las Flores Creek Settlement and Subsistence Patterns

Review of Settlement Models

How does the Red Beach site fit into the local settlement and subsistence system based in the Las Flores Creek drainage, and how has this system changed over time? According to Bean and Shipek (1978), the Luiseño exploited a wide range of resources in a bi-modal seasonal system. Most inland groups had fishing and gathering sites on the coast that were visited annually when the tides were low or when inland foods were scarce from January to March. The mountain camp was occupied by most of the village population during October and November when acorns were harvested and game animals hunted. It has also been suggested that coastal Luiseño and Juaneño groups stayed along the seashore the entire year instead of utilizing Bean and Shipek's bi-modal system (Koerper 1981). Alternatively, Shipek (1977)

suggests that the Luiseño occupied permanent villages in a variety of ecological zones and made seasonal forays to procure specific resources from particular localities.

The ethnographic record reflects a time when indigenous lifeways had already been affected by Spanish contact, and it may not accurately portray pre-contact times. Even if one of the above models accurately describes ethnohistoric lifeways, settlement and subsistence strategies had certainly changed from earlier periods, partly due to the condition of the local environment. For example, the Holocene era has been a time of rapid change in terms of the structure of paleocoastlines and the representation of local flora and fauna. The abundance of many types of fish and shellfish would have changed depending on what habitats were available in the local landscape. In addition to differences in the structure of the coastline, palynological studies in the Las Pulgas Canyon (see Fig. 1) have demonstrated considerable change in the local plant communities over the last 4,000 years (Byrd 1996). The various paleoecological developments during the Holocene would have had profound effect on the local hunters and gatherers because the types of flora and fauna available in the local region would have varied depending on the structure of local habitats at the time.

Review of Archaeological Sites Within the Las Flores Creek Drainage

Based on data from the Red Beach site, the coastal region was occupied during various seasons of the year for short-periods of time. In order to determine how the Red Beach site fits into the local settlement system, the following discussion reviews archaeological data from other sites in the Las Flores Creek coastal drainage.

Archaic Period Sites (ca. 6,000 B.C. - A.D. 0)

Hunter/gatherers have occupied the coastal region of Las Flores Creek since Early Archaic times. The oldest occupation, to date, is from CA-SDI-10728 Locus A (Byrd 1997), which has 2-sigma calibrated dates ranging from B.C. 6415 to 4665. The site is situated along the crest of a ridge northeast of CA-SDI-811 (Fig. 1). Locus A actually represents a somewhat mixed deposit of Early Archaic and Late Prehistoric components. The mixed deposit in the upper portion of the locus is dominated by *Donax* remains while a lower, unmixed Early Archaic deposit primarily contains *Chione* and *Argopecten* along with a moderate range of artifacts, vertebrate remains, and macrobotanical material. The vertebrate remains, represented by birds, fish, small mammals, and large mammals, reflects a mixed hunting/fishing strategy. The Early Archaic occupation revolves around the exploitation of bay and estuary settings along with some use of rocky shore habitats and terrestrial resource zones. The site also yielded strong evidence for multiple seasons of occupation including fall and/or winter (Byrd 1997). The site was probably used as a short-term base camp during the Early Archaic period based on the density and diversity of cultural material represented.

The second Early Archaic occupation documented for the Las Flores Drainage is very similar to the one described above. The lower deposit at CA-SDI-10726 Locus B (Byrd 1996) has a 2-sigma calibrated range of B.C. 5520 to 5100. The site is located along a ridge overlooking the Las Flores Creek and CA-SDI-811 and lies southwest of CA-SDI-10728 (Fig. 1). The upper deposit of Locus B dates to the Late Prehistoric, but the lower component is clearly associated with the Early Archaic. The lower component contains a diverse range of terrestrial animal and plant remains as well as a variety of nearshore shellfish and fish species, especially from bay and estuary settings. The density and diversity of cultural material suggests that this site had been used as a base camp during the Early Archaic period (Byrd 1996).

The cultural deposit found in the deeply buried Ab horizon soil at CA-SDI-811 is currently the only local component dating to the middle part of the Archaic Period, with a calibrated range of B.C. 2405 to 1890 (Table 1, Fig. 3). The small samples retrieved from the deposit suggest that rocky-shore species were being exploited during this time period, but the samples were not extensive enough to characterize the purpose or the duration of site occupation.

The majority of the cultural deposits from CA-SDI-811 represent the end of the Archaic and the Late Prehistoric (1200 B.C. to A.D. 1000). In summary, the site appears to have been used primarily as a short-term residential base, with repeated occupations over time during various seasons of the year. Occupants utilized a wide range of coastal and terrestrial resources from numerous local and inland habitats.

Late Prehistoric/Ethnohistoric Period Sites (ca. A.D. 0 - 1850)

The rest of the investigated archaeological sites from Las Flores Creek date to the Late Prehistoric and/or Ethnohistoric Periods. The upper component of CA-SDI-10726 Locus B (Byrd 1996) yielded two dates with calibrated ranges of A.D. 875-1025 and A.D. 1420-1660. The upper component was restricted to the western portion of the locus while the lower Early Archaic component was much more extensive in area. The upper Late Prehistoric component of Locus B is characterized by dense concentrations of *Donax*, *Argopecten*, and *Chione* as well as prehistoric ceramics, flaked stone artifacts, and some ground stone and fire-affected rock. Animal remains from the upper and lower components of Locus B represent a mixed hunting and fishing strategy, but the high density of *Donax* remains are only associated with the Late Prehistoric component.

Locus A of CA-SDI-10726 dates to A.D. 1015-1285 (Byrd 1996). This locus can be found slightly downslope from Locus B at the west end of the ridge. The deposit is composed primarily of *Donax* along with small amounts of animal bone, flaked stone artifacts, ground stone, and fire-affected rock. Locus A may represent a specialized *Donax* processing and consumption site; however, this designation would not fully explain the existence of the other types of cultural material (Byrd 1996).

The upper component of Locus A from CA-SDI-10728 ranges from A.D. 1230 to 1435 (Byrd 1997). The upper component is more difficult to define than the lower component because much of it has been mixed with Early Archaic cultural material. The Late Prehistoric material is centered in the eastern half of the locus while the lower, Early Archaic deposit is much more extensive in area (similar to the pattern from Locus B at CA-SDI-10726). The main difference between the upper and lower components was the presence of *Donax* remains associated with the Late Prehistoric occupation.

CA-SDI-10723 yielded dates ranging from A.D. 1275 to 1835 (Cagle et al. 1996a). It is located on a marine terrace overlooking CA-SDI-811 and at the mouth of Las Flores Creek. The site is composed primarily of *Donax* remains as well as sparse to moderate amounts of flaked stone artifacts, bone, fire-affected rock, and prehistoric ceramics. The site also appears to contain multiple, horizontally discrete occupations (Cagle et al. 1996a).

CA-SDI-14482 lies on the northeast side of Interstate 5 (Fig. 1). It dates between A.D. 1320 and 1680 (Cagle et al. 1996a). The site consists of mainly redeposited cultural material as well as one small deposit of intact remains containing high densities of *Donax* and sparse to moderate amounts of flaked stone, vertebrate remains from a moderate range of species, and fire-affected rock.

Locus B of CA-SDI-10728, lying slightly downslope from the much larger Locus A, dates between A.D. 1375-1675 (Byrd 1997). This Late Prehistoric locus is composed primarily of *Donax* remains along with smaller amounts of animal bone, plant remains, flaked stone artifacts, ground stone, shell beads, and fire-affected rock. Although the high density of *Donax* remains suggests an intensive exploitation of sandy-shore habitats, the vertebrate remains represented by small mammals, large mammals, bird and fish, demonstrate that a wide variety of habitats were being exploited.

CA-SDI-812/H is a large, sprawling site composed of 5 distinct loci, two of which are directly associated with historic occupations at Las Flores Estancia and at Las Flores Adobe ranch house (Cagle et al. 1996a, 1996b; Rasmussen et al. 1999). Only one portion of the site contains undisturbed cultural material from a pre-contact time period. A buried component within Locus C, approximately 140-180 cm below the surface, dates to the Late Prehistoric/ Ethnohistoric periods, with radiocarbon dates around A.D. 1500 to 1800 (1 sigma-calibration). The buried component has a high density and high diversity of cultural material, including bifaces and other flaked stone material, vertebrate remains, marine shell, and prehistoric pottery. The animal bone is dominated by rabbits and other small game while the invertebrate assemblage consists primarily of *Donax*. The deposits appear to represent a pre-contact Luiseño residential base (Cagle et al. 1996b).

The final two sites, CA-SDI-4536 and CA-SDI-10731, are the only ones in the coastal drainage with human interments. Both sites are located in the alluvial fill and inland from the ocean

(Fig. 1) and may have been originally part of the Red Beach site. According to Byrd (1996), the differentiation of the surface deposits into three discrete site locations may be a product of modern development, especially the construction of the Old Coast Highway and Interstate 5.

CA-SDI-4536, the Las Flores Cemetery Site, was discovered in 1973 during construction of a wildlife sanctuary (Ezell 1975). Subsequent testing documented the existence of fourteen human burials, four hearth cobble features, and a buried cultural midden deposit containing flaked stone artifacts, stone bowls, pestles, mortars, shellfish, and projectile points (Ezell 1975). A recent review of the data (Carrico 1996) suggests that the burials date to the Late Prehistoric period.

CA-SDI-10731 is primarily a *Donax* shell scatter with associated artifacts, but two human burials were discovered during grading (Bull 1975; Byrd 1996). No detailed report was prepared during the grading project, but condition evaluation concluded that although construction activities and recent flooding have heavily impacted the site, intact buried deposits probably still exist at the site (Byrd 1996). The presence of high amounts of *Donax* at CA-SDI-10731 suggests that it dates to the Late Prehistoric period.

Las Flores Creek Coastal Settlement Through Time

What do these sites reveal about settlement and subsistence organization within Las Flores Creek? People were visiting this part of the coast by 8,000 years ago and were utilizing a mixed subsistence strategy emphasizing bay and estuary habitats for shellfish and fish exploitation. They also hunted terrestrial mammals of various size-classes. It appears that people utilized ridgetops as short-term base camps during multiple seasons. More sites that date to the Early Archaic may have existed within the floodplain but probably have been deeply buried by alluvial sediments.

The limited information about the middle portion of the Archaic period makes it difficult to reconstruct what people were doing in the region for this period. Existing data suggest that people occupied the alluvial floodplain around 4,000 years ago and exploited rocky-shore habitats. One hopes that more sites will be discovered to fill in data gaps from this period.

The latter part of the Archaic and the transition into the Late Prehistoric period is solely represented by the various components at the Red Beach site dating between 1200 B.C. to A.D. 500. People utilized the alluvial floodplain as a short-term residential base and reoccupied the site during various seasons of the year. Site occupants applied a mixed hunting strategy of both marine and terrestrial resources.

There appears to be an extensive Late Prehistoric occupation in the Las Flores Creek drainage, especially after around A.D. 1000. Subsistence strategies still revolved around the exploitation of both marine and terrestrial habitats. The main difference during this time period is

the intensive exploitation of *Donax*, demonstrating a shift away from bay and estuary habitat utilization to one focused on sandy-shore species. Most of the sites appear to be short-term residential bases located on ridgetops and the low-lying floodplain. One site (CA-SDI-10726 Locus A), however, may represent a specialized *Donax* processing center. In addition, the buried component at CA-SDI-812/H may represent a semi-sedentary base camp based on the density and diversity of recovered cultural material; however, more extensive excavations of the buried component are needed in order characterize the areal extent and spatial variability of the deposit.

Conclusions

Ethnohistorically, the Luiseño were divided into several autonomous lineages or kin groups living in territorial areas with exclusive hunting and gathering rights (Bean and Shipek 1978). They probably had established either sedentary or semi-sedentary bases along the coast, depending on whether they used a bi-modal settlement system between the coast and inland regions or whether some groups stayed along the coast throughout the year. Obvious research questions are: when did this territoriality and possible sedentism become established, and what factors contributed to its development? At this point, only an initial assessment has been formed on how the settlement and subsistence system within the Las Flores Creek area has changed over time. Most of the existing data comes from an extensive Late Prehistoric occupation of the region. Despite the number of sites investigated from this time period, none of them appear to represent a long-term residential base except perhaps the buried component of CA-SDI-812/H. The rest of the sites are more consistent with short-term residential use during multiple seasons of the year.

Archaic sites are fewer in number and only offer the smallest glimpse of the overall settlement system during this period. The Red Beach site, which represents over 3,000 years of prehistory, provides the only recorded information, to date, about the end of the Archaic and the transition into the Late Prehistoric for the Las Flores Creek coastal region. The cultural deposits appear to represent repeated short-term occupations during various seasons of the year. Site investigations also clearly demonstrate the existence of intact deposits buried within the alluvial floodplain, including the only known deposit dating to the middle of the Archaic Period.

Information from the Red Beach site, in conjunction with other known sites in the local area, provides the data needed to begin to piece together changes in the local settlement and subsistence system through time. Settlement systems were probably not restricted to a single coastal drainage, and future research should focus on connecting the inland areas with the coast and examining possible movements between drainages.

Acknowledgements

This paper is based on a presentation given during the 1998 Society for California Archaeology Meetings in San Diego, which reported on Science Applications international Corporation's (SAIC) 1997 data recovery project at the Red Beach site. The success of the project was due to the expertise and enthusiasm of a number of individuals. Craig F. Woodman (SAIC) was the project manager and senior editor of the technical report. Dr. Jean Hudson (California State University, Bakersfield) analyzed the non-fish vertebrate assemblage. Dr. Sean Hess (SAIC) examined the flaked stone material. Dr. Doug Kennett (University of California, Santa Barbara) performed shell isotopic studies. Dr. Judy Berryman (SAIC) studied the ceramic remains. Mitchel Bornyasz (Earth Consultants International, Inc.) provided on-site geomorphological support. Steve Martin and Dr. Virginia Popper (University of California, Los Angeles) analyzed the paleoethnobotanical assemblage. I was the principal investigator of the project as well as the fish and shellfish analyst. Stan Berryman and Slader Buck (Camp Pendleton) provided key coordination and logistical support for the project. The Assistant Chief of Staff, Environmental Security, Marine Corps Base, Camp Pendleton, United States Marine Corps funded the investigation.

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