

**HOLOCENE OCCUPATION IN SOUTHERN
CALIFORNIA USING DATA DERIVED FROM
CULTURAL RESOURCE MANAGEMENT STUDIES
ON MARINE CORPS BASE CAMP PENDLETON
SAN DIEGO COUNTY, CALIFORNIA**

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Doctor of Philosophy
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by

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Abstract

This thesis explores aspects of the archaeology of coastal California. Drawing on a large body of data collected during cultural resource management studies on Camp Pendleton in northern San Diego County. It develops a new synthesis of a large body of archaeological data relating to this material. The purpose of this thesis is to present, use and interpret information that will lead to an expanded understanding of the Archaic and the Late Prehistoric Periods of Southern California that is from about 7500 B.P. to 100 B.P. The period of broad focus of the thesis is the Early through Late Holocene. The scope of the study narrows to the late period of the Late Holocene (700 B.P. to 100 B.P.). Since chronological issues are central to this study, only radiocarbon dated sites are described while exploring the wider landscape, and changes in its use, and occupation. Landscape factors considered include chronology, topographic setting, climate, and landscape and taskscape elements. It explores the possible causes of major changes taking place in the Late Holocene. It addresses the coastal resource intensification debate which has two contrasting models. This thesis has shown that resource intensification along the coast appears to occur later than generally postulated with a significant change from post 700 B.P. resulting from stress reduction due to the end of persistent droughts. Additionally, it explores the apparent processes of population aggregation taking place post 700 B.P. during the Late Holocene. The timing and potential causes of the aggregation and the resulting sedentism are discussed. It is suggested that this may be linked with a transition from foraging to possible forms of agriculture drawing on domesticated foods.

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Appendix Radiocarbon Dates

Chapter One Introduction

The purpose of this thesis is to present, use and interpret information that will lead to an expanded understanding of the Archaic and the Late Prehistoric periods of Southern California: that is, from about 7500 B.P. to 100 B.P. However, the major chronological focus is the nature of the Late Prehistoric occupation. For an outline chronology see Table 1.1 which displays the various chronological systems developed for San Diego County. These schema broadly correspond to the Early, Middle, and Late Holocene (Tables 1.1 and 1.2).

Period	Date range	Date range	Date range
Early Holocene	12,000-8,000 B.P		
Middle Holocene		7,900-4,000 B.P	
Late Holocene			3,900-0 B.P

Table 1.1 Holocene Periods and General Dates.

The research takes a landscape approach and is based on data from archaeologically tested sites located primarily within a portion of northern San Diego County, California, on Marine Corps Base Camp Pendleton. This study area begins at the San Diego and Orange County border and extends south for a distance of approximately 27 kilometers and 24 kilometers inland from the Pacific Ocean to the foothills (Figure 1.1). The data acquired from the study area at Camp Pendleton is of special potential as the Marine Corps Base is the only uniformly surveyed block of land within coastal Southern California, over 250 excavated prehistoric archaeological sites. The results of intensive survey and site evaluation in the study area provide an unusually extensive and high-quality dataset, much better than that typically produced by archaeology performed under constraints of development and Cultural Resource Management (CRM).

YEARS A.D./B.C.	COASTAL SAN DIEGO COUNTY		INTERIOR SAN DIEGO COUNTY NORTHERN SOUTHERN		SYNTHESES			CAMP PENDLETON			
	Rogers 1939, 1945	Moriarty 1966	Bull 1975	Meighan 1954; True 1958, 1966, 1970	Wallace 1955	Meighan 1959	Warren 1968	King 1981	Byrd 1986, Woodman 1986	Cleveland et al. 1983, Sturdivick 1985	Apple and Cleland 1994, Cleland and Pipitone 1995
1500	Yuman III Culture		Late	Luisaño	Horizon IV Late Prehistoric		Shoshonean	Late Period	Late Prehistoric	Late	Late Archaic
1000	Yuman II Culture			Diegueño	Horizon III Intermediate		Yuman	Middle Period	Archaic		Early Archaic
500	Yuman I Culture			Cuyamaca Complex							
A.D.				Transition of Hiatus?							
0											
B.C.											
500											
1000	La Jolla II Culture	La Jolla III			Archaic Stage		Encinitas Tradition				
1500											
2000											
2500											
3000					Horizon II Millingstone						
3500	La Jolla I Culture	La Jolla II		Millingstone Substratum (La Jolla/Pauma Complexes)							
4000		La Jolla I									
4500											
5000			Early								
5500											
6000	San Dieguito Culture	San Dieguito		San Dieguito	Horizon I Early Man						Paleoindian
6500											
7000											
7500											
8000											

Table 1.2 Various cultural chronological schemes for the Camp Pendleton area (From Reddy 2003).

As the Cultural Resource Manager from October 1996 to March 2009 I established the Camp Pendleton research program, selected the areas to be

surveyed, sites to be excavated, and secured the funding to carry out the research. Since the 1970's cultural resource management (CRM) archaeology has made the claim that the data collected could and should be used to address significant research issues and this is what this thesis aims to do, using the accumulated data collected from fieldwork at Camp Pendleton, most excavated under my direction.

1.1 Research Questions and Orientation

This thesis aims to explore cultural changes at the transition to and within the Late Holocene, as reflected in the sites and landscapes of coastal northern San Diego County, California. Its specific focus is on the archaeological record of the landscape that now lies within Camp Pendleton. The thesis draws on an extensive database of CRM-generated data relating to dated archaeological sites within Camp Pendleton first to look at landscape occupation in a broad sense through the entire Holocene, and then to focus down on specific issues concerning its Late Holocene archaeology.

It will then explore the possible drivers for major changes that we can identify taking place in the Late Holocene. In the process it will address the coastal resource intensification debate which has two contrasting models. One puts forward the idea of a decline in available coastal resources and their use during the Late Holocene, in favor of inland resources Rosenthal *et al.* 2001. An alternative model argues for a more intensive use of coastal resources with a lesser emphasis on inland resources (Hale and Becker 2006:494).

In addition to this primary question, an additional theme that will be explored concerns evidence for population aggregation during the Late Holocene period (post 700 B.P.) within the Camp Pendleton area of southern California. What are the causes and outcomes of this aggregation of people? What are the indicator elements of the landscape that inform about possible changes in landscape use during this period? May, for example, evidence for increasing sedentism be linked to a shift to food production in the post 700 B.P. Late Holocene through a transition to agriculture? The transition from hunting and

gathering (or perhaps more correctly foraging) to agriculture is represented by a shift from food collection to food production. It is a change, from wild foods to domesticated foods. This transition has been the subject of intense research and debate for more than a century. For recent consideration see Barker (2006), Bowles and Jung-Kyoo Choi (2013), Dow *et. al.* (2005), and Vierra (2005). Ethnographies often demonstrate that hunter-gatherers/foragers have extensive knowledge about their environment, including detailed information about plant and animal species, geography, and subsistence alternatives (Lee and DeVore 1968). These in turn may be important factors in subsequent shifts towards food production. As such, the data examined in this thesis may provide further insights possible shifts towards food-production in this region.

In order to address these questions this thesis will need to explore different approaches to evaluating cultural change across the Holocene in coastal southern California. At a basic level, the thesis will examine how Holocene sites are arranged across the landscape and how they may best be characterized? Here an emphasis will be placed on exploring data not only on an individual site-by-site basis, but also in terms of wider landscape occupation. Drawing on an important dataset of C14 dates available the sites within the study, the research is also able to establish chronological parameters for many of the changes apparent in the archaeological record.

Building on a general consideration of the Holocene record, the thesis then focuses more specifically on the kind of changes that can be seen in the archaeological record between the Early/Middle Holocene to the Late Holocene? How may these be interpreted? Both general and more specific questions will be addressed, most specifically within the Late Holocene and especially the period from 700 B.P. to the present. In general terms, how can we best characterize the nature of occupation in the study area during Late Holocene? More specifically, how may we explain changes in occupation? To what extent may such changes relate to changing resource use, or

availability, and changes in landscape use? Is it possible to detect the possible impact of other cultural forces (e.g. religion) on resource and landscape use? For this more recent period, can the ethnographic record provide any clues as to why certain locales were chosen and resources used? If so, how may this relate to other changes underway in the Late Holocene?

Most of the data used to address these questions originate from over 250 archaeological sites and other related studies on Camp Pendleton. The sites used in this thesis have been excavated, analyzed and contain sufficient radiocarbon dates and artifact assemblages. Many of the sites have yielded multiple dates, which provides a basis for good chronological controls.

A baseline of site data is developed to provide information sufficient to evaluate the perceived change from the Middle Holocene to Late Holocene and in particular the specific research concerns with the archaeological record of the recent period, post 700 B.P. Some researchers (Rogers 1929, 1939, 1945; True 1958; Moriarty 1966; Byrd 1998) have postulated different coastal and inland settlement patterns for these periods. In addressing this shift, the location of sites will be particularly important: for example there are Middle Holocene, Archaic sites occur along the coast and along the river drainages of Camp Pendleton, but none are found in the inland portions of the base. True (1958) recorded a major Archaic complex (Pauma) just 32 kilometers from Camp Pendleton.

A landscape approach has been selected to address the research issues within this thesis. Using landscape archaeology will permit a broader view that moves beyond the standard cultural resource management approach which is generally site focused or indeed site fragmented (Reddy 2007). It will provide

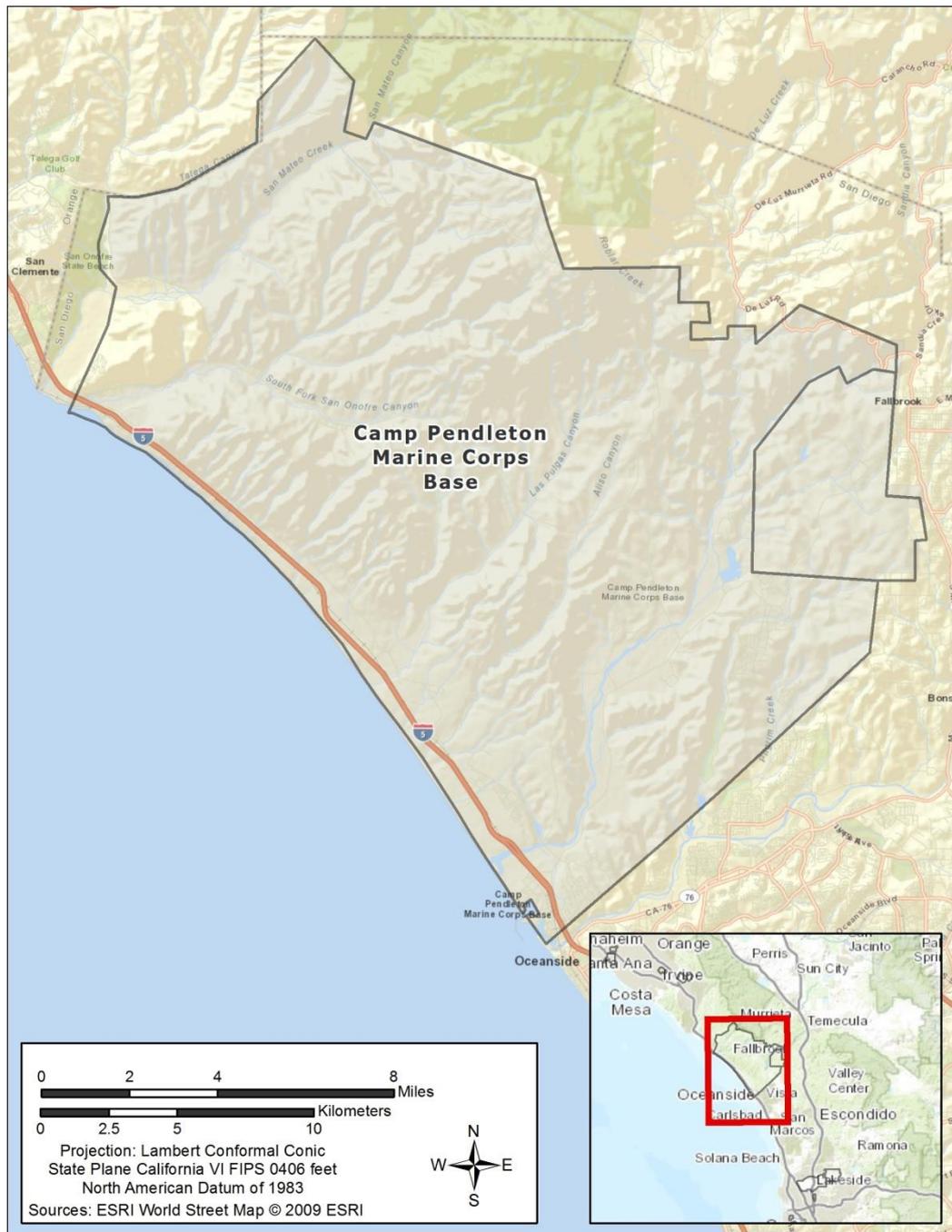


Figure 1.1 Marine Corps Base Camp Pendleton location (Source ESRI.).

the opportunity to look at the archaeology of Camp Pendleton as exemplary of the Southern California/Northern San Diego County region. A landscape approach will emphasize the importance of looking at sites as more than

single isolated “entities” but rather as groups that can inform about cultural systems.

In understanding archaeological landscapes, a number of methods and approaches have informed this study. Many archaeological studies, regardless whether they are landscape-focused in nature, share issues in common (Zvelebil *et. al.* 1992: 196). As is commonly found, problems are encountered with a lack of chronological resolution, especially with surface scatter sites which may be treated as a chronologically undifferentiated assemblage used over a long time period. Problems also commonly emerge is the definition of different scales of human activities, which take place at different levels of spatial resolution and which change with time (Zvelebil *et. al.*1992).

The scale of the study area is within the boundaries of Camp Pendleton and will focus on five defined landscape units/areas (Figure 1.4). As chronological issues are central to this study, only radiocarbon-dated sites will be described within each unit. In exploring the wider landscape, factors to be considered will include chronology, topographic setting, and basic artifact and ecofact content. Within the data available from these sites, particular attention will be paid to the presence of specific materials such as *Donax gouldii* shellfish, Piedras de Lumbras chert, and materials related to issues of climate change, as well as human modification of the landscape through the use of fire, and how this may have changed over time. They will be used to develop a landscape approach to analyzing the changes visible in the late part of the Late Holocene archaeological record.

1.2 Environmental Setting

Camp Pendleton occupies 50,586 hectares with 27 kilometers of coastline, in north San Diego County of Southern California. The Cleveland National Forest shares a portion of the northeastern boundary with the base (Figures 1.1 and 1.2). Camp Pendleton is in the Coastal Area physiographic province which is characterized by an ancient marine terrace coastal plain that drains

the Peninsular Mountain Range east of the Base (Pearl and Waters 1998). The streams that drain the mountains are often deeply incised into the marine terraces that are between 2 km and 5 km wide. Studies have shown that at the ocean, cliffs have been cut by transgressive wave action (Pearl and Waters 1998:4). Elevations on Camp Pendleton range from sea level to the relatively low relief with Margarita Peak rising to 972 meters above sea-level. Characteristic of the Peninsular Range, natural erosion over time has formed a series of southwest-trending stream valleys across northwest-trending hills and mountains.

Much of the steep coastal area is dominated by the lowlying San Onofre Hills which are dissected by major stream systems. The 524 meter high San Onofre Mountain has the highest elevation in the range. The topography east of the San Onofre Hills is gently rolling rising to the Santa Margarita Mountains and is part of the Peninsular Range that extends from Orange and Riverside counties to the border. Overall, the physiography of the Base (INRMP 2007) includes sandy shores and seaside cliffs, coastal valleys, and mountains with rolling hills and canyons (Figure 1.2 Topographic Map and Figures 1.3, 1.4, and 1.5 Setting Photographs). There are 16 major drainages on the Base (Figure 1.6). From an archaeological perspective the most significant of these are Christianitos/San Mateo Creek, Aliso Creek, Las Flores Creek, Piedra de Lumbre Creek, Pilgrim Creek, and the Santa Margarita River. Some of the streams and creeks are perennial. However most are ephemeral. The Santa Margarita River is the most important perennial drainage system. Topographically, these streams and creeks generally flow in a south southwest direction.

1.2.1 Geology

The Camp Pendleton area of Southern California is diverse in its geologic makeup with Holocene to late Pleistocene unconsolidated sedimentary deposits that are underlain by Eocene to Pliocene (2 to 55 mybp) sedimentary

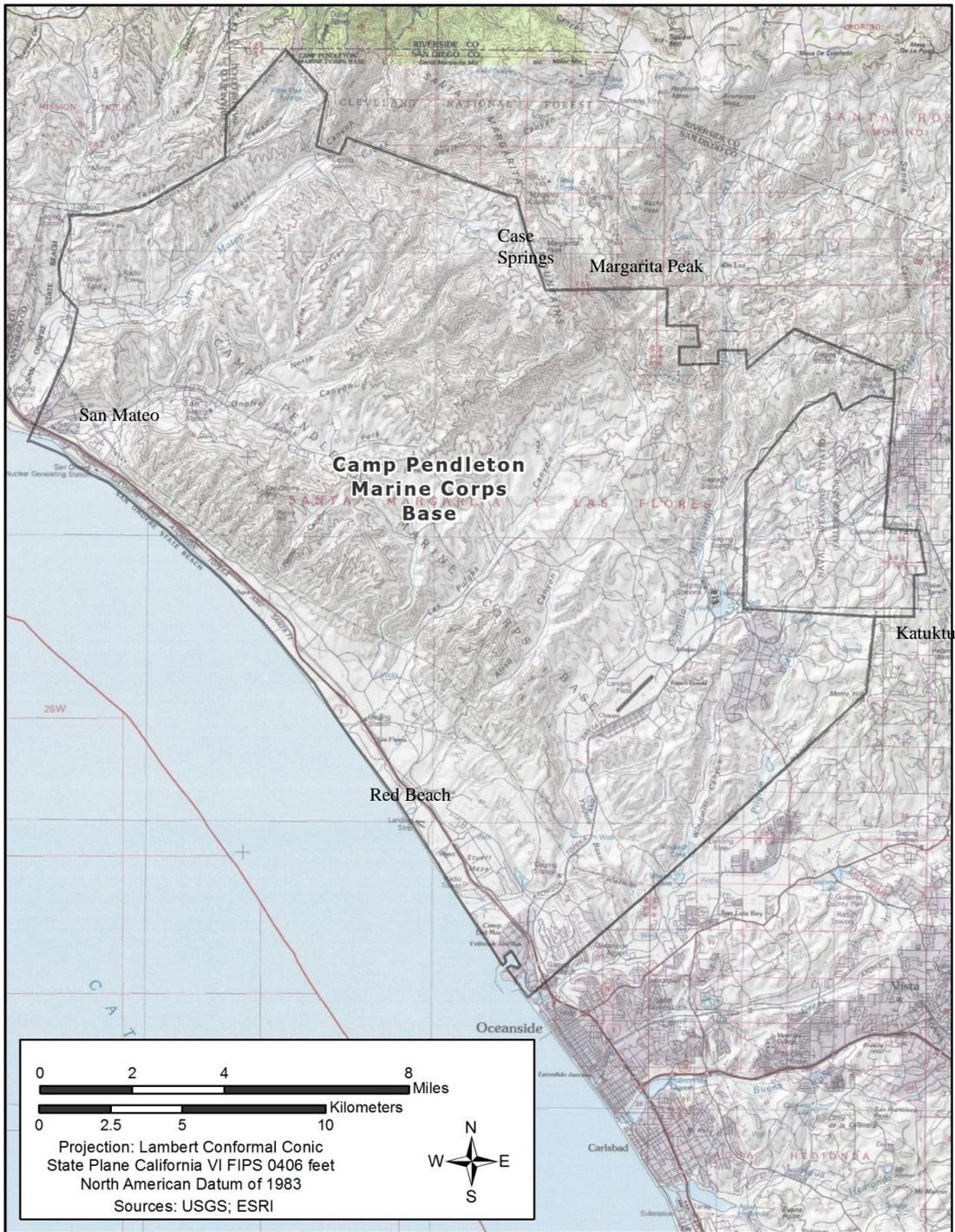


Figure 1.2 U.S.G.S. Topographic Map MCB Camp Pendleton Topography and Drainages (USGS and ESRI).



Photograph 1.1 Modern Camp Pendleton Landscape (Berryman, Moffitt and Moffitt 2010).

rocks of marine and nonmarine origin, and Cretaceous to Triassic (63 to 240 mybp) bedrock that includes highly consolidated and cemented sedimentary rock, and plutonic and metamorphic crystalline rock (Waters 1998).

1.2.2 Pedology

Over fifty soil types are found on Camp Pendleton (Bowman 1973). Soils on the coastal plain are made up of poorly consolidated, poorly sorted marine sediments. In the river and creek flood plains the soil is primarily alluvium; and in the uplands soils are granitic based and exhibit some metasedimentary



Photograph 1.2 An Upland Grass Area Camp Pendleton. (Photograph, AC/S Environmental Security)



Photograph 1.3 A riparian area on Camp Pendleton.
(Photograph, Assistant Chief of Staff, Environmental
Security, Camp Pendleton) .

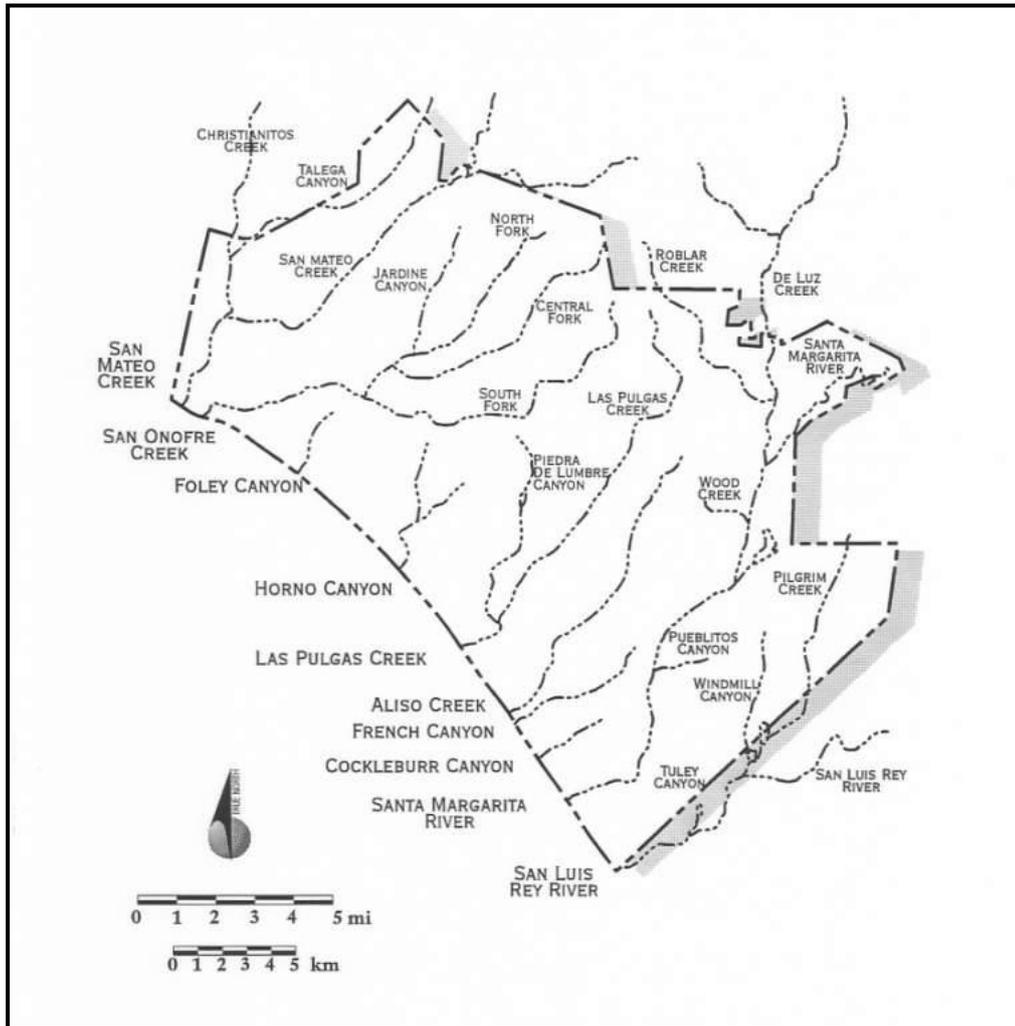


Figure 1.3 Major Streams and rivers on Camp Pendleton (Pearle and Waters 1999).

and metavolcanic inclusions. Both sedimentation and soil erosion are common on Camp Pendleton. The soil types vary from heavy clays to alluvium and with sandy soils building in place. One might expect that past choices were in part made to locate habitation and other activity areas and sites on or close to areas on or close to particular types of soils or their associated vegetation or other attendant characteristics.

1.3 Climate

Camp Pendleton today has several climatic zones that roughly coincide with the three geomorphic regions present: coastal plain, coastal valley, and mountain. The Base has a semi-arid Mediterranean climate with warm, dry

summers and mild, wet winters. Daytime temperatures rarely exceed 95° F, and night time temperatures usually remain above freezing in the winter (Camp Pendleton Integrated Natural Resources Management Plan, 2007).

The Early Holocene climate along the San Diego coast was influenced by cold ocean surface temperatures resulting in a fog belt with conditions gradually warming and becoming more arid towards the climatic optimum. This is followed by increasing precipitation during the Middle Holocene supporting local riparian vegetation, cypress trees and gallery forests. The Late Holocene period is characterized by much more variable conditions of temperature and precipitation from wet, to extremely dry (see Chapter 4) during prolonged droughts followed by a long wet period (Jones *et al.* 1999; Jones and Schwitalla 2008; Raab and Larson 1997). How closely these climatic and related environmental changes are associated with cultural shifts is one of the key analytical issues explored within this thesis.

1.4 Natural Resources

Coastal southern California is one of the most biologically diverse regions in the continental United States (INRMP 2007). The diversity of habitat types within the region is reflected in the rich diversity of natural resources on Camp Pendleton. The modern upland ecosystems of this area of Camp Pendleton are made up of a variety of vegetation types that include oak woodlands, grasslands, shrublands (coastal sages scrub and chaparral), and vernal pools. There are also areas of riparian habitats along the streams and creeks. Some elements of these vegetation types would have been present during much of the Middle and Late Holocene. Their distribution would have been affected by issues of climate and human manipulation (Davis 2005).

Most of the 150 plant species on Base are considered native to the region, but some 22 percent are exotic (INRMP 2007). These non-native species are believed to have displaced some native plant species in the region. Shipek

(1977) indicates the native grass species mentioned in a 1789 account by a Father Palou have been extirpated by the invasive plants.

The savages subsist on seeds of the Zacate (wild grass) which they harvest in the season. From these they make sheaves as is the custom to do with wheat. (Father Francisco Palou in Pourade 1969 II, 17)

Fire has a necessary role in the maintenance of native vegetation and natural community structure. Fires can create a mosaic of seral stages within a particular vegetation community that promotes habitat diversity. However, the fire frequency on Camp Pendleton is higher than other areas in southern California (MCB Camp Pendleton 1998a). A high fire frequency can permanently change the vegetation type (type conversion) of a given site by suppressing it to a lower seral stage.

Anthropogenic causes of fire in southern California are not a recent phenomenon (Zedler *et al.* 1997). In fact, it appears that prehistoric humans played an active and significant role in elevating fire frequency.

1.4.1 Study Units Background

Five study Units have been developed as a means to control the data. They are the Red Beach coastal area; Las Pulgas; Case Springs; Santa Margarita River, and San Mateo Creek. These were developed based on the clustering of dated sites along basic physical features. These study units are intended to help orient the reader and the analysis when a particular site is discussed.

1.4.2 Paleo-Geography and General Environment: Red Beach

Extensive paleo-environmental reconstructions have been conducted in the Red Beach Coastal Area since 1996. The most complete study has been the excavation of 38 geomorphological cores drilled in the Las Flores Creek floodplain north of the Las Flores estuary and just east of the sand line of Red Beach (Becker 2006).

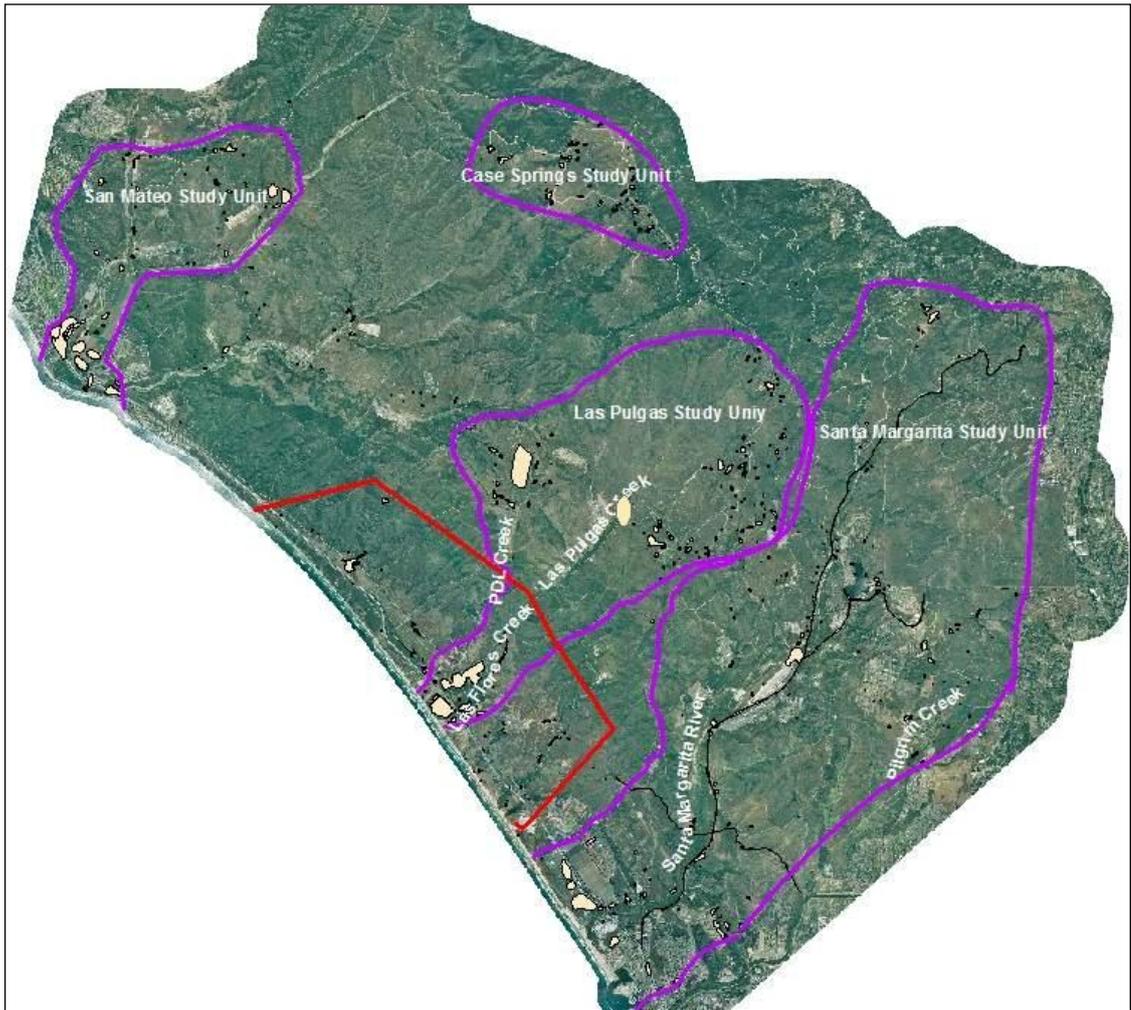


Figure 1.4 The Five Study Units Used in this Thesis (Map prepared from Camp Pendleton CRM database by Stan Berryman 2014).

Nine thousand years B.P. the coastline was 3 km west of its present location. Las Flores Creek flowed onto a rocky shore. By 8,000 B.P. a saline bay at the mouth of the creek connected to an inland freshwater lagoon by a slough. By this period the shoreline was 1 km further inland. The following 2,000 years saw the shoreline continue to move inland by another km. The mouth of Las Flores Creek changed to a saltwater lagoon. By the middle Holocene (4,000 B.P.) the shore had retreated to within .5 km of the modern one and the lagoon was virtually closed off. For the next 4,000 years the shoreline continued a slow movement until the modern shore was developed. [Byrd 2004:11].

Thus the Red Beach/Las Flores Creek area shows the extent of marine transgression and consequent changes over the Holocene period in at least parts of Camp Pendleton.

1.4.3 Paleo-Geography and General Environment: Las Flores and Las Pulgas

Las Flores Creek and Las Pulgas Creek are discussed by Pearl and Waters (1998). Their work by has revealed a high potential for archaeological sites to be present on QAL2 alluvium underlying fans present along Las Flores Creek in the eastern reaches. QAL2 soil, "...consists of older sediments that are not deposits of the active stream. That is, these sediments were deposited at some time in the past when the stream had different flow characteristics than it does today." Thus it is possible that Middle Holocene sites may be found buried beneath up to three meters of alluvial fill and demonstrate an earlier use of the inland areas than is currently thought.

1.4.4 Paleo-Geography and General Environment: Santa Margarita River

In 2005 two palynological and geomorphological sediment cores (SMR-1 and YSD-1) were excavated, one in the Santa Margarita estuary and one at Ysidora Basin. Samples from the 30m deep Ysidora Basin core date from the Early through Late Holocene (Byrd 2005). Evidence points to filling of the deeply incised Santa Margarita River as sea levels rose during the end of the Pleistocene and the beginning of the Holocene. According to Davis (2005) the filling of the valley with alluvium was the response to Late Pleistocene rise in sea level. This resulted in the "landward migration of estuarine environments in the lower Santa Margarita River valley" (Davis: 2005:73). By 8800 B.P. the short-lived first lagoon formed in the Ysidora Basin lasting only 200 years. This was followed by rising sea level during the Early Holocene which "created a rich wetland mosaic in the Ysidora Basin until ca. 5,000 B.P., with freshwater and saltwater habitats persisting in the basin ...The decline in trees and subsequent increase in chaparral both probably bracket the Holocene maximum of aridity [from these indicators about 5500-3500 C14 yr B.P.]" (Davis: 2005:85). The subtlety and variety of habitats and the changes

in the river basin are extensive over the past 8,000 years and the extent of which are demonstrated through detailed local specialist studies.

1.4.5 Paleo-Geography and General Environment: San Mateo Creek

The San Mateo Creek which comprises the major topographic feature of the San Mateo Study Unit is made up of two tributary systems, Cristianitos Creek and Talega Canyon.

According to Waters *et al.* (1997) there are three factors largely responsible for the development of San Mateo Creek; sea level changes, shore line erosion, and tectonic uplift. It is estimated that sea level was 120 m below its present level around 18,000 to 20,000 BP. By 8,000 BP the sea level was 16 m below its modern level and, as explained elsewhere in this thesis, it has continued to rise to its present level resulting in inundation of many archaeological sites. Shoreline erosion is the result of wave energy and bedrock resistance. According to Muhs *et al.* (1987) shoreline retreat in Southern California has been between 0.01 and 0.5 m per year. The shoreline retreat in the area of San Mateo Creek would be between 0.125 to 0.25 m per year, due to sandstone being the local bedrock material. These factors have created the primary physical landscape feature described in the recent geomorphology studies at Camp Pendleton's Sierra 1 training area. These studies have brought forward evidence of continuous deposition over the last 1700 years (Bullard and Bacon 2010:102). The work at San Mateo Creek has shown the San Mateo Creek system is different in its geomorphological history from Red Beach and the Santa Margarita River thus making more detailed study worthwhile.

1.5 Cultural Setting

The existing data base for archaeological sites in southern California from the coast to the inland foothills seems to represent a changing dynamic prehistoric settlement pattern. Although inconsistently used and defined, three cultural periods have been identified, the Paleo-Indian, Archaic and Late Prehistoric, the latter including the protohistoric period (Byrd 1996, Cagle *et al*

1996, Reddy 2003). In addition to the cultural periods, researchers have also used the terminology developed by Binford (1980) in describing different site types on the basis of their site assemblages, including villages, field camps, locations, stations, and caches. Local archaeologists (True 1958, Warren 1968, Reddy 2003) have identified the key distinctions between the Archaic and Late Prehistoric periods.

The Late Prehistoric Period stands out in the San Diego archaeological record from the long Archaic Period that preceded it. Archaeological characteristics that have been claimed as distinctive to the Late Prehistoric Period include ceramics, small projectile points, cremation, mortars and pestles, the use of obsidian from the Obsidian Butte source, a greater density of settlement, and a settlement shift from primarily coastal to inland locations. The appearance of Prehistoric characteristics has also commonly been taken to mark the initial appearance of the ethnographically-known Kumeyaay, Luiseno, Cupeno, and Cahuilla peoples. (Laylander 2005:10).

A shift in settlement organization may characterize the general difference between Early, Middle and Late Holocene use of the area. The Early and Middle Holocene occupation along the north San Diego County coastal area appears to represent a more mobile foraging settlement strategy, while Late Holocene periods are represented by larger, more stable residential bases (Becker and Hale 1996). There is currently an ongoing debate among archaeologists in the San Diego region about whether the Middle Holocene people intensified their use of local resources, and/or if there was a broad-based increase in population along the coast and coastal lagoons followed by a decrease in population toward the end of the period (Becker, *et al.* 2008, Byrd 1996, Byrd and Reddy 2002, Reddy 1998, Rosenthal, *et al.* 2000, and York 2005).

Based on the archaeological record, the settlement pattern noted ethnographically developed relatively late, probably not more than 200-300 years before the first Europeans visited California, that is, in the 15th to 16 centuries A.D. This settlement system seems to have seen an intensification of resource use and possibly more sites along coastal northern San Diego

County. Shippek (1977) and White (1963) stressed that the ethnographic settlement patterns for the Luiseno and Juaneno appear to have been flexible. Major primary centers were represented by year-round sedentary villages. In addition other site types included camps and field stations associated with resource extraction and ceremonial uses. As such there was some 'logistic mobility' with sedentary residential bases and specialized activity sites/areas.

1.6 History of the Research

In the early 1920's Malcolm Rogers began formal archaeological research in Southern California. A curator at the San Diego Museum of Man, Rogers was the first archaeologist to conduct detailed and scientifically based studies of the region. A geologist by training he laid the ground work for nearly all subsequent archaeological research in San Diego County. He devised a three part scheme that identified archaeological complexes distinguished through changes in artifact types (Rogers 1928, 1945). The three complexes are: the San Dieguito, the La Jollan, and the Yuman. Nearly every scheme presented subsequent to Rogers' is in some degree dependent on his work. Many of the subsequent schemes are also three parts, which though using different terms possibly mean much the same thing (Byrd 1996). One of the major problems in San Diego County archaeology is that after nearly 90 years of study, despite the creation of numerous cultural chronologies (Table 1.2) "no single chronological sequence or terminology for San Diego county has widespread acceptance" (Reddy 2007:29). What we have in San Diego County is a situation where each archaeologist develops his or her own sequence using a variety of generally poorly defined terms. The cultural contexts are often presented without defining the terms used or their meaning. As a result, local cultural history development is reminiscent of finding a "new" hominid skeleton and giving it a unique name without regard to all the previous findings. The contents and implications of these cultural schemes are discussed in Chapter 3.

1.6.1 Ethnohistory

In San Diego County archaeology it is difficult to make a distinction between the ethnohistoric inhabitants and the Late Prehistoric inhabitants based on artifact styles and types. As Reddy (2007) has indicated, much of what is proposed for the Late Prehistoric cultural activities in northern San Diego County is based upon extrapolation from the historic Spanish reports and draws upon quite direct ethnohistoric analogies. In this area Spanish explorers first established regular contact with coastal Native Americans in 1769 with the establishment of Mission San Diego de Alcalá. The Mission of San Juan Capistrano was established in 1776. Later the Mission San Luis Rey de Franciscan was founded in 1798. The local tribes were named after these missions, Diegueno (now Kumeyaay also Ipai/Tipai - San Diego (Figure 1.5); Juaneno (San Juan Capistrano); and Luiseno (San Luis Rey). In addition to converting the local people to Catholicism, the missions used "recruited" Luiseno and Juaneno as laborers having a detrimental effect on traditional cultural practices. Research of mission records conducted for Camp Pendleton has indicated that the Luiseno and Juaneno were the same people at the time of contact (Johnson *et al.* 1998 and Johnson and O'Neill 2001). The Missionaries would remove families from the various villages, take them to the mission for training and then return them to a village different than their home.

Archaeologically there is little to distinguish a Luiseno site from either a Juaneno or Kumeyaay site even though the former two speak a different language from the Kumeyaay. The types of sites are often similar. All three groups formed villages that were the focus of day-to-day life. The Luiseno and Juaneno villages were generally more stable and ethnohistoric records suggest they were controlled by one or two clans (White 1963). Every Luiseno and Juaneno village had ceremonial sites in close proximity. For example, female puberty rock art sites would be located generally within one to three kilometers from the central part of the village (Reddy 2000). Artifacts are identical within Luiseno and Juaneno sites. The major difference between Kumeyaay sites and Luiseno-Juaneno sites is the large amount of high quality

pottery. Pottery, while not rare in Luiseno-Juaneno sites, is not nearly as common at the former as in Kumeyaay sites.

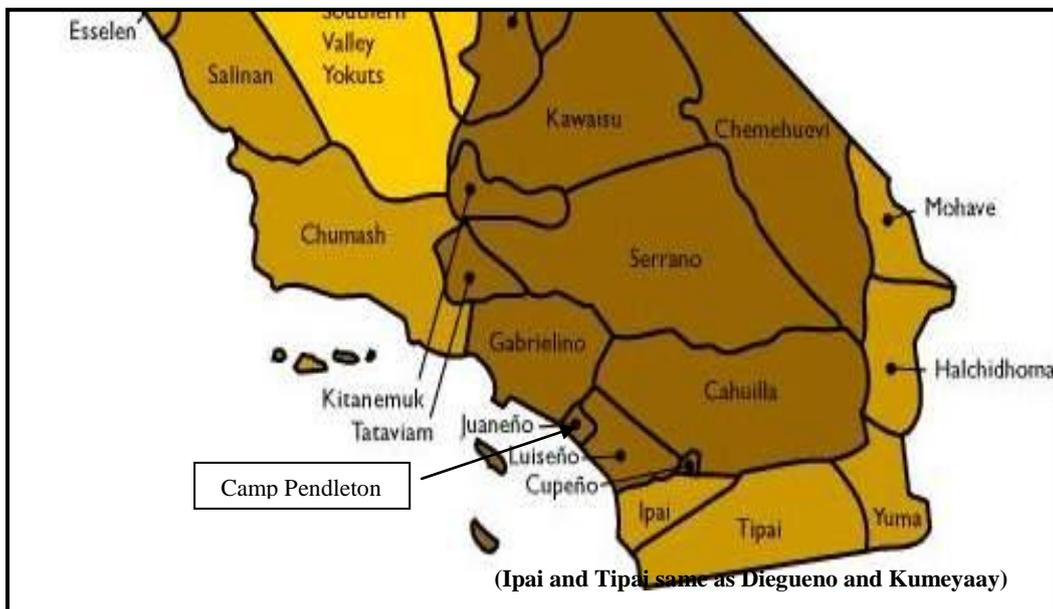


Figure 1.5 Map of southern California Tribal Territories.

Ethnohistoric residential bases among the Luiseno/Juaneno referred to as *Rancherias* or villages were identified by the Spanish in the *padrones* of the missions. There are more than 100 such residential locations in the region recorded by the Spanish (Johnson and O'Neill 2001). The traditional archaeological views of Luiseno/Juaneno settlement patterns were that they were flexible and rarely represented by year-round sedentary villages (True 1970). Instead communities utilized one to three camps per year.

The diet of the Luiseño/Juaneño included both plant and animal foods. The relative importance of plant versus animal food and also the types of plant and animal foods was a seasonal factor. In general, the plant foods were high in fat, carbohydrates, and protein, and provided a high-energy diet. Gathering of foods followed an annual cycle from the coast to higher elevations following the ripening of utilized plants. During this seasonal round two or three family units would camp together where they would gather, process and cache

certain foods (Luomala, 1978:599). Acorns and pinon nuts were gathered at higher elevations from September to November (Luomala, 1978:599).

The Luiseno/Juaneno manufactured many types of specialized tools. Stone tools were frequently made as needed from rocks found lying on the ground (Cuero, 1970:30). At Camp Pendleton there is a source of a rare type of chert known as Piedra de Lumbre (Pigniolo 1992). Due to its fracture characteristics only small tools can be made. The material colors that include gray/translucent, waxy yellow, and red may be more important than the fracturing. Colors had importance for the Luiseño/Juaneno and their neighbors to the south, the Kumeyaay. Colors are oriented to the cardinal directions and to particular stories and myths (Dubois 1903).

Pottery was of the coiled type that was shaped with a stone and wooden paddle and anvil and then fired. Sometimes it was painted in red with linear designs. Common forms included cooking pots, bowls, platters, water jars (including double mouthed) and ladles (Curtis, 1926:43-44; Kroeber, 1976:722; Spier, 1923:348).

Basketry was the same general type found throughout Southern California and of very high quality. These items were very important to the inhabitants since they were used to carry everything from seed grains, clay, water, etc. and to store foodstuffs. Most baskets were coiled, although some were of the twined variety.

Ethnographic records show that the Luiseno social organization was based on autonomous patrilineal and patrilocal clans. The kin group was the basic political unit among many southern California Indians (Reddy 2005). According to Bean and Shipek (1978) and True (1966), the Luiseño kin group/lineage commonly maintained two permanent base camps, or villages, one in a valley and another in the mountain region. This model was developed using inland/upland areas focused around the San Luis Rey River.

The Luiseno and Juaneno religious beliefs described by Constance Dubois have a loftiness of conception and abstract cognition (Dubois 1908), with specialist religious leaders and elaborate ceremonies characterizing Luiseño religion. According to White (1963) ceremonial knowledge was secretly maintained. White (1957) indicated the Luiseno/Juaneno religion was bound in their theory of knowledge. He has stated that knowledge, or *ayelkwi*, regulates the differences between animate and the inanimate. "As a feature of social status, the acquisition of knowledge-power forms a measure of the degree to which the individual achieves mastery over his material and social environment" (White 1957:2).

The ethnohistoric Luiseno/Juaneno exploited many of the floral species observed or expected to be found in the Camp Pendleton area (Loumala 1978). Different species were utilized for food, medicine and construction material (Loumala 1978, Spier 1923). Although the recorded uses of plants were derived from groups after contact with Europeans, it can be assumed that the earlier occupants of San Diego County utilized all or at least some of the same species. Macro botanical and pollen records extracted from sites substantiate what plants were available during occupation. Understanding the use of plants can lead to better understanding the archaeological landscape. Archaeological site locations are based on a deliberate choice of the inhabitants either to exploit plants for food, medicine, housing, tools, etc. Shipek (1978) has indicated the order of preference of plant foods were acorns, seeds, cactus pods, fruits, bulbs, roots and tubers. They also utilized plants in house construction, manufacture of bows and arrows, fibers, women's skirts, baskets and dyes (Kroeber, 1976:650-651).

Fires can create a mosaic of seral stages within a particular vegetation community that promotes habitat diversity. Manipulation of the vegetation landscape is a key element to the success of the Late Holocene peoples in northern San Diego County. Dodge (1975) hypothesized that many American Indians in San Diego maintained the vegetation landscape with a mix of grassland and shrubland through repeated burning. Frey Juan Crespi's diary

notes on 17 July 1769 north of San Diego: 'We climbed a very grassy hill ... then traveled over mesas that are in part covered with grass and in part by a grove of young oaks, rosemary, and other shrubs not known to us' (Bolton, 1927). Further north and a few days later the diary continues: 'We ascended a little hill and entered upon some mesas covered with dry grass.' Another early Spanish account includes: 'The soil is very good; it is black, well grassed, and mellow; and the fields are thickly dotted with shrubs' (Fages, 1937).

It is contended in this thesis that the Late Holocene ancestors of the modern Luiseno used fire to manage their physical landscape to increase the abundance of food in a form of fire/swidden horticulture. As Lightfoot and Parrish have indicated "...the cornerstone of Native California management practices revolved around fires" (2009:21).

A key to understanding the use of the landscape by the prehistoric peoples of Camp Pendleton is to see that the prehistoric people, like their descendants, used, modified and managed the physical landscape. This was done to provide for food and nonfood resources (Lightfoot and Parrish 2009:20). California Indians had a diverse set of perishable items that came from a managed landscape.

1.7 Background to the Thesis

The information summarized and presented in greater detail in Chapters 2 and 3 provides further information on the modern physical landscape including the topography, and available plant and animal resources. The geomorphology is discussed as far as necessary to aid in understanding the changes over time to the physical setting of the very important riverine resources. It also provides data concerning the climatic landscape of Holocene southern California. The modern climate until recently has been thought to be relatively predictable and unchanging (Callendar 1961; Weart 2013). The brief discussion on climate from the Early to Late Holocene presents a picture of a changing climate landscape over a broad time period and suggests that the climate in southern California has gone through many

cycles of wet, moderate, dry to drought. A glimpse of how the prehistoric people responded to climate change may perhaps be found reflected in the ethnographic stories, such as that of the Katuktu Mountain (Dubois 1903) and a flood (Chapter 2).

The discussion in Chapter 2 about Luiseno/Juaneno kin groups and residency will show a pattern of land use and residency mobility that may not be fully supported by the Camp Pendleton data. Rather than a “bi-modal” village, we may well see a focus around a single village with a specified territory as discussed by White in 1963. This should become apparent in Chapters 4 and 5. This discussion relates to the question characterizing site arrangement across the modern landscape and characterizing the nature of Early and Late Holocene occupation and a possible transition from foraging to farming.

Another area of interest concerns Luiseno/Juaneno religious beliefs and how these may have influenced site locations, or indeed wider connections and contacts through trade. For example, the religious beliefs of their neighbors to the south may be significant to understand the explosion in exploitation of the PDL chert in the later part of the Late Holocene, post 700 B.P. It may also be a factor in selection of food resources such as the shellfish *Donax sp.* The Luiseno/Juaneno knowledge system known as *ayelkwi* or, as White has dubbed it, the Theory of Knowledge (1957), is important to understand in that it tells about how the people quested for knowledge about all animate and inanimate objects, and how each item (a specie animal or mineral) might have its own knowledge. *Ayelkwi* provides how learning about an object can give understanding to the individual seeking that knowledge. It does not necessarily mean that the individual who gains knowledge becomes a big person in the community, but can refer to power over the elements, power in a more abstract meaning than just physical power or authority. *Ayelkwi* may well be a factor in locating a residential base or other sites. We need to understand how this concept may also have resulted in selection of residential and other site locations.

The extent to which prehistoric populations may have modified the landscape through fire is also of considerable interest. The use of fire by California Indians in general and the Luiseno/Juaneno Indians in particular seems to have been sophisticated. The fires were set to do more than just control vegetation; it was used in a manner that provided a type of fire horticulture. There is ethnographic evidence seen in Shipek (1977) of planning for the burns in a prescribed manner. Lightfoot and Parrish (2010) have indicated fire was used to provide and enhance food and nonfood resources. Fire may also play a role in *ayelkwi*, in that gaining mastery over fire and how it prepares the landscape for renewed plants is a form of knowledge that aids in power.

The approach in this thesis uses the full range of dated archaeological sites on Camp Pendleton derived from CRM fieldwork. It starts broadly, covering the entire Holocene at Camp Pendleton, and setting the stage for the subsequent focus on the Late Holocene occupation. This narrowing of the narrative takes into account how the elements of the landscape were used over a long period of time and how these elements influenced the cultural expressions seen in the archaeological record. As the focus narrows to the later Holocene the changes in use of the various elements and their organization becomes more specific in those landscape elements studied with specific concerns for the use of PDL chert, *Donax sp.*, issues of climate change, the use of fire/prescribed burning, mobility, and their chronologies. The initial longer time span necessarily relates to issues of broader socio-cultural trajectories, rather than assuming that there was a single moment of rapid change whether in response to environmental or population change or other factors.

In order to document any changes, the most important landscape element will be time as demonstrated by radiocarbon dates recovered from the archaeological record, reiterating a point I have previously made: “We must move away from the culture phase classification that has held sway so long at Camp Pendleton and really for the coastal region of San Diego as a whole... Instead we advocate adoption of an [arbitrary] radiocarbon-based

chronological classification that divides time into finer segments...” (Byrd and Berryman 2006: 230).

For this thesis the time frame reference has been expanded to determine if there are patterns of human interactions with the landscape that are visible over time and consistent chronologically. The radiocarbon dates will provide the necessary framework for the landscape study. The pieces of the stage setting will be natural physical elements and may include topography, soil type, climate, and the visibility of or distance to specific physical features (such as Katuku Hill and Piedra de Lumbre Hill). In a relatively rugged area topography may prove to be a significant factor; similarly, distance to streams and rivers in an arid environment might prove to be important. Climate will hopefully inform about other potential reasons for people to aggregate into larger communities and to occupy previously vacant areas inland from the ocean during the late, Late Holocene. Distance to ethnographically significant physical features may point to the relative importance of the feature or the resource found at the feature. Religious stories and the Luiseno/Juaneno “Theory of Knowledge” or *ayelkwi* may help understand why certain elements were selected and how the elements fit into the overall landscape. Finally part of the stage setting will be the taskscapes, the spatial and chronological distribution of activities of varying duration (Ingold 1993) identified at the sites. However, the stage setting will be much like that in a minimalist play. In other words instead of setting the play in a fully formed town with buildings, park, gazebo, street, sidewalks, etc., the play will have outlines suggesting some of the set elements while others will be fully formed. Some elements will be completely missing.

What I believe makes this study different from others in southern California is how it consider the landscape (and the ‘taskscapes’ within it, to borrow Ingold’s term in a loose sense) over a large area. It is not taking a site or even a set of sites and comparing that set to others in the area.

Another factor that makes this study different and original is the use of this substantial body of pre-existing data. As has been stated elsewhere cultural resource management studies provide a large but commonly untapped database. Other than legal rationales being given for Federal agencies to fund archaeological excavations, providing an archive of data for future studies is, in my 18 years as a Federal cultural resource manager, the primary reason to justify active fieldwork/excavation programs. However in practice, relatively little further use of such material is in fact made, analysis rarely proceeding beyond site-specific comparisons. Camp Pendleton has however provided a unique database that has been developed under the direction of one individual, using a long-standing study protocol. The data used includes site descriptions, artifact and ecofact material descriptions, as well as a now substantial series of radiocarbon dates. The sites are plotted within defined study units and now invite further analysis within a well-understood environment.

Chapter Two Approaching Southern California Landscapes and Prehistory

This thesis is concerned to look at aspects of southern Californian archaeology in a way which moves beyond the limitations of site-based CRM work, the results of which tend to remain within dispersed single-site reports in the gray literature, and are little used to contribute to the development of more synthetic archaeological research. Here I discuss how adopting more 'landscape' oriented approaches can act as a useful corrective to this tendency, as well as offer the potential for new insights and interpretations of prehistoric life ways, activities, perceptions and meanings.

2.1 Landscape Archaeology

Archaeologists, geographers, historians, ecologists and others continue to explore ways in which the essential values of societies are shaped and perpetuated; humans not only adapt to their environment but also interact with it (Kuna and Dreslerova 2007; David and Thomas 2008). Many and varied approaches to ideas of 'landscape' may be encountered. Landscape archaeology is a concept, "which arose out of a very particular European and American relationship between people and the natural world, and which was based upon a predominately visual aesthetic" (Whitmore: 2007:197). The term landscape has also been defined as "a cultural image, a pictorial way of representing, structuring or symbolizing surroundings that can be physical or ideational "(Cosgrove and Daniels 1988: 1).

A rather different approach may be found in concerns with the fundamental daily experience of people in non-industrial societies, in their physical and biological experience of the natural environment – earth, water, wood, stone, high places, the wind, rain, sun, stars and sky (Tilley 1994:26). Most importantly perhaps, we may look beyond landscape as environment, to accommodate meanings. According to David and Thomas (2008: 38) "This, then is the crux of landscape archaeology: it concerns not only the physical environment onto which people live out their lives but also the meaningful

location in which lives are lived.” A landscape provides the backdrop against which the archaeologist can use to plot the site(s) (Knapp and Ashmore 1999). It is a tool that permits the researcher to document the range of past human activity. Traditionally landscapes were looked upon as “...a passive or forcible determinant of culture...” (Knapp and Ashmore 1999:2). According to Kuna and Dreslerova (2007), for example, the intent of the landscape approach is to reconstruct elements or parts of the landscape in order to understand past human activities both in their physical and ideational manifestations.

Landscapes are physical areas containing patterns that affect and are affected by human activity. Landscape archaeology involves the study of these patterns, the interactions among individual elements, and how these patterns and interactions change over time. In the broadest sense landscape means shaped lands or lands shaped by human agencies (Haber 1995). The landscape can be physical or cultural. A driving force, but not necessarily a defining force within a landscape, is the environment. In its most simplistic definition the environment includes all naturally occurring things on earth such as plants and habitats, fauna, topographic features, climate, soil, etc. However, landscapes both physical and cultural occur within the environment but their nature is not necessarily determined by that environment.

In the American context the term “settlement archaeology” is often linked to landscape archaeology and as such is also much used in this background discussion. Gordon Willey (1953) promoted the concept of settlement archaeology in North America. His definition gave this approach both a spatial and temporal dimension. Rather than considering sites as isolated phenomena he suggested that a regional context was needed. Willey demonstrated that the spatial relations between sites were important to understanding what was going on at a particular location. The spatial dimensions were described through a series of geographical categories and included the site, locality, region and culture areas (Willey and Phillips 1958).

Ecologically-based settlement archaeology was exemplified by two main approaches discussed by Sternquist (1978). The first of these approaches involved the spread of settlements over the landscape and the environmental factors that determine its formation. The second approach dealt with settlements as social systems, "...the aim is to analyze human activities and their relationship to the environment within delimited social units" (Sternquist 1978:252-253). At first glance this approach to settlement archaeology seems to have a common approach to that discussed by Kuna and Dreslerova of identifying human interaction with the environment. However, Sternquist's earlier settlement archaeology approach to the landscape was much more aligned with ecological or environmental determinism, whereas landscape as discussed by Kuna and Dreslerova is not separable from human symbolic and day- to-day activities.

Gojda (2008) argues there are three ways in which landscape archaeology is an alternative to traditional settlement archaeology: First, it is used to study settlement processes of large spatial units: areas and regions such as Camp Pendleton. Second, landscape archaeology is concerned with those parts of the archaeological record that are not recognizable with non-traditional methods. Third, it uses non-destructive data collection methods. The non-destructive methods can include remote sensing, use of existing data collections, GIS modeling, etc. The use of existing data collections is relevant to this thesis since the data are derived from existing cultural resource management studies on Camp Pendleton.

2.2 The Site within Archaeology

Archaeologists, according to Willey and Phillips deal with sites as the smallest unit of space. Sites are remnants of areas of former occupation and use and are the basic unit for stratigraphic studies. They felt that the site is the "minimum unit of geographic spaces" (Willey and Phillips 1958:18). The dominant contemporary view regards sites as archaeologically relevant, empirical units that exist independently of the archaeologist: they can

therefore be discovered, described, and interpreted in archaeologically meaningful ways (Dunnell 1992:25).

Concepts of the site are also however determined by the nature of archaeological practice, and especially the requirements of the legislative background to CRM. The common view of sites implied by CRM legislative frameworks is that they have fixed boundaries that are a reflection of physical reality. "In general terms, an archeological site is defined as the physical remains of any area of human activity greater than 50 years of age for which a boundary can be established" (VDHR 1996:1). The National Park Service, the federal agency that establishes federal requirements for CRM, states:

"In an attempt to add consistency to the process of cultural resource management, many State Historic Preservation Officers (SHPO's) have offered specific statements on the characteristics of archeological sites. For SHPOs, the definition of archeological site is often tied to the process of completing an archeological site form, which forces the regulators to standardize terms... "(Seifert-National Parks Service 1997: 51)

This view does not consider the area between the sites or the variability of "boundaries" within the site. The boundaries of sites are based on the distribution of artifacts, ecofacts, and features. The edge of a site is reached when there are no more "things," and may be found by shovel pit testing, or surface survey, or evidence of physical transformation of the area of the site.

"An archeological site must have some physical evidence of occupation, use, or transformation. This evidence is usually in the form of artifacts, but also includes human alterations to the landscape. Without some form of physical presence it is impossible to define boundaries to archeological sites." (Seifert-National Parks Service 1997:51).

A boundary would surely change as people came and went within the site over time. By making sites the basic analytical unit one loses the broader perspective that a landscape method can provide, with the landscape as "a medium to be read for the ideas, practices, and contexts constituting the

culture which created it" (Ley 1985:419). In discussing hunter-gather archaeology Jochim (1998:2) stated that individual sites rarely have evidence for more than a sample of human behavior.

However, rather than fixing boundaries, landscape approaches can look at the site or activity location and also consider the spaces between sites which includes the myriad of features that people saw and experienced in their daily lives. These can include trails and paths between sites and locations on the landscape. Space includes all the natural and social features that make up a landscape. "When things are done to the land, they are done knowledgeably, expressing an understanding of what is required at that moment and at that place" (Barrett 1998:26). This knowledge of the landscape changes over time. As the environment changes, the perception and use of the landscape also changes. These land use changes do not just happen in a haphazard fashion but rather are deliberate responses by people with knowledge of their environment. Thus because the environment was different during the Archaic Period (sea stands were lower, etc.) than it was during the Late Prehistoric Period (higher sea levels), the landscape is also different.

Landscape approaches may provide us with the means to look at sites not only as individual "entities" but also as groups that can inform about wider cultural systems. Site-specific studies have the problem of collecting data that basically eliminate wider connections between the land and the people (Dunnell and Dancy 1983). When viewing a site in isolation the broader landscape relationships of the past occupants are often lost. Studying individual sites, the only perspective is that of the site, its boundaries, its artifacts, and relationships of artifacts within the site.

Zvelebil *et al.* (1992) indicate that spatial relationships of artifacts and features can provide information about past uses of the landscape. These relations particularly between sites will be seen in Chapter 5 as a new construct for inferring how the past inhabitants used and organized the landscape. There is evidence that the organization and use of sites on Camp Pendleton is due to

increasing sedentism. By looking at the spatial relationships of artifacts and features one can infer the past uses of the landscape and how it was organized by the inhabitants (Zvelebil *et al.* 1992). Archaeological landscapes are made up of both natural and cultural elements (Knapp and Ashmore 1999). As discussed by Darvill (2008) landscapes vary, based on the orientation and the purpose of the study being conducted. He indicates that landscapes have physical limits of time or space that are defined by the researcher (Darvill 2008:69). In the case of this thesis the landscapes on Camp Pendleton are identified by radiocarbon dates, climate, and physical features such as proximity to a river or stream or coastline.

2.3 The Elements of Landscape

There are a number of elements that can make up physical landscapes. These include topographic relief, soils, water resources, plant and animal communities (Stafford and Hajic 1992:139-140). Natural features such as rivers, coastlines, rock outcrops were probably important symbolically and in other ways for prehistoric people: “Neither for hunter-gathers nor for agricultural communities was the natural landscape merely a backdrop” (Gojda 2008:7). The natural environment was also always bound up with diverse human associations, memories, and local names, which gave it its specifically human dimension (Gojda 2008). These physical elements are located within sites, but also in the spaces between sites. These features do not in and of themselves provide the archaeologist with any clues about their significance to the archaeological culture under investigation. However, the features' importance can be assumed if, for example, a pattern of returning use can be supported. I will therefore be examining site distributions and locations in relation to features such as topographic relief, stream and river courses, the coastline and estuaries, and rock outcrops.

Binford described forager groups' resource procurement strategy as one where foragers typically do not store foods but gather foods daily; they range out gathering food on an “encounter” basis (1980:5). The encounter of resources is similar to Stafford and Hajic (1992:139) in that human use of the

landscape is analogous to an organism that must move across a landscape to use nutrient patches. The nutrient patches are important elements of the landscape and can be used to define patterns of mobility. Human forager populations move knowledgeably between nutrient patches and stop at specific locations because of their usefulness or characteristics (Stafford and Hajic 1992:139).

Archaeological landscapes are surfaces that exist because of previous features and modifications.

"The evolving human landscape is depicted as a continuum rather than as a series of stages emphasizing the likelihood of continuous rather than discrete development. The evolving landscape is acknowledged to be a consequence of both previous landscapes and of the ongoing process prompting change" (Norton 1989:3).

The landscape can be buried, eroded or otherwise modified by either human or geomorphological actions (Zvelebil *et. al.* 1992). This relationship between the physical and cultural elements makes up the archaeological landscape: "the environment manifests itself as landscape only when people create and experience space as a complex of place, and their engagements with the world around them are invariably dependent on their own social, cultural and historical situations" (Knapp and Ashmore 1999:20-21). According to Ingold, "a place owes its character to the experiences it affords to those who spend time there" (1993:155). This implies that there is cultural meaning in landscapes that can be interpreted by the archaeologist. Ingold has proposed applying the concept of taskscape as means to look at landscape. His 'tasks' are specific actions carried out by an individual skilled in that action. A taskscape is the "entire ensemble of tasks, in their mutual interlocking..." (Ingold 1993:158). He goes on to say that "the landscape as a whole must likewise be understood as the taskscape in its embodied form: a pattern of activities 'collapsed' into an array of features" (Ingold 1993:162). Such an approach has also influenced my work here, where the sites investigated

seem likely to relate to a range of different 'tasks' taking place in different parts of the landscape

There is thus no one unified concept of landscape within what we may term 'landscape archaeology'. According to David and Thomas (2008:28) "when 'landscape' has been used by archaeologists, it cannot therefore be assumed *a priori* to refer to one particular preconceived thing or another. Indeed, even within the works of individual archaeologists, the term may shift its connotation according to context" (2008:28). Landscape archaeology includes a wide array of research domains and definitions about what constitutes landscape and how it should be applied. Tuovinen's (2002) thesis on the Bronze Age and Iron Age Aboland Archipelago, Finland; Tilley's (1997) observations on experiencing the landscape; Zvelebil *et al's*. use of the landscape to determine physical transformation of the archaeological "residues" all point to the variety of approaches to landscape archaeology.

Physical landscapes also change over time. A major problem for any landscape archaeologist is the changes in the landscape under study, especially when dealing with long time periods, as is the case with this study. In this case, climate, and as a result, the vegetation, have changed considerably over the past centuries and millennia. To stand on a hilltop site and imagine what a prehistoric person would be viewing is very difficult without knowing the vegetation of the time under consideration. A site that overlooks a valley with trees will have a different appearance and aspect to an observer than looking over a grassy valley. This can result in a definite change in "experience of place." For example just south of Camp Pendleton's boundary there is a round top hill (Katuktu), today visible from many directions both on and off the Base. The hill figures prominently in local Indian creation stories (DuBois 1903) and because of its configuration has been thought likely had a significant role in more ancient cultures. However, the visibility of the hill changes, depending on whether the area was wooded, grassy or scrubby. The current view includes a modern housing subdivision which significantly changes the visual perspective. The viewscape is just one perspective of the

landscape and is likely not the only perspective of the early inhabitants. According to a contemporary Luiseno religious leader, the traditional perspective is that all the rocks, trees, animals have roles in their religion and as a result all elements were important (Basquez, Personal Communication, open forum meeting Camp Pendleton). This concept aligns with the Luiseno Theory of knowledge or *ayelkwi* (White 1957).

As we have noted landscape approaches may provide different ways to see the world. "Landscape is both material and symbolic. It is material in the sense that it comprises such things as settlements and it is symbolic in that it has meaning to humans" (Norton 1989:2). In the Luiseno creation stories all the elements found in the natural world have sacred meaning and this meaning is often derived from their songs (DuBois 1903, White 1957). This belief that all elements of the landscape are sacred can be difficult for modern Western scientists to understand, since we compartmentalize and separate phenomena into understandable units such as topography, artifacts, ecofacts, macrobotanical, and faunal. According to Teeman (2008:627) American Indian views have often been left out of archaeological analysis: "the voices of Indigenous Great Basin peoples have been silenced by the archaeological and anthropological interpretations of those peoples, and the intimate relationships between people and places have been for the most part overlooked." However, anthropological understandings of such non-Western understandings of landscape are now much more widely recognized within archaeology (Feld and Basso 1992).

2.4 Landscape Archaeology in Southern California

As we have seen Southern California archaeology is generally centered on the individual site as the basic unit of evaluation. The site concept is so engrained into the psyche of California archaeologists that the site as a unit displaying activity occupation remains the primary focus of most archaeological interpretation. This may in large part be due to the role that cultural resource management-driven field archaeology plays in the regional archaeology. Very little non-cultural resource management archaeology takes

place in southern California. While it is difficult to quantify the scale of archaeological fieldwork in the USA, there are 1,300 CRM firms nationwide, 10,000 people employed by CRM firms and an estimated one billion dollars of annual revenue generated by such work (American Cultural Resources Association 2012). The level of resources devoted to other forms of non-CRM/'research' fieldwork can only represent a tiny fraction of such resources. For example on Camp Pendleton no non-CRM derived studies have been conducted in the past 20 years.

It is also worth stressing that the purpose of CRM within the region is to provide regulatory compliance to developers, city and county agencies, and to federal government agencies. A major goal of CRM is to identify sites, evaluate site significance, and mitigate project-specific impacts to significant archaeological sites. As such it is not a goal to conduct archaeological 'research'. In a CRM study the funding is based on "clearance", either excavation or avoidance of the site, to permit a non-archaeological project to move forward. This in turn is driven by national and state laws and regulation. The State of California regulations (CEQA, California Environmental Quality Act 1970) relating to identification of significant archaeological sites and to the federal government regulation (NHPA, National Historic Protection Act 1968) relate to assessing the effects a project will have on an archaeological site.

In order to make that assessment on a federal government project the site must first be determined either eligible or ineligible for inclusion to the National Register of Historic Places (NRHP) (Code of Federal Regulations, 36 CFR 800). Except in the case of a group of sites, which can in certain circumstances be considered significant as a 'National Register District', all evaluations are made at the site level. Even when determining that a group of sites are National Register eligible as a district, the evaluation is still made based on individual sites and how they contribute to the importance of the whole or group of sites making up the district. As a result the CRM archaeologist rarely has the opportunity, or need, to look beyond the individual site; if they do the scale is often limited to the parcel of land under

compliance investigation or to a group of sites to aid in determining National Register eligibility of the site under study. If broader perspectives are in fact used, this is usually only to identify archaeological sites within a larger area which may be affected by larger-scale impacts of projects (Little *et al.* 2000; King 2002).

If most archaeological work within the confines of CRM compliance remains descriptive and site-focused, a few, more synthetic studies have been attempted in this region. In her ground-breaking study of China Lake, Davis brought together geomorphologists, paleontologists, malacologists, climatologists, paleobotanists, and archaeologists to produce a picture of human involvement with the Pleistocene/Early Holocene environment in California's Mojave Desert (Davis 1978). More recently geo-archaeological and remote sensing studies have been joined with economic settlement studies to better understand the process of the site development (Byrd 1998, Reddy 2004, Becker *et al.* 2006). Other recent examples of a broad synthesis of the data would include Reddy's study of the Southern California Bight (Reddy 2006). Most studies however, remain quite focused on limited areas, such as a recent context study of the Santa Margarita River drainage on Camp Pendleton (York 2005). York studied a regional pattern of settlement within the river drainage. In addition to development of the regional context, Byrd (2005) has developed paleo-ecological reconstruction of the same river basin. Becker, in 2006 and with consultation with me, also initiated a limited landscape analysis of a cluster of sites within the upper reaches of the Las Pulgas Creek in central Camp Pendleton. This was however still a regulatory compliance-driven study. Its purpose was to evaluate the possible interrelationship of sites in the Las Pulgas Creek area and whether such evaluation of sites as a landscape (Becker 2006) might broaden perspectives on their 'significance' under the National Historic Protection Act (NHPA). Notwithstanding such studies, overall, any 'landscape' archaeology in southern California remains primarily concerned with the study of sites within a regulatory context. However, many of the studies at Camp Pendleton are not just standard compliance projects, that ask the basic who, what and when

questions, but rather are research-oriented studies that, while compliance driven, are directed to a more regional approach. My thesis is concerned with drawing out this wider research potential within the regional landscape.

2.5 Landscape Ecology/Landscape Archaeology

The view of landscape archaeology portrayed in this thesis has been much influenced by projects with Emma Lou Davis in the 1960s through the late 1970s and includes elements from some of the various papers discussed above. Davis' broad approach of bringing a range of disciplines to address regional archaeological issues, such as Paleo-Indian use at China Lake in California's Mojave Desert was very unusual within the context of archaeological practice at that time when even non-CRM studies were site-specific focused.

The archaeologist chooses how to look at the landscape/cultural interaction. Landscapes then contain patterns that affect and are affected by ecological and cultural processes. I see the landscape as the compiled elements that make up an understandable whole to the observer. These compiled elements most easily translate to Ingold's 'taskscape'.

Archaeological sites may be viewed not so much as entities that have fixed boundaries but rather as part of a greater whole where activities take place and are reflected in the archaeological record. Within this perspective archaeological sites are subsumed into taskscapes. Taskscapes as defined by Ingold (1993) are locations where activities or tasks take place. A task is a specific action carried out by an individual or group skilled in that action. A taskscape is the, "entire ensemble of tasks, in their mutual interlocking" (Ingold 1993:158). Archaeological taskscapes are thus activities collapsed into an array of features (Ingold 1993:162).

Taskscapes are the aggregate of activities within a landscape carried out within a definable space and time. Certain taskscapes may represent the same or similar tasks, separated in terms of time - a palimpsest. Ingold also

defines a taskscape as, "...an array of related activities" (Ingold 1993:163). A taskscape is an occupied area of one or more related tasks made up of a number of activities. As used here it is also time sensitive. It may represent a single point in time or similar tasks carried out over multiple years.

Artifacts and ecofacts may be found at the activity areas, such as the dinner site sufficient to be defined as an archaeological site. Isolated artifacts such as broken scythe blades may be identified. A taskscape is a set of tasks made up of one or more specific archaeologically recognizable activities that occur within a discrete area over a period of time. Thus the taskscape which exists within a landscape may or may not contain areas defined as an archaeological site. The task may only occur one time or a few times. The tasks are occurring in a specific locale within a larger area over a period of time (defined in this case by the range of C14 dates) for the tasks. Taskscapes may also exist within archaeological sites.

The taskscape may include more than a single archaeological site and clusters of isolated artifact and ecofact occurrences. In this study area an example would be small shell scatter that derives from a limited set of activities that occurred at one location. The task may have involved activities that are archaeologically inferred such as shellfish collection, transport, shucking, making a fire, and preparing and consuming a meal. Another related activity would include packing up and then moving on down the trail back to the campsite/village. The elements of the activities which make up the tasks are those items needed to successfully carry out the activity. For the activity of shucking the clams, component elements could include the procuring the actual shellfish, a sharpened stick to remove the clam from the shell, and possibility a prayer or appropriate ritual needed prior to shucking. The tasks performed at these small shell sites in turn appear to be related to people transiting from the interior to the coastal area, going down to the beach, collecting shell, coming to the limited activity area, performing the tasks related to a brief meal preparation and then going back inland to their residential base. This empirical and practical understanding of a typical task

would clearly have potential archaeological correlates. However this empirical aspect does not exhaust the concept.

Landscape archaeology deals with the relationship between human activity and the environment that are manifested in ecological, socioeconomic and cultural patterns. Cultural landscapes depend on physical conditions and on the culture at a given time (Farina 2000). Cultural landscapes provide meaning to the physical landscapes, just as the physical landscapes influence culture (Zube 1987 and Nassauer 1995).

2.6 Why a Landscape Approach

The study to be embodied within this thesis is based upon those reasonably persistent elements that add understanding to the archaeological cultures being studied. On the one hand these elements include aspects of the physical environment and topography such as ridges, benches, mesas, valley floors, streams, creeks and rivers. Other elements of the landscape that may be considered are soil types, viewsheds where pertinent, and unusual physical/topographic features, such as oddly shaped hills, or clusters of large bedrock outcrops. Climatic conditions must also be considered part of the landscape; certainly they had an effect on the patterning of archaeological as well as environmental material/sites. These elements are tied together by dates derived from radiocarbon analysis of shellfish remains, charcoal, or other charred material. How these elements were organized, used, and re-organized over the time from the Early Holocene to the Late Holocene can in many cases be determined. The local ethnohistory may also help inform interpretations, particularly for the Late Holocene post 700 B.P.

Using the definitions and approaches summarized above, the focus of this thesis will not be explicitly working around what we may loosely conceptualize as 'tasksapes' but will approach the data much more from a landscape perspective rather than a site-specific focus. While it will be viewing the entire Holocene occupation of the Camp Pendleton area, it will be centered on the Late and late, Late Holocene. The changing activities and changing ways of

using the landscapes implies that the taskscapes of these people would be organized differently. The central research focus of this thesis is the occupational changes within the Late Holocene reflected in changes in the landscapes that made up the prehistoric area that is now Camp Pendleton. This study aims to define some of the key changes taking place through the Holocene.

2.7 Physical and Cultural Background to the Study Area

Camp Pendleton exhibits a diversity both physically and culturally. The terrain varies from beaches to seaside cliffs and oceanfront terraces, rising eastward to inland foothills and then to steeply sloping upland coastal mountains. There are 16 major drainages on the Base (Figure 1.6). From an archaeological perspective the most significant of these are San Mateo/Christianitos Creek, Aliso Creek, Las Flores Creek, Piedra de Lumbre Creek, Pilgrim Creek, and the Santa Margarita River. These rivers and streams drain from north to the south/southwest. The flora in this part of southern California consists of a mix of coastal sage scrub, chaparral, oakwoodlands, and riparian communities. The fauna is adapted to the vegetation communities

2.7.1 Geology

As noted in chapter 1, the Camp Pendleton area of Southern California is diverse in its geologic makeup with Holocene to late Pleistocene unconsolidated sedimentary deposits that are underlain by Eocene to Pliocene (2 to 55 mybp) sedimentary rocks of marine and nonmarine origin, and Cretaceous to Triassic (63 to 240 mybp) bedrock that includes highly consolidated and cemented sedimentary rock, and plutonic and metamorphic crystalline rock.

Pleistocene marine deposits are located along the coast. These deposits make up a significant part of the coastal plain on Camp Pendleton, but emerging behind these deposits are much older marine and non-marine deposits [Rogers 1965]. Terraces of Miocene, Eocene, and Upper Cretaceous marine deposits form the remaining portions of the coastal plain. Many of the foothills rising in the interior of the base are composed of these marine deposits. The underlying bedrock

geology of the Santa Margarita Mountains consists of metamorphic and igneous rocks. On Camp Pendleton these include Santiago Peak volcanics, Black Mountain volcanics, Bedford Canyon formation, and undifferentiated metamorphic rocks [Rogers 1964]. These rocks are Mesozoic in age. (Pearl and Waters 1998:4).

The geology of the coast and uplands is an important factor in determining land use patterns and available materials for tool use during the prehistoric period. To date, there have been only two quarries identified across the land - a chert formation (Piedra de Lumbre; PDL) and a metavolcanic quarry (Pigniolo 1992; Berryman 2009). Along the streams and rivers archaeological sites are found in the Quaternary alluvium (Qal) as well as colluvial and fan deposits on slopes that interface with older sediments or bedrock. Quaternary marine terraces and bedrock surface generally contains sites with little to no deposition (Pearl and Waters 1998). Generally marine terraces and remnant shore lines are good locations for procurement of small cobbles for tool manufacture and millstone implements.

Southern California is very seismically active. There are several geologic faults on Camp Pendleton. The Christianitos Fault, a northwest trending fault, is the largest. It forms the trough where the Christianitos Creek flows between Talega Canyon and San Mateo Creek. Other faults are followed by the De Luz Creek and the Santa Margarita Rivers. In general the San Diego County coastline is experiencing uplift, and “a relatively consistent rate of uplift has turned these ancient terraces into an elevated coastal plain” (Pearl and Waters 1998:5).

2.7.1.1 Pedology

Over fifty soil types are found on Camp Pendleton (Bowman 1973). Soils on the coastal plain are made up of poorly consolidated, poorly sorted marine sediments; in the river and creek flood plains the soil is primarily alluvium; and in the uplands soils are granitic based and exhibit some metasedimentary and metavolcanic inclusions. Both sedimentation and soil erosion are common on Camp Pendleton. The soil types vary from heavy clays, to alluvium, to sandy soils building in place. One might expect that choices were sometimes made

to locate habitation areas on or close to particular types of soils or their associated vegetation or other attendant characteristics. Among the 50 varieties of soils present on Camp Pendleton, many are similar in appearance and consistency and likely can be lumped together. Others are vastly different such as heavy gray colored clays and light well sorted sandy soils forming in place on a granitic based hill or ridge. Soils are part of a landscape based on physical features and relate to use choice by the prehistoric inhabitants. This physical feature may also have a relationship to use of the landscape by the inhabitants. For example, the heavy clays are poorly drained and make a poor location for residential activities but are good for grasses and other foodstuffs to grow. Soils building in place are often shallow in profile (Bowman 1973) and can be associated with bedrock outcrops that are good locations for milling activities, rock art, and residential activities.

Major soil loss occurs approximately once every 20 years and is influenced by the year-to-year climatic variability. The pattern of winter storms determines whether there is enough soil moisture before an intense storm to cause significant soil loss. Intense storms have little impact if the soil is dry enough to absorb water quickly. The rate of soil erosion is influenced by soil types, slopes, and the occurrence of wildfires. Slopes burned during wildfire are susceptible to accelerated soil erosion. In addition, fires of a very high temperature can result in hydrophobicity of the soil surface, allowing less water to enter the soil and increasing the amount of runoff and resulting in more erosion and sedimentation (INRMP 2007). These two can make it difficult to evaluate both cultural context and stratum in an archaeological site. Soil erosion can affect site survival through removal of all or part of a site making interpretation of the site characteristics difficult or nearly impossible. In my personal experience, erosion can also affect visibility of archaeological remains rendering them “invisible” during a site reconnaissance survey. Large area erosion resulting in gulling, sheet erosion, and transport of soil may change how an archaeologist perceives archaeological phenomena.

2.7.2 Climate

Camp Pendleton has several climatic zones that roughly coincide with the three geomorphic regions present: coastal plain, coastal valley, and mountain. Today the Base has a semiarid Mediterranean climate with warm, dry summers and mild, wet winters. Daytime temperatures rarely exceed 95° F, and night time temperatures usually remain above freezing in the winter (INRMP 2007).

Rainfall averages in southern California range between 20 and 101 cm depending upon location. Winds generally originate from the west or southwest, carrying in cool, moist offshore air. Camp Pendleton has over one hundred twenty-nine years of rainfall records. The southern portion of the Base has recorded an average rainfall of 35.15 cm per year, with a minimum of 11.45 cm and a maximum of 97.10 cm (1992-93). In the mountains at Case Springs (701 meters elevation, (Figure 1.2), the average precipitation is 55.52 cm, with a minimum of 15.44 cm and a maximum of 128.06 cm. The region is characterized by night and early morning clouds throughout the spring and summer. Low clouds frequently extend inland over the coastal foothills and valleys but usually dissipate during the morning. Afternoons are generally clear. Coastal fog averages 29 days per year, being heaviest during the fall and winter months (INRMP 2007).

2.7.2.1 Early Holocene

Climate will have played a significant role in determining much of the human interaction with the landscape. The period of transition from the Pleistocene to Early Holocene was one of significant change. Deglaciation occurred at the Pleistocene-Holocene transition at ca. 10 B.P. resulting in a period of significant global climate change. The Laurentide ice-sheet collapsed by ca. 8,000 BP (Dawson 1992), and the Milankovitch solar maximum resulted in warmer and drier climates than are now present (Minnich 2007).

It appears that modern global circulation patterns were established at this time. Evidence of warmer temperatures globally comes from stable isotopic

composition analysis by Feng and Epstein (1994). By matching dead with living trees, they were able to develop a continuous chronology from 8,000 BP to present. Evidence from this chronology places 6,800 BP as the point when temperatures reached maximum levels. Clark and Gillespie (1997) indicate that glaciers in the Sierra Nevada may have melted completely at this Early Holocene time. Additional evidence for Early Holocene climate comes from the high salinity of the San Francisco Bay (Ingram 1998). Forests had ascended to their current limits around 10-9,000 B.P. according to Barbour *et al.* (2007). As the climate became drier during the Early Holocene, evidence from packrat middens point to pinyon-juniper woodlands disappearing from the Mojave Desert and being replaced by desert scrub plants that are still present. Minnich (2007) shows there is evidence that far southeast California and northern Baja California were wetter than the present. He believes that intensified summer monsoons are the best explanation for this difference. "the persistence of *Juniperus californica* and chaparral species in the California and Baja California deserts into the early Holocene may reflect phenological plasticity from winter to summer rains" (Minnich 2007:47)

Paleoecological reconstruction along the Camp Pendleton coast has suggested that during the Early Holocene cold ocean-surface temperatures resulted in a fog belt along the coast, reminiscent of the modern northern California coast. It has been suggested that this coastal fog favored trees and ferns (Davis 2003). A warmer and drier climate persisted from 7500 B.P. to 5,000 B.P. Known as the Altithermal or Holocene Climate Optimum, it was time of warming and increased aridity and overlaps with the Early and Middle Holocene. As used in this thesis the Early Holocene ends at 8200 B.P., the Middle Holocene ends at 4200 B.P. and the Late Holocene is continuing today (Walker *et al.* 2012).

2.7.2.2 Middle Holocene

The Middle Holocene in the United States was generally wet enough to support local riparian vegetation, cypress trees and gallery forests. The Middle Holocene is a period of increasing precipitation. Glaciers in the Sierra

Nevada Mountains absent during the Early Holocene are present during the Middle Holocene. Increasing inflow to San Francisco Bay is evidenced by decreased salinity (Minnich 2007). Changes to mesic vegetation are seen in the Great Basin with, "...sagebrush replacing shadescale between 5400 B.P. and 4000 B.P. with juniper and grasses reaching greatest abundance at 3500 and 2500 B.P. and a grass/sage maximum at 3600 B.P. and 3100 B.P. [Wigand 1987; Miller and Wigand 1994]" (Minnich 2007:55). There is apparently little change in the Mojave Desert. The tree line identified during the Early Holocene in the southern Sierra Nevada Mountains ended about 3500 BP and declined due to wet and cooler conditions (Scuderi 1987).

The general picture is supported in the study area. The paleoenvironment at Las Flores Creek on Camp Pendleton near the end of the Middle Holocene was significantly wetter than today (Anderson 2003). Wetter conditions between ca. 4,000 B.P. and 2600 B.P. are evidenced by the occurrence of pollen from *Typha* (cattail) and *Cyperaceae* (sedges), *Cupressus* (Cypress), or a closely related tree, may have grown along this riparian corridor. Coastal sage, chaparral, and grassland communities were established by ca. 2600 B.P. within the Las Flores Creek/Red Beach area of Camp Pendleton (Byrd 2006).

2.7.2.3 Late Holocene

The climate over the past 3,000 years of the Late Holocene is better understood. The Late Holocene experienced a period of drought that occurred from ca. 2000 B.P. to 700 B.P. (Stine 1990, Larson, no date) known in Europe and much of North American as the Medieval Climatic Anomaly (MCA). The highest C14 content of marine shell occurred between 1900 B.P. to 1200 B.P. Ingram (1998) shows that the age of the West Berkeley (San Francisco Bay area) mound top is coeval with the long drought, coastal upwelling and low river inflow into San Francisco Bay. This period of the Holocene experienced significant climatic shifts, that may coincide with cultural shifts seen in the archaeological record (Jones and Schwitalla 2008). The MCA is characterized by a period of extreme drought. According to York this period has received a

large amount of archaeological attention “due to the apparent severity of the droughts and to its apparent coincidence with important cultural changes (York 2006:7). Raab and Larson (1997) indicate that the severe drought led to hiatuses in occupation of the coastal region of Southern California and may have led to increasing cultural complexity that is seen in the archaeological record.

Based on tree ring and pollen dating developed by Larson and Michaelson (1989) the period from 1450 B.P. to 950 B.P. displays a high degree of precipitation variability. Precipitation generally declines from 1450 B.P. to 1200 B.P. resulting in extreme drought conditions between 1200 B.P. to 1180 B.P. The drought was followed by 200 years (*circa* 1150 B.P. to AD 950) of the highest precipitation amounts for the entire 1,000 year period.

The Little Ice Age dating from 700 B.P. to 200 B.P. was the end of the prolonged period of drought resulting from the Medieval Climatic Anomaly. Feng and Epstein (1994) indicate rapid cooling at 350 B.P. with temperatures as cold as any during the entire Holocene. Michaelson and Haston (1998) indicate that tree ring data from the *Pseudotsuga macrocarpa* shows more frequent wet winters from 550 B.P. to 450. Although the Little Ice Age resulted in minimal changes to the vegetation (Minnich 2007) there was a worldwide significant and rapid change in the climate. Coupled with lower temperatures there was an increase in precipitation. “For the late prehistoric and early historic occupants of the lower Santa Margarita River, this likely meant more frequent floods than are seen today” (York 2006:8). The increased flooding can be extrapolated to have occurred throughout the rivers of the region.

2.7.3 Natural Resources

Coastal southern California is one of the most biologically diverse regions in the continental United States (INRMP 2007). The diversity of habitat types within the region is reflected in the rich diversity of natural resources on Camp Pendleton. Based on the climate information it seems that there was little change in the climate and vegetation from the late Middle Holocene through

to the Late Holocene when the modern coastal vegetation emerged (Byrd 2003)., Of course, this does not account for the rising sea stands which would make what was Middle Holocene inland, the Late Holocene coast line. There are currently four major ecosystems on the Base: estuary, beach, riparian, and uplands (Camp Pendleton Integrated Natural Resources Management Plan [INRMP] 2007). These includes the Santa Margarita River Estuary and the coastal lagoons located at Cacklebur, French, Aliso, Las Flores, San Onofre, and San Mateo Creeks.

The coastal habitats can be significant to understanding the various physical landscapes and their relationship to archaeological remains. They provide a knowledge base to provide a point of comparison between what is seen today and what was present in the past. Archaeologists often during CRM surveys and site excavations do not look at a prehistoric landscape in terms of what would have been present when the archaeological site was occupied. This is driven by the types of projects as well as the perspective of the researcher. Linear projects such as power lines are usually narrow corridors that go from point A to point B and the project proponent wants only a document that provides compliance with laws, not necessarily a research undertaking. One such project was a powerline project on Camp Pendleton that came from off-base. One site was recorded in the corridor, but no attempt was made to place the site into a regional landscape (Cleland 2003). Another project on Camp Pendleton was the National Register evaluation of a prehistoric site in the Santa Margarita river Basin. The evaluation of significance focused on site specific questions and did not look at the site as to how it fits into the regional landscape (Collett 2001).

The estuary and beach habitats include the intertidal zone which is inundated on a regular basis by the ocean; the strand or beach, subject to wave action and deposition; foredunes subject to sand deposition, high winds, salt deposition; back dunes, stable or moving; and coastal bluffs/cliff faces toward the ocean subject to exposure by high winds and high salt deposition (Camp Pendleton INRMP 2007). The estuary and beach habitats would have been

the site of shellfish collection by prehistoric people. The dunes habitat would often have been used for residential locations.

There are 3,966 hectares of floodplain on Camp Pendleton: of this amount riparian habitats cover about 3,318 hectares. The varieties of habitats in riparian ecosystems include riparian scrublands, riparian woodlands, fresh water marsh and open water/gravel. San Diego County upland areas are generally moisture deprived, so riparian vegetation can be easily discerned visually, from the surrounding more xeric vegetation. Riparian vegetation is dominated by winter-deciduous trees – willows, cottonwoods, alders, and sycamores in contrast to oak woodlands and coastal sage scrub (Camp Pendleton INRMP 2007). Riparian habitats provided significant resources for wood construction material, medicinal and food plants as well as habitat for various animal species. However, based on early Spanish records discussed in subsequent sections, it is likely that many of the large riparian areas on Camp Pendleton are an artifact of modern land management practices. The records point to prehistoric grasslands in areas such as Las Flores Creek (Bolton 1926); where today the vegetation is very dense riparian habitat.

Upland ecosystems on Camp Pendleton are made up of shrublands, vernal pools, grasslands and oak woodlands. San Diego County's weather is characterized by hot, dry summers and cool, rainy winter reminiscent of land around the Mediterranean Sea, central Chile, the Cape region of South Africa, and the coastal regions of southeast and southwest.

2.7.3.1 Shrubland

There are two recognized types of shrubland in Southern California: chaparral, dominated by evergreen species with small, thick, leathery, dark green, sclerophyllous leaves; and coastal sage scrub which is dominated by species that lose all or most of their softer, larger, and grayish-green leaves over the summer. Chaparral tends to be most abundant above 914 meters, where temperatures are lower and moisture more abundant. Coastal sage scrub is more common at lower elevations with higher temperatures, lower

rainfall, and a more pronounced summer drought. Both types of shrublands are present on Camp Pendleton (INRMP 2007).

Typical plants in the shrublands include Chamise (*Adenostoma fasciculatum*), Eastwood Manzanita (*Arctostaphylos glandulosa*), California sagebrush (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum*), Laurel sumac (*Rhus laurina*), Golden Yarrow (*Eriophyllum confertiflorum*), Prickly Pear cactus (*Opuntia spp.*), Lemonade berry (*Rhus integrifolia*), White sage (*Salvia apiana*), Black sage (*Salvia mellifera*), and Our Lord's Candlestick (*Yucca whipplei*) (Bowman 1973). Chaparral and coastal sage scrub lands can become very dense and nearly impenetrable; as a result, as argued by Keeley (2002) and Lightfoot and Parrish (2009), they would have been subject to burning by later prehistoric people to provide easier passage, augmented growth and open areas for grasslands and a greater diversity of species useful for successful habitation.

2.7.3.2 Grassland

There are approximately 16,187 hectares of grassland on the Base. The coastal terraces are largely covered with grassland, as are the rolling hills; both areas have deep fine textured soils. Among the native grasses were Ripgut brome (*Bromus diandrus*) and Soft chess (*Bromus mollis*). Grasslands were a very prominent feature of the Camp Pendleton physical landscape at the time of Spanish colonization. Grasslands provided not only forage for game animals but significant seed and greens resources for the prehistoric people. As will be discussed later in this thesis, burning was often employed to reduce the area and density of both riparian and coastal sage and chaparral scrub lands and to promote the growth of grasses (Keeley 2002; Lightfoot and Parish 2009).

2.7.3.3 Woodland

Oak woodlands are the primary woodland on Camp Pendleton. Oaks are well adapted to survive in drought prone Southern California. Oaks are most abundant on north-facing slopes where they are protected from the maximum

intensity of the sun. They are also found in drainages and below rock faces or areas where runoff is concentrated (INRMP 2007). The two primary species of oak found on Camp Pendleton are the Engelmann oak (*Quercus engelmannii*) and coast live oak (*Quercus agrifolia*). Both are drought-hardy and tolerant of fire and will resprout from the branches and the base after wild fires. Oaks provided important resources in the form of acorns and firewood. Oaks were managed through the use of controlled fires to provide a cleared area for the collection acorns and for planting of grasses under the trees (Shipek 1977). Oak woodlands would have been more prevalent in the recent prehistoric past. Spanish and Anglo-American settlers have reduced the numbers of oak trees though cutting for fire wood (Shipek 1977).

2.7.3.4 Wetlands

Wetlands occur where there is standing water or continual seepage that maintains saturated soils. Wetlands are primarily found as habitats associated with permanent standing water in the upland portions of Camp Pendleton. These are mostly as a thin fringe along riparian areas and along the margins of natural (Case Springs) bodies of water and temporary wetlands such as vernal pools which are abundant on the Base. Wetlands provide plant food resources as well as plants used in basketry (Hedges 1986). Typical plants include Woolly sedge (*Carex lanuginosa*), yellow nutsedge (*Cyperus esculentus*), cattail (*Typhia sp.*), bulrush (*Scirpus sp.*), and southern mudwort (*Limnolobos aquatica sp.*) (INRMP 2007).

2.7.3.5 Vegetation and Fire

Most of the 150 plant species on Base are considered native to the region, but some 22 percent are exotic. These non-native species are believed to have displaced some native plant species in the region. Shipek (1977) indicates the native grass species mentioned by Father Palou (1784) have been extirpated by the invasive plants.

The savages subsist on seeds of the Zacate (wild grass) which they harvest in the season. From these they make sheaves as is the custom to do with wheat. (Father Francisco Palou in Pourade 1969 II, 17)

Fire has a necessary role in the maintenance of native vegetation and natural community structure. As noted in Section 1.4 fires can create a mosaic of seral stages within a particular vegetation community that promotes habitat diversity. However, in recent times the fire frequency on Camp Pendleton is higher than other areas in southern California because of the Marine Corps training activities that can result in inadvertent fires (MCB Camp Pendleton 1998a). A high fire frequency can permanently change the vegetation type (type conversion) of a given site by suppressing it to a lower seral stage.

Anthropogenic causes of fire in southern California are not a recent phenomenon (Zedler *et al.* 1997). In fact, it appears that the prehistoric inhabitants of the region played an active and significant role in elevating fire frequency. Vegetative, topographic, and climatic factors in the region have also favored fire since the emergence of the Mediterranean climate in the Late Holocene. Father Crespi noted during the Portola expedition marched from San Diego to San Francisco in 1769 to 1770 many burned-over grasslands. His first report of burning was south of San Onofre (the northern end of Camp Pendleton), where the expedition, "crossed some mesas covered with dry grass, in parts burned by the heathen for the purpose of hunting hares and rabbits" (Boulton 1927:132). Archaeologically this purposeful burning is identified by the macrobotanical remains of fire-follower plants found in midden soil at sites on Camp Pendleton (Chapter 3). Remains of such plants as *Madia sp.* within the record points to more than the occasional natural fires.

2.7.3.6 Fauna

There is a wide variety of wildlife on modern Camp Pendleton that is also found throughout southern California, including Mule deer (*Odocoileus hemionus*), Cottontail rabbit (*Sylvilagus sp.*), Jackrabbit (*Lepus californicus*), California ground squirrel (*Sciuridae sp.*), Woodrat (*Neotoma sp.*), Raccoon (*Procyon lotor*), fox (*Urocyon cinereoargenteus*), coyote (*Canis latrans*),

mountain lion (*Puma concolor*), bobcat (*Lynx rufus*), Western Diamondback rattlesnake (*Crotalus atrox*), Pond turtle (*Clemmys marmorata*), and Steelhead trout (*Oncorhynchus mykiss*) as well as various migratory game birds. Mammals along the coast include the California sea lion (*Zalophus californicus*), Guadalupe fur seal (*Arctocephalus townsendi*), and sea otter (*Enhydra lutris*) (INRMP 2007).

Ocean fish include near shore marine fish species of rockfish (*Sepastes sp.*), Sheephead (*Semicossyphus pulcher*), White Croakers (*Genyonemus lineatus*), and Surfperch (*Embiotocidae sp.*). Major pelagic fish include tuna (*Thunnus sp.*) and Pacific mackerel (*Scomber japonicus*). Shellfish include the Venus clam (*Chione sp.*), oyster (*Ostrea urida*), Bean clam (*Donax gouldii*), scallop (*Argopecten sp.*), and Littleneck clam (*Protothaca staminea*) (Reddy 2004)

The productivity of particular zones can be partly correlated with climate. For example during the Early and Middle Holocene the sea stands were considerably lower and the coast line was up to 2 km further west. If indeed the region was warmer and drier during the Altithermal that could have had an impact on population and resource use decisions. As seen in Chapters Three, Four and Five there is evidence that points to people congregating around the coastal lagoons and streams during the Early and Middle Holocene taking advantage of the resources associated with aquatic resources and riparian forests. The Late Holocene, and in particular the very late Holocene (700 B.P. to 0 B.P.) was moister. This change in climate could have encouraged or necessitated changes in the use of resources.

2.7.4 Paleo-Geography and General Environment

Detailed geomorphological studies have been carried out on four localities on Camp Pendleton: the Red Beach/Las Flores estuary, Las Flores/Las Pulgas Creeks, Santa Margarita River Basin, and the San Mateo Creek terraces. These studies took place in four of the five study units within this thesis. They

provide detailed descriptions of the physical setting of the study units and are described in the following.

2.7.4.1 Red Beach Paleo-Geography and General Environment

Extensive paleo-environmental reconstructions have been conducted in the Red Beach Coastal Area since 1996 (Figure 2.1). The most complete study has been the excavation of 38 geomorphological cores drilled in to the Las Flores Creek floodplain north of the Las Flores estuary and just east of the sand line of Red Beach (Becker 2006). This was completion of a preliminary coring study began in 2003 by Reddy and follows initial studies by Rasmussen and Woodman in 1997. The purpose of the cores was to define the paleo-environment and to define the limits both aerially and subsurface of the Red Beach site CA-SDI-811. The coring revealed seven stratigraphic units that have been correlated with radiocarbon dates, palynological study and archaeological analysis. The modern Las Flores Creek channel is deeply incised with limited sediment deposited on the plain. The creek has not always been so deeply incised and the flow has been episodic in the past. It would overflow its banks and deposit alluvial sediments on the plain. There were long periods of no deposition when soils would develop in the alluvial sediments (Pope 2002:3-4). Reddy (2003) believes there has been 4,000 to 5,000 years of intermittent, at times intensive human occupation of the Las Flores coastal plain.

The five meter deep cores identified the following layers:

Unit 1 is the upper most measuring 50-100 cm thick. It contains archaeological material dating to 1500 to 1800 years B.P. The environmental period at this time is known in Europe as the Subatlantic with a cool and wetter climate (Walker *et al.* 2012)

Unit 2 shows a time of floods with periods of standing water. The flood deposits fill small gullies.

Paleosols are developed in the alluvial sediments of Unit 3 which date to 2610 years B.P. Pope believes the paleosols point to a period when there was little deposition in the floodplain, possibly due to drier climate or to incision of Las Flores Creek (Pope 2004).

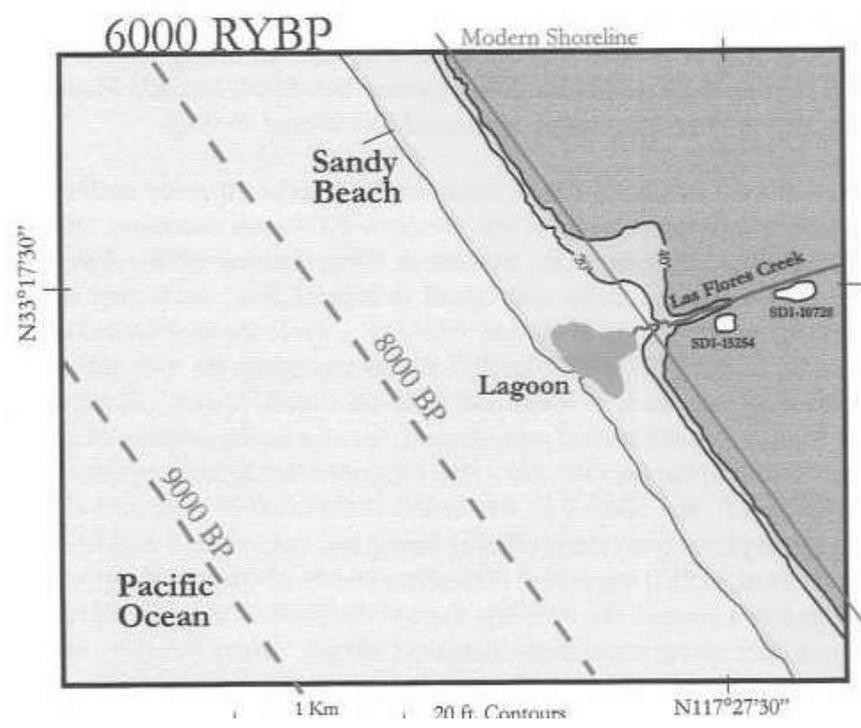
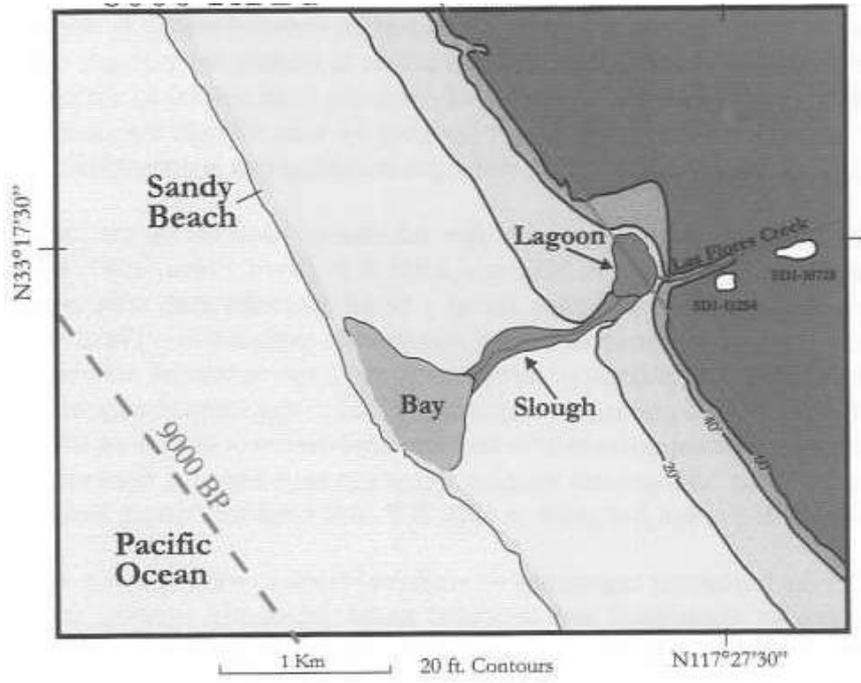


Figure 2.1 Changes in the Red Beach Coast Line (from Reddy 2003).

This would be the beginning of an environmental period called the post Subarboreal which is dry and warm (Walker *et al.* 2012).

Unit 4, which dates to around 4230 years B.P., is a major period of non-deposition with a paleosol developed. This unit has numerous artifacts and ecofacts pointing to occupation of the floodplain during a time when it was aggrading. This is a continuation of the Sub-boreal period.

Unit 5 dates to between 4230 B.P. to 6140 B.P. It marks a period of non-deposition with a freshwater marsh developed in the floodplain. This environmental period is called the Glacial Atlantic and is the warmest period of the Holocene.

Unit 6 dates from 6140 B.P. and has very limited archaeological remains.

The coring results show that “archaeological materials are above and below the paleosols. This pattern suggests that prehistoric settlement occurred during active aggradation, whereas during stable conditions (i.e. no deposition) people were not camping in this locality” (Pope 2002:9). It is Pope’s contention that the climatic events that caused the aggradation of Las Flores Creek likely created conditions that resulted in a fairly rich environmental setting useful to humans. Byrd, using the results of the geomorphological studies has developed the following sequence of the prehistoric coast line at the Red Beach Area (see also Figure 1.8):

Nine thousand years B.P. the coastline was 3 km west of its present location. Las Flores Creek flowed onto a rocky shore. By 8,000 B.P. a saline bay at the mouth of the creek connected to an inland freshwater lagoon by a slough. By this period the shoreline was 1 km further inland. The following 2,000 years saw the shoreline continue to move inland by another km. The mouth of Las Flores Creek changed to a saltwater lagoon. By the middle Holocene (4,000 B.P.) the shore had retreated to within .5 km of the modern one and the lagoon was virtually closed off. For the next 4,000 years the shoreline continued a slow movement until the modern shore was developed. (Byrd 2004:11).

The soil units identified for the Red Beach area include (Bowman 1973):

Farwell Gravelly Loam, a very deep, moderately well drained soil that has formed in alluvium from weathered mixed rocks. Farwell soils are on flood plains with slopes from 0-2 percent.

Ysidro Fine Sandy Loam, a gravelly very fine sandy loam often developed in alluvium predominately from granitic or acidic igneous rocks. It is found on terraces and alluvial fans at elevation of 152 to 762 meters amsl (NRCS Website).

Altamont Fine Sandy Loam soil, consisting of well-drained clays formed in material weathered from calcareous shale. It is found on uplands with slopes from 5 to 50 percent and elevation of 60 to 183 meters amsl.

Huerhuero Fine Sandy Loam, a soil that formed on coastal terrace in sandy to clayey marine sediments at elevations of sea level to 122 meters amsl.

These soils are part of the physical landscape that includes the archaeological sites and may be able to inform about why sites are in particular settings. These soils appear to be indicative of where sites may be found and will be used in the analysis of the Late Holocene landscapes.

2.7.4.2 Las Flores and Las Pulgas Paleo-Geography and General Environment

Las Flores Creek and Las Pulgas Creek (Figure 1.6) are discussed by Pearl and Waters (1998). The study of this creek system covered the full distance from the coast to the head waters 9 km inland. They indicate that Las Flores Creek is flanked by two Late Quaternary terraces; Terrace 2 is 5m above the modern streambed and Terrace 1 is 2m above the modern stream bed (Pearl and Waters 1998:13). The Las Flores/Las Pulgas Creek system flows perennially and is a braided stream with multiple channels. Figure 2.2 shows the basic geology of the creek system while Figure 2.3 shows the sediments of Terrace 2 and their dates.

The work by Pearl and Waters (1998) has revealed that there is a high potential for archaeological sites to be present on QAL2 alluvium underlying fans. QAL2 soil “consists of older sediments that are not deposits of the active stream. That is, these sediments were deposited at some time in the past when the stream had different flow characteristics than it does today.” Within the Las Flores Creek area Terraces 1 and Terrace 2 are made up of QAL2

sediments and within the entire Las Flores drainage 21% of the area is QAL2 soils.

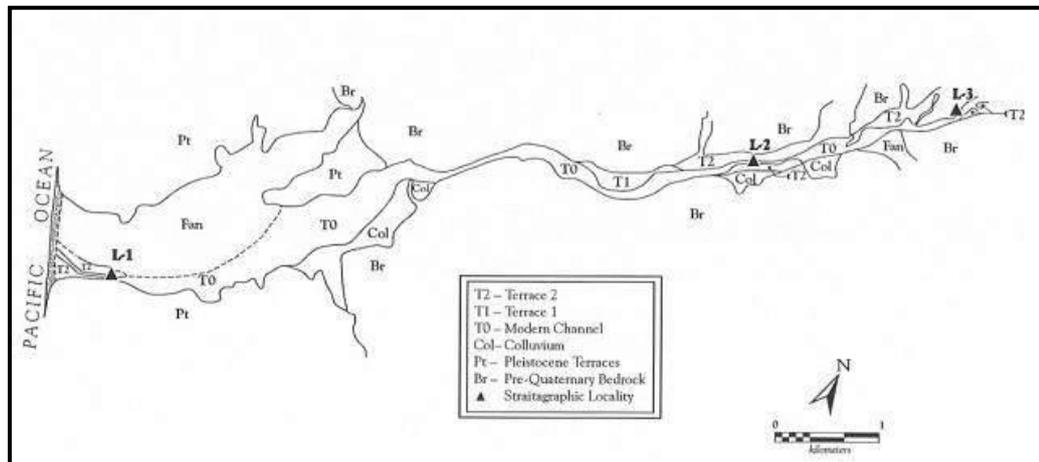


Figure 2.2 Las Flores Creek Surface Geology Map (from Pearl and Waters 1998:14).

These soils date from the Middle Holocene to the Late Holocene. Looking at the dates it appears that the potential intact living surfaces around the creek were the QAL2 sediments during the Late Holocene. Figure 2.3 and Table 2.1 shows that the QAL2 alluvium within Terrace 2 there is a buried archaeological site (CA-SDI-811) that is outside the active stream channel. As a result there may be more sites within the terrace that are not visible on the surface. Thus it is possible that Middle Holocene sites may be found buried beneath up to three meters of alluvial fill, which if found would demonstrate an earlier use of the inland areas than is currently thought.

Six primary soil groups form the matrix on which nearly all the sites are found in the Las Pulgas Study Unit. Altamont Clay upland soils are formed from calcareous shales; Escondido is a very fine upland sandy loam formed in weathered metamorphosed sandstone; Huerhuero a fine sandy formed in weathered marine deposits along the second terrace of Las Pulgas Creek; Tierra sandy loams, an upland coarse sandy loam; and Vista sandy loam, a deep sandy loam derived from granodiorite or quartz diorite base material (Bowman 1973). These soils have formed in specific types of settings and from specific materials. The Huerhuero soil is part of the same group found in

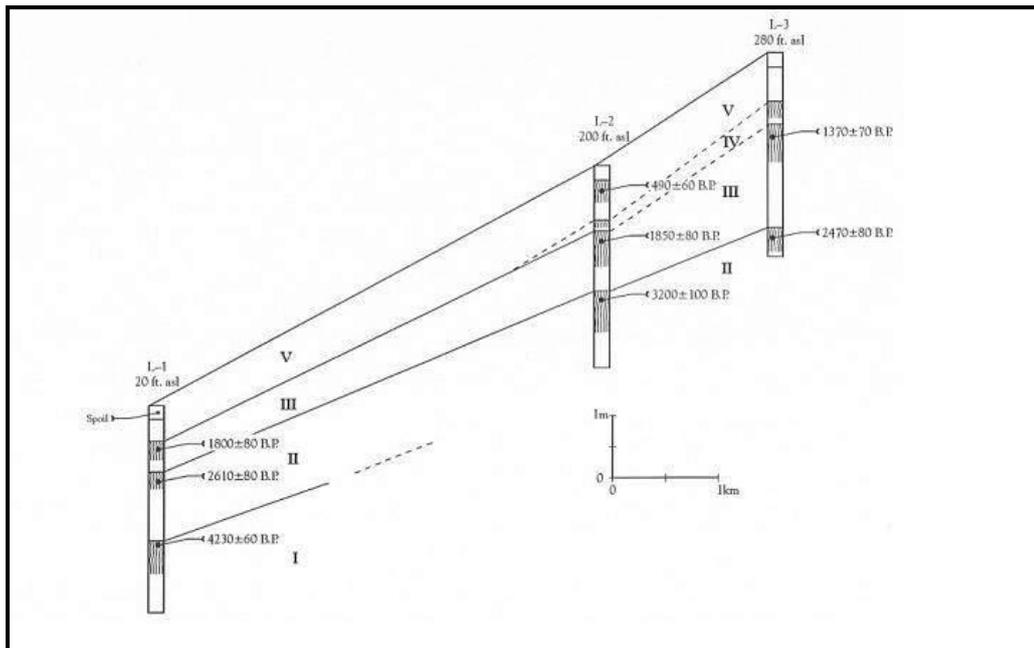


Figure 2.3 Las Flores Creek Terrace 2 Sediments with C14 Dates (from Pearl and Waters 1998:15).

Radiocarbon Age	$\delta^{13}\text{C}$ (‰)	Laboratory Number	Material Dated	Remarks
Terrace 2:				
490 ± 60	-26.8	Beta-89977	Sediment	Locality 2
1370 ± 70	27.9	Beta-89979	Sediment	Locality 3
1560 ± 50	+2.2	Beta-76211	Shell	Locality 1, archaeological site SDI-811
1725 ± 70	+2.1	Beta-84170	Shell	Locality 1, archaeological site SDI-811
1740 ± 80	+1.9	Beta-76212	Shell	Locality 1, archaeological site SDI-811
1800 ± 80	-25.0	Beta-75375	Sediment	Locality 1
1850 ± 80	-26.2	Beta-89976	Sediment	Locality 2
2470 ± 80	-26.9	Beta-89978	Sediment	Locality 3
2610 ± 80	-26.1	Beta-76432	Sediment	Locality 1
3200 ± 100	-25.6	Beta-89975	Sediment	Locality 2
4230 ± 60	-25.0	Beta-75376	Sediment	Locality 1

Table 2.1 Radiocarbon Dates from Las Flores Creek (From: Pearl and Waters 1998:16).

the Red Beach unit. These soils may be a factor used by the prehistoric inhabitants when a site is selected to camp or act as a residential base.

2.7.4.3 Santa Margarita River Paleo-Geography and General

In 2005 two palynological and geomorphological sediment cores (SMR-1 and YSD-1) were excavated, one in the Santa Margarita estuary and one at Ysidora Basin (Figure 3.28), as part of the evaluation of archaeological site CA-SDI-13930. Samples from the 30m deep Ysidora Basin core date from the Early through Late Holocene. The Santa Margarita estuary core was historic in age. Evidence points to filling of the deeply incised Santa Margarita River as sea levels rose during the end of the Pleistocene and the beginning of the Holocene (Figure 2.4). According to Davis (2005) the filling of the valley with alluvium was the response to Late Pleistocene rise in sea level. This resulted in “the landward migration of estuarine environments in the lower Santa Margarita River valley” (Davis: 2005:73). By 8800 B.P. the first lagoon formed in the Ysidora Basin, although this was a short lived event with the lagoon filling with sediment 200 years later. A second lagoon formed about 7000 B.P. and lasted until it was silted in about 5400 B.P. when the sea level retreated and a salt marsh covered the old lagoon (Davis 2005). Piasis (1979) has indicated a climatic shift during this time resulting in higher winter rainfall and more sediment discharge into the Ysidora Basin. Another cooling around 3600 B.P. to 3200 B.P. corresponds to the Sub-boreal period that in the eastern United States resulted in decline of arboreal species. This period would have resulted in more freshwater discharge of sediments into the Santa Margarita River. Davis (2005) indicates progradation of the river delta is continuing today, although not as fast as in the past. Davis states the rise in sea level during the Early Holocene “created a rich wetland mosaic in the Ysidora Basin until ca. 5,000 B.P., with fresh- water and saltwater habitats persisting in the basin. The peak abundance of freshwater taxa probably records the filling of the basin by the delta of the Santa Margarita River and the displacement of estuary waters seaward” (Davis: 2005:85). Pine and oak pollen are most abundant in the sediments prior to 5000 B.P. and the pollen of chaparral taxa are more common from 3500 B.P. “The decline in trees and subsequent increase in chaparral both probably bracket the Holocene maximum of aridity from these indicators about 5500-3500 C14 yr B.P.]” (Davis: 2005:85).

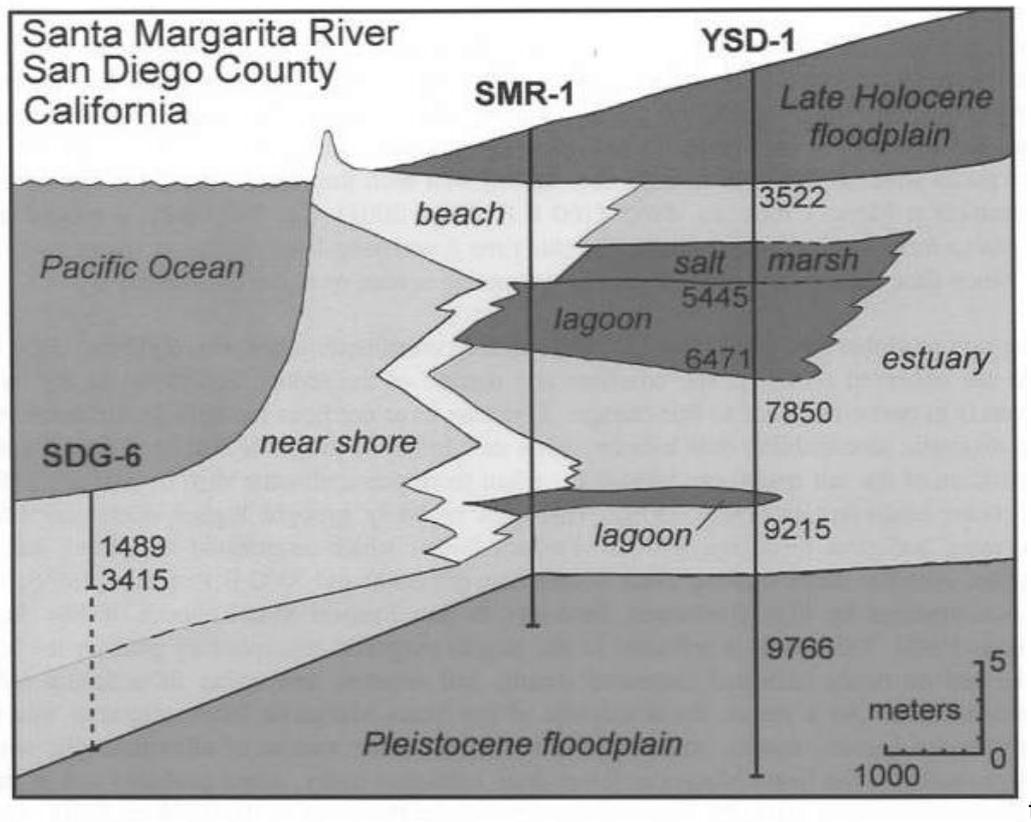


Figure 2.4 Stratigraphic Reconstruction of the Lower Santa Margarita River (from Byrd 2005).

2.7.4.4 San Mateo Creek Paleo-Geography and General Environment San Mateo River

The San Mateo Creek which comprises the major topographic feature of the San Mateo Study Unit is made up of two tributary systems, Cristianitos Creek and Talega Canyon. San Mateo Creek drains a 325 km² area (Figure 3.37). According to Byrd (1997) it is divided into three sections; the upper portion passes through steeply sloping land, the middle section is entrenched into Tertiary marine sediments and the lower section is incised into a series of unconsolidated and uplifted Quaternary marine terraces (Byrd 1997:5). According to Waters *et al.* in the lower reaches the San Mateo Creek:

...is deeply entrenched into Quaternary marine terraces that range from 10-50 m above sea level. The lower reach of San Mateo Creek is broad, roughly 4 km wide from its juncture with the Pacific Ocean for 4

km inland. Beyond this, the stream narrows to 0.5 km in width for the next 10 km.

Within San Mateo Creek are two late Quaternary alluvial terraces. This terrace, Terrace 2 (T-2), lies approximately 5 m above the active stream bed of the creek. The lower terrace, Terrace 1 (T-), lies about 2 m above the modern stream bed. Below Terrace 1 is the modern channel of San Mateo Creek which is characterized by an abraded pattern with sand and gravel forming multiple bars and channels. Stream flow is perennial and confined to the deepest channel on the stream bed; however, high flows cover the entire stream bed and occasionally inundate T-1. San Mateo Creek empties directly into the ocean (Waters and Pearl 1997:11).

Terrace 2 (Figure 2.4) which lies unconformably against Pleistocene terraces is approximately 5 meters above the modern stream bed and comprises coarse-grained channel and fine-grained floodplain sediments. Waters *et al.* (1997) identified three major late Quaternary Stratigraphic units which they label I to IV (oldest to youngest). Four radiocarbon dates were derived from the area around Locality 1 (Figure 2.5). These dates range from the Pleistocene to the Late Holocene: 17,380 \pm 460 BP, 3810 \pm 60 BP, 1310 \pm 90BP, and 850 \pm 70 (Waters *et al.* 1997).

According to Waters *et al.* (1997) there are three factors largely responsible for the development of San Mateo Creek; sea level changes, shore line erosion, and tectonic uplift. It is estimated that sea level was 120m below its present level around 18,000 to 20,000 BP. By 8,000 BP the sea level was 16m below its modern level and, as has been explained elsewhere in this thesis, it has continued to rise to its present level resulting in inundation of many archaeological sites. Shoreline erosion is the result of wave energy and bedrock resistance. According to Muhs *et al.* (1987) shoreline retreat in Southern California has been between 0.01 and 0.5m per year. Kern has indicated that shore line retreat in the area of San Mateo Creek would be between 0.125 to 0.25m per year, due to sandstone being the local bedrock material. Tectonic uplift during the quaternary is between 16 and 20 cm

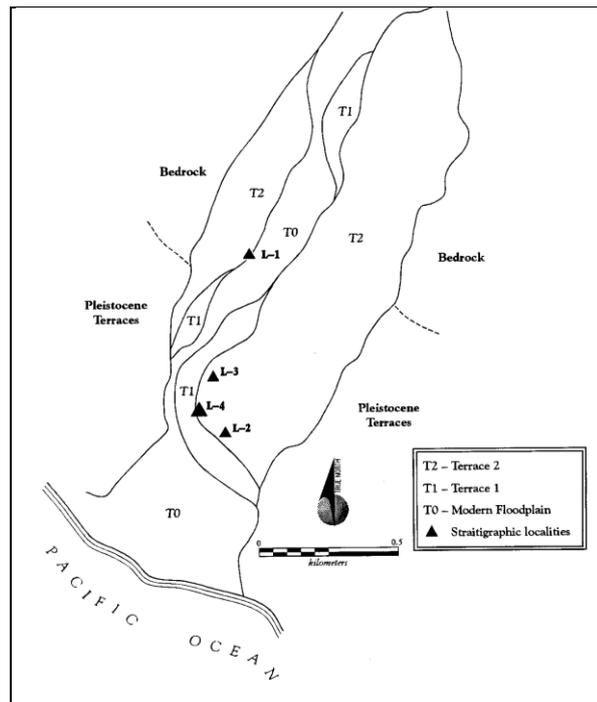


Figure 2.5 Surficial Geological Maps of San Mateo Creek (from Waters *et al.* 1997: Figure 2).

per 1000 years (Shlemon 1987). These factors have created the primary physical landscape feature. Recent geomorphological studies in Camp Pendleton's Sierra 1 training area have brought forward evidence of continuous deposition over the last 1700 years (Bullard and Bacon 2010:102). The geomorphic history of the San Mateo Creek (Figure 2.6) has demonstrated variations in climate throughout the Late Holocene (Bullard and Bacon 2010):

Our depositional unit 4 may represent the later stages of the long Holocene dry period and help account for aggradation of much of the San Mateo Creek valley fill. Depositional units 2 and 3, even though overlapping and separated by brief pauses in aggradation, are coincident with the wet periods from about 1200 to 1000 B.P. and from about 600 to 200 B.P. which is at the time of the Little Ice Age.

Eleven soil groups form the matrix on which nearly all the sites are found in the San Mateo Study Unit. They include upland soils are formed from calcareous shales; very fine sandy loams, an upland sandy loam formed in

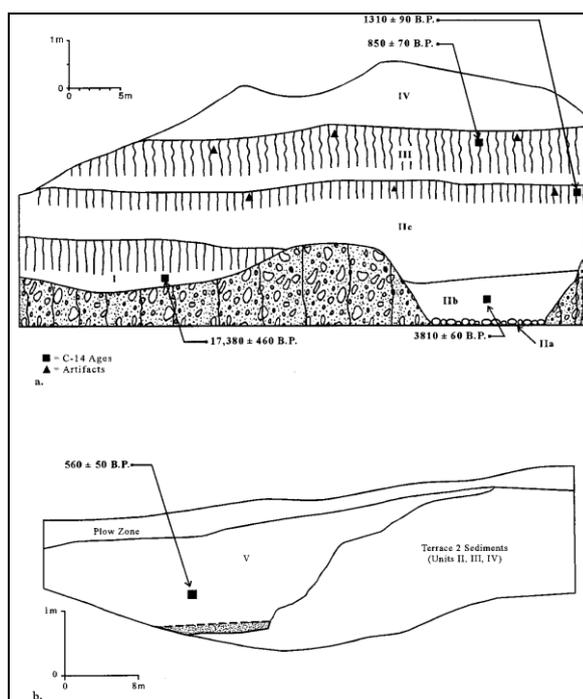


Figure 2.6 Sediments of Terrace 1 and 2, San Mateo Creek (from Waters *et al.* 1997; Figure 3).

weathered metamorphosed sandstone; fine sandy loams formed in weather marine deposits along the second terrace of San Mateo Creek; an upland coarse sandy loam; and, a deep sandy loam derived from granodiorite or quartz diorite base material (Bowman 1973). These soils have formed in specific types of settings and from specific materials and again may have been a factor used by the prehistoric inhabitants when a site is selected to camp or act as a residential base.

2.8 Cultural Setting

Archaeological sites in southern California have generally been placed into one or other cultural sequence based on the work of Malcolm Rogers (see Section 1.7 above). These have been identified as the Paleo-Indian, Archaic and Late Prehistoric stages or a derivation of this pattern (see Table 1.2).

Gordon Willey and Philip Phillips, in their “Method and Theory in American Archaeology” (1958) proposed interpretation of archaeological findings and development of cultural contexts using the historical-developmental

interpretation. The temporal aspect of settlement archaeology as seen in Willey and Phillips included Lithic, Archaic, Formative, Classic, and Post Classic Stages. These stages as well as the spatial classifications are the underpinning for many of the cultural contexts prepared throughout southern California. According to Willey and Phillips (1958) the lithic stage demonstrates the earliest evidence of human occupation in the Americas during the Late Pleistocene period, before 10,000 years before present. It encompasses what is traditionally called the Paleo-Indian period. The Archaic Stage was the second period of human occupation in the Americas (10,000 B.P. to 4,000 B.P.). It is characterized by subsistence activities including collecting nuts, seeds and shellfish. The Formative Stage is exemplified by developing complex social organization, including permanent towns and villages seen as a growth of urbanism, and ceremonial centers. It is this approach that has been used to develop the various chronological sequences. Many of the early cultural contexts used in San Diego archaeology (such as Rogers 1939 and 1945) are based on developmental changes within artifact types reminiscent of traditions defined by Willey and Phillips, “a primarily temporal continuity represented by persistent configurations in single technologies or other systems of related forms” (1958:63). More recent interpretations of local culture change (Rosenthal *et al.* 2001; Byrd 1996; Becker *et al.* 2008) use something reminiscent of Willey and Phillips' historical developmental scheme but without formal definition. Some, such as Reddy and Byrd (1997) use a combination of terms including Paleo-Indian (archaeological complex), Archaic (historical/developmental), and Late Prehistoric (historical/ developmental).

2.9 Cultural Stages

Traditionally, prehistoric sites in southern California have been broadly assigned to three cultural periods with various ‘traditions’ defined within them. However, the problems associated with defining cultural periods stem from the inability to develop a cohesive and coherent chronological terminology. This has led to poor understanding of the regional cultural context and difficulty in addressing basic questions regarding site use and periods of

occupation. To avoid continuing the basic problem of identifying different time periods, a number of researchers, including myself (Byrd and Berryman 2006) have recommended adopting an arbitrary chronological classification based on calibrated radiocarbon dates. By using radiocarbon dates, one can define the cultural characteristics of chronological periods and begin to evaluate the use of the archaeological landscape. The cultural scheme described below generally relates to three commonly ascribed periods or cultural phases of the Holocene geological epoch. These cultural stages are the departure points from which archaeological research in San Diego begins.

2.9.1 Paleo-Indian Stage

The Paleo-Indian Stage in San Diego County dates from the end of the early Holocene to the beginning of the Middle Holocene, from 10,000 B.P. to 8500-7500 B.P. (Moratto 1984; Warren *et al.* 1993). The term "Paleo-Indian" is the most consistently used, followed by "Early Period" for human occupation during the early Holocene although Clevenger *et al.* (1993), Strudwick (1995) and Gallegos (2006) use the word 'Early' to describe this period. It is characterized by the San Dieguito Tradition, considered to have been an offshoot from the Clovis and Basic Ovate Traditions (Davis 1969). Malcolm Rogers first described this tradition as the "Scraper-Maker Culture" in 1929. He later re-defined the tradition into four temporal phases based on the geomorphological placement of artifacts within one site (Harris Site). These phases are the San Dieguito I, II, III and IV and are defined generally by the artifacts that make up the sites. Tool types used include scrapers, leaf-shaped knives, crescents, hammerstones, and crude chopping tools. Materials are mostly local felsites with other local fine-grained volcanic stones.

Hypotheses have been offered to describe what this represents or how the San Dieguito tradition came into being. Warren (1967) felt that the artifacts belonged to a distinct Desert Culture, representing a generalized hunting tradition associated with people who moved into the San Diego area from the Great Basin in the north. He described the San Dieguito Complex as

containing leaf-shaped points, stem and shouldered points; ovoid, domed rectangular-end scrapers; engraving tools; and crescents.

Moriarty interpreted this Tradition as a Pre-Desert Complex dating around 11,000-8,000 BC (Moriarty 1969:2). He characterized it as a flake industry, with well-made knives, leaf-shaped points, convex scrapers, scraper planes and crescents. Little evidence of grinding has been associated with these people. Davis (1969) interpreted the San Dieguito as part of the Western Lithic Co-Tradition. The San Dieguito Tradition fits a pattern of related lithic industries that existed in the Great Basin and throughout the desert, southern coastal and peninsular California as early as 10,000 B.C. These industries would have persisted for several thousands of years without change. Only a central core of tools would remain the same, while the other tools would reflect highly stylized forms.

Regardless of definition or terminology, the Harris Site, SDI-149, has been used as the San Dieguito type site (Warren 1966). Warren *et al.* (1961) indicated that the artifact inventory included a wide range of scraper types, leaf-shaped knives, crescents, and few hammerstones. Artifacts for the most part were pressure flaked, using local fine-grained volcanics and some imported materials. Pottery is absent and grinding implements extremely rare.

Although the San Dieguito people were probably hunters, their generalized tool assemblage suggests they may also have subsisted on plant foods found along the coastal areas (Moriarty, 1969). Evidence from the Harris Site in northern San Diego County also suggests the use of shellfish resources: "the site was a very late San Dieguito III, coincident with an extremely arid period. Changes to dietary choices came about during this period as game became scarce resulting in the San Dieguito people overcoming their traditional avoidance of shellfish" (Warren, 1966: 12). The climate during this period was very warm and dry; the Anathermal, or Period II, occurred around 10,000 B.P. and the Altithermal around 8,000 BP. Analysis of pollen from the Anathermal

indicates that pinon and juniper were the dominant forest species of the San Dieguito period (Moriarty, 1969:8).

The large fauna associated with this type of semi-arid climate, such as deer, elk or bighorn, were probably not numerous. Thus, although people of the San Dieguito Tradition are considered hunters, the probable scarcity of such resources would limit hunting to a secondary role. Moriarty felt that the primary food source would have been the pine nut, various waterfowl, freshwater mussels, and local vegetation (Moriarty, 1969). Settlement patterns may be interpolated from the subsistence patterns. Warren (1967) suggested that since San Dieguito sites contain little or no bone, animals were hunted from various camps, with only the desired parts brought to the entire campsite. Warren *et al.* (1961) stated that though the Harris Site is located in a river valley, most San Dieguito sites are located on mesas or ridges, generally lack midden, and are heavily eroded. They further suggested that the small number of artifacts found per site is an indicator of small population camps. Based on information developed since Warren *et al.* (1961) described the Paleo-Indian San Dieguito, Reddy has stated that Paleo-Indian occupation sites are “centered around coastal lagoons and river valleys in San Diego County (e.g. the Harris site [CA-SDI-149], the Agua Hedionda sites, Rancho Park North, Remington Hills, and the Red Beach sites on Camp Pendleton” (Reddy 2007:30).

2.9.2 Archaic Stage

The Archaic Stage within San Diego County is postulated to extend from around 8500 B.P. to 7500 B.P. until about 2000 B.P. (Rogers 1966; Moratto 1984; Warren *et al.* 1993). It spans a period that includes the early Holocene extending through to the early part of the late Holocene. The Archaic Stage is made up of coastal and inland manifestations. Rogers (1945) referred to the coastal aspect as the La Jolla tradition, Wallace (1955) called it the Millingstone Horizon, and Warren (1968) the Encinitas Tradition. The inland Archaic manifestation is referred to as the Pauma Complex (True 1958) and Inland La Jolla by Ezell (personal communication). The major distinction

between Archaic sites along the coast and inland Archaic sites is the presence of extensive shell middens. “There is little agreement on whether the inland Pauma and the coastal La Jolla were seasonal expressions or distinct cultures” (Reddy 2007:31).

Coastal Archaic sites are characterized by shell middens, flaked cobble tools, basin metates, manos, discoidals, and flexed burials. The La Jolla Tradition is distinguished from the preceding San Dieguito Tradition by a major change in subsistence patterns. A shift from a hunting mode to a gathering exploitative pattern is inferred from the variation in tool type. The presence of numerous manos and metates (grinding implements), flaked cobble tools, and discoidals, in addition to quite extensive shell middens, have been noted in conjunction with La Jolla type sites (Moriarty 1966; Warren *et al.* 1961; Warren 1964). Warren (1964) argued that the La Jolla Complex may represent actual migrations of peoples to the coast, bringing with them a gathering economic pattern adapted to a more arid inland environment. This pattern was later adapted to gathering of shellfish along the beaches, but not readily adapted to the resources of the ocean. The abundant supply of shellfish in the lagoons and on the coast made possible an increase in population and the development of large population centers. Coastal Archaic Stage sites are often exemplified by large extensive shell middens (Warren 1964).

Excavations at a series of coastal Archaic shell middens provided the data to more accurately characterize the associated artifacts and dates. A series of Archaic Stage coastal shell midden sites produced radiocarbon dates for the ninth millennium B.P. to the third millennium B.P. As a result of these studies, several proposals were offered regarding temporal change during the coastal Archaic. These interpretations either added or subtracted sub phases and modified the temporal distribution of various archaeological traits (Davis 1976, Warren 1964). According to Hale and Becker:

Shellfish have been interpreted as a dietary staple, although plant resources, both nuts and grasses, were also an important dietary component. Major changes in human adaptations were considered to have occurred when lagoon silting became as [sic] extensive as to cause a decline in associated shellfish populations. This occurred between 4000 B.P. and 3000 B.P. at Batiquitos Lagoon and possibly later at other larger lagoons. The decline in littoral shellfish resources, Torrey pine nuts, and drinking water drastically affected human populations and resulted in a major depopulation of the coastal zone. Populations shifted inland to a river valley orientation and intensified exploitation of terrestrial small game and plant resources (possibly including acorns) (originally proposed by Rogers [1929:467]). The coast was either abandoned or subject to only seasonal, often short-term, occupation. (Hale and Becker 2006:15)

Considerably less archaeological study has taken place on inland Archaic Stage sites within San Diego County. True (1958) developed the Pauma Complex schema using the data from 25 sites set on hills and ridges overlooking creeks and streams. They predated the Late Prehistoric Stage in inland northern San Diego County. Pauma Complex sites generally lack shellfish and bone and are surface sites or with shallow stratigraphy. Seed-gathering is the primary economic pursuit. There has been no definition of the appropriate distance from the sea shore or other boundary that defines where La Jolla ends and Pauma begins.

2.9.3 Late Prehistoric Stage

In northern San Diego County the Late Prehistoric Stage is thought to have occurred during the Late Holocene between 2000 B.P. and 200 B.P. (Moratto 1984). Meighan in 1954 first defined this stage in northern San Diego County as the San Luis Rey Complex (Meighan 1954; True *et al.* 1974). It has been divided into two phases: The aceramic San Luis Rey I (1500 B.P. to 500 B.P.) and the ceramic San Luis Rey II Complex (500 B.P. to 200 B.P.). True and Waugh (1982) proposed a somewhat longer time frame with San Luis Rey I occurring primarily during the prehistoric period and San Luis Rey II appearing sometime before A.D. 1000 [950 B.P.] (York 2006:12). Some researchers (Meighan 1954; Warren 1968) believe that Late Prehistoric Stage began with the advent of the Shoshonean-speaking predecessors to the modern Luiseno

Indians migrating from the eastern deserts to south coastal Southern California as proposed by Kroeber (1925:578). The evidence for the intrusion of Shoshonean speakers who originated in the eastern deserts is based on linguistic studies rather than archaeological evidence. However, others such as Rogers (1954) believed there was occupational continuity from the Archaic Stage to the late Prehistoric Stage. He argued that the Mission Indians (as he described the Kumeyaay) culture 500 years ago was the result of an earlier migration of Yuman-speaking people from the coast to the Colorado River and then back again at the beginning of the Late Prehistoric Stage. During this later migration they brought with them riverine adaptations and desert-based technologies. True (1966 and 1970) and Warren (1964 and 1967) also argued for cultural continuity from the Archaic Stage to the Late Prehistoric Stage. Bull (1987) believed there were population replacements occurring, particularly in northern San Diego County.

The Late Prehistoric Stage is exemplified by introduction of the bow and arrow technology as seen by the presence of Desert side-notched and Cottonwood Triangular projectile points. A greater emphasis is seen in collecting and processing plant foods. Acorn processing technology is thought to have had its introduction during the Late Prehistoric Stage. Acorn technology is associated with the use of bedrock mortars and a complex procedure of leaching to produce an edible meal (MacDonald and Eighmey 1998; Meighan 1954; True 1966; Warren 1964 and 1968). True *et al.* (1991) believe there was a San Luis Rey I settlement pattern of small, short-term use camps spread over a range of topographic settings. About 500 years before the present that foraging pattern (Binford 1980) went through a change that resulted in centralized village system in the San Luis Rey II. Each major stream and river system contained a community supported by two permanent residential bases (True *et al.* 1974). Byrd and Reddy indicate that the “emergent maritime economy of the Late Archaic Period subsided, as focus turned to the extensive sandy beach habitats with the collection of bean clam and the netting of small schooling fishes” (Bird and Reddy 2002:28). Shellfish remained a significant food source within the Late Prehistoric Stage.

Where estuaries persisted into the late Holocene, shellfish assemblages reflect continued use of these habitats. Other sites along the coast include widespread scatters of shellfish associated with anthropogenic soil, abundant remains of near-shore fishes, and small terrestrial mammals” (Byrd *et al.* 2005:7).

The Late Prehistoric Stage is a Late Holocene cultural phenomenon. This period of the Holocene experienced significant climatic shifts, that may coincide with cultural shifts seen in the archaeological record. The Medieval Climate Anomaly dating from 1,000 to 700 B.P. is characterized by a period of extreme drought. According to York this period has received a large amount of archaeological attention, “...due to the apparent severity of the droughts and to its apparent coincidence with important cultural changes (York 2006:7). Raab and Larson (1997) indicate that the severe drought led to hiatuses in the occupation of the coastal region of Southern California and may have been a factor leading to the increased cultural complexity that is seen in the archaeological record.

Culture change in these two regions [American Southwest/southern California coast] clearly involved a wide range of disparate factors, including differences of demography, climate, subsistence resources, technology, social organization, and long-term patterns of subsistence intensification ... Stresses of paleoenvironmental origin may have been a significant factor in bringing about the dynamic sequences of culture change recorded in many regions of late Holocene western North American (Raab and Larson 1997:333).

There was also worldwide significant and rapid change in the climate during the succeeding period known as the Little Ice Age which began approximately 600 BP. It continued until nearly 200 years B.P. This was a period of lower temperatures and increased precipitation. “For the late prehistoric and early historic occupants of the lower Santa Margarita River, this likely meant more frequent floods than are seen today” (York 2006:8). The increased flooding can be extrapolated to have occurred throughout the rivers of the region. From a settlement perspective frequent flooding would be a factor in residential site

location. All of the Late Prehistoric sites are located up from the rivers and streams of the area.

Thus within San Diego we have identified three basic cultural stages including the Paleo-Indian Stage, the Archaic Stage and the Late Prehistoric Stage. The Paleo-Indian Stage is often called the San Dieguito Tradition, considered to have been an offshoot from the Clovis and Basic Ovate Traditions (Davis 1969). The Archaic has two manifestations, the coastal and the inland. The coastal aspect is most often referred to as the La Jollan tradition (Rogers 1945) although it has also been called the Millingstone Horizon (Wallace 1955) and the Encinitas Tradition (Warren 1968). The inland Archaic manifestation is referred to as the Pauma Complex (True 1958). The Late Prehistoric Stage has been defined in northern San Diego County as the San Luis Rey Complex (Meighan 1954; True *et al.* 1974). It has been divided into the aceramic San Luis Rey I (1500 B.P. to 500 B.P.) and the ceramic San Luis Rey II Complex (500 B.P. to 200 B.P.). These Stages date from 10,000 B.P. to 200 B.P. With the advent of Europeans into California the independent development of California Indians ends and the Ethnohistory period begins.

2.9.4 Ethnohistory

In north coastal San Diego County the “desert influence” is thought to have arrived with the Takic/Shoshonean speakers and is generally placed during the Late Holocene (Late Prehistoric Period) (Moratto 1984; Rogers 1945; Warren *et al.* 1993). Using glottochronology as a proxy for the dating of development of culture changes by studying the changes in language, it has been argued that there are new people coming into Northern San Diego around the time of the transition between Archaic and Last Prehistoric (Meighan 1954; Rogers 1945; Warren 1964, 1968). People from the east are said to have brought in a desert-based culture. The Late Prehistoric period is characterized by the introduction of the bow and arrow technology exemplified by small pressure-flaked projectile points, the processing of acorns for food using bedrock mortars, and the introduction of ceramics. Inhumation through cremation is also thought to have been a hallmark of this period (Meighan

1954; Rogers 1945; Warren 1964, 1968). Recent evidence at Camp Pendleton indicates that the introduction of cremations can be used as a marker for late, Late Holocene sites. The material culture is relatively uniform within all of San Diego County in both the Yuman-speaking Kumeyaay territory and in the Shoshonean-speaking Luiseno/Juaneno territory (Becker, Iverson Garcia-Herbst 2008) with the major exception being pottery. Pottery dates relatively late among the Late Holocene people in northern San Diego County, appearing not earlier than 400 B. P. (Berryman 2009).

As noted in Chapter 1, there is little to distinguish a Luiseno site from either a Juaneno or Kumeyaay site even though the former two speak a different language from the Kumeyaay. The types of sites are often similar. All three groups formed villages that were the focus of day-to-day life. The major difference between Kumeyaay sites and Luiseno-Juaneno sites is the amount of high quality pottery. Pottery, while not rare in Luiseno-Juaneno sites, is not nearly as common at the former as in Kumeyaay sites.

Traditional tribal names in southern California were given to the tribes by the Spanish Franciscan missionaries. These were based on affiliation with a particular mission (Figure 1.8). Thus the names are an arbitrary assignment of the original inhabitants of an area plus an aggregate of people from different linguistic stock located at a particular mission (Johnson and O'Neil 2001:3). For example Mission San Juan Capistrano (Juaneño) had native speakers from villages associated with the Gabrielleño, Serrano, and Cahuilla as well as "Luiseño." Mission San Luis Rey originally was made up of the Luiseño and later included native speakers from the Diegueno (northern Kumeyaay), Cupeño, and Cahuilla (Johnson and O'Neill 2001). The Luiseño and Juaneño referred to themselves as the *Payómkawchum*, meaning "westerners" (Bean and Shipek 1978:550; Kroeber 1925:648) and are thought to have been one people before the intervention of the Spanish missions. One of the earliest linguistic descriptions from southern California comes from a 1790 report by two missionaries assigned to Mission San Juan Capistrano, Fr. Vicente Fuster and Fr. Juan Norberto de Santiago.

This Mission [San Juan Capistrano] is founded on the coast of the South Sea. It is surrounded in all directions by a multitude of gentiles... These gentiles do not distinguish one another by nationality, but rather by language. Toward the North there are some Christianized people, whom those of this language call Chiluche, and those people call the ones of this language Chiroreche, and the one and the other both call the people of the coast on down Chichamquechem, and the mountain people Cuimquichim. The missions contiguous to this one are that of San Diego to the south and that of San Gabriel on the north. Each of the two possesses a distinct language without either having a connection with this one (cited in Johnson and O'Neill 2001:3).

The Chiluche are the people north of the mission and are now referred to as the Gabrielino or Tongva, the Chichamquechem are the coastal people south of the Diegueno (Kumeyaay or Ipai), the Cuimquichim or mountain people are east of the mission and are now known as the Cahuilla and or Cupeño (Johnson and O'Neil 2001).

Kroeber (1925) believed the ethnohistoric period Juaneño were spatially separate from the Luiseño, despite their similarities in language and culture. Limited territory (Figure 1.9) was ascribed to the Juaneño by Kroeber (1925:636) extending from Aliso Creek on the north to the area between San Onofre and Las Pulgas drainages on the south (Camp Pendleton), with the Pacific Ocean forming the western boundary and the crest of the Santa Ana Mountains forming the boundary on the east. Luiseño territory (Figure 1.9) encompassed an area from roughly Agua Hedionda on the coast, east to Lake Henshaw, north into Riverside County, and southwest to the coast (Bean and Shippek 1978; Kroeber 1925). The Luiseño shared boundaries with the Juaneño to the west and northwest, the Cahuilla from the deserts to the east, the Cupeño to the southeast, and the Kumeyaay to the south. While Kroeber was likely describing the situation in 1925, the records from the Spanish missionaries Fuster and Norberto de Santiago do not support a separation of the Juaneno from the Luiseno. Kroeber (1925:63) recognized the Juaneño as a dialect of Luiseno, but treated the populations as separate group. Cameron (1987:318) supports this interpretation based on

archaeological evidence. Bean and Shipek (1978:550), and White (1963:91) treat the Juaneño as part of the Luiseño on the basis of cultural and linguistic similarities. From the perspective of this thesis, the Luiseno and Juaneno are considered one people separated by action of the Spanish missionaries and perpetuated by American government and anthropological biases.

2.9.5 Residential and Land Use

A landscape, as Cooney stated (1998:47), is carried around in the head of the inhabitants. Recognizing how they organized the landscape can lead to better understanding of the people. Ethnohistoric residential bases among the Luiseno/Juaneno referred to as *rancherías* or villages were identified by the Spanish in the *padrones* of the missions (Johnson and O'Neill 1998 and 2001). There are more than 100 such residential locations recorded by the Spanish. However, Johnson and O'Neill (1998) have concluded that only 27 of these locations contributed more than 10 individuals to the missions. There are seven known or recorded ethnohistoric villages on Camp Pendleton including the most populous Luiseno village at the time of Spanish incursions, Topomai. Other named villages on Camp Pendleton are Ushme, Pomameye, Chacape, Panhe, Hechmai, Zoucche, Mukwachi, Jololla and Quigaia. One other village, Tobe, is located just north of the Base.

"...each *rancheria* [village] is comprised of [*sic*] several definite topological units arranged so that all necessary types of terrain are included within its territories, for example, oak groves, chaparral-covered slopes, river bottoms, springs, and so forth. None is so large that a man could not reach any part of it on foot in about half a day starting from the major dwelling site or village..." (White 1963).

This village organization scheme evident in the 18th through early 20th century seems to be based on an inland model and may not accurately reflect the prehistoric system or indeed the system at the time of Spanish arrival in the 1760s. It may well reflect a settlement pattern influenced by two hundred years of acculturation, oppression and population reduction following the introduction of a dominant European/American culture. Clan names,

marriages, and villages reflected in the early mission marriage records shows that earlier assumptions about Luiseno/Juaneno village and clan organization

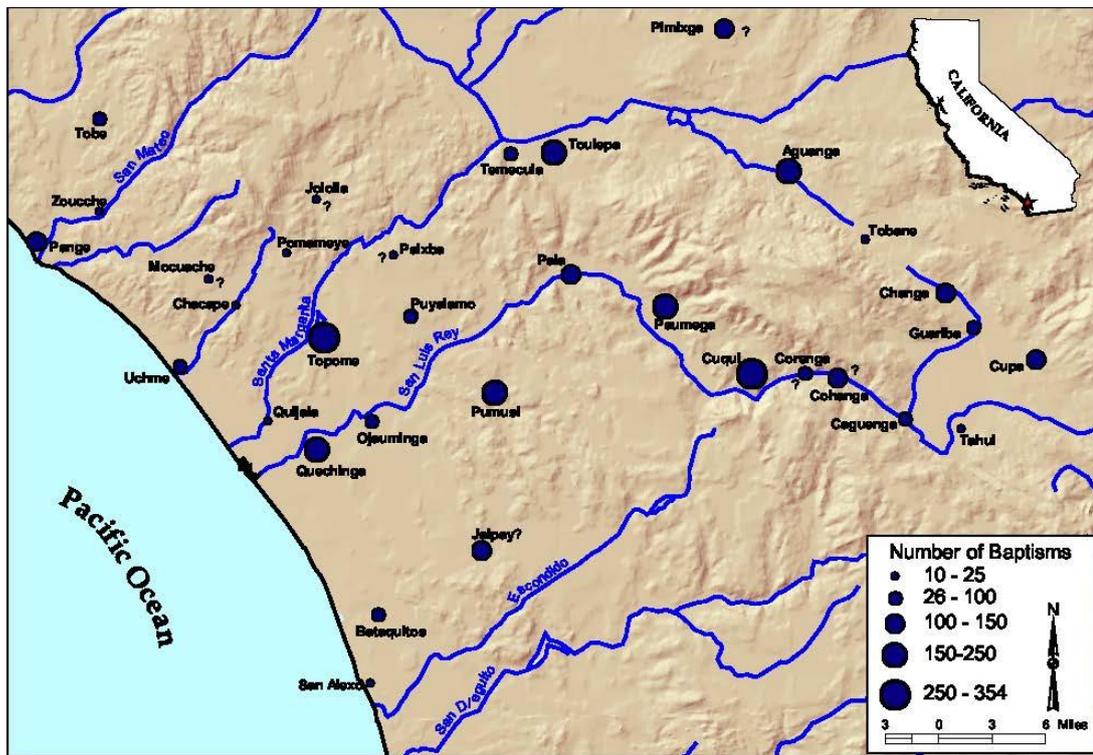


Figure 2.7 Luiseno Villages at the time of Spanish Incursion (From: Johnson and O'Neill 2001, Hechmai not shown).

does not seem to hold true, suggestive that significant cultural changes in recent centuries may not have been prevalent. At Topomai Johnson and O'Neill (2002) found evidence in the Spanish *padrones* that in 35 cases both spouses were native to Topomai, indicating a high degree of endogamy. Twenty-seven marriages were exogamous involving people from other villages including Quechinga, Chacape, Husime on Camp Pendleton and six Luiseno villages outside of Camp Pendleton.

Settlement patterns and annual residences are of particular relevance to hunter-gatherers such as the Luiseño/Juaneño, since subsistence strongly influences variations in the annual settlement systems (True and Waugh 1982). The effective use of any particular resource for food, medicine, or manufacture would be tied to a complex set of factors related to seasonality and scheduling of primary resources (Fowler 1986). The plants used by a

culture provide a focus as the arranged use of the land by its inhabitants. For example, according to Shippek (1971) the Kumeyaay managed the landscape to promote the growth of a seed-bearing grass that they harvested much like wheat. They would "cultivate" the land first by burning and then by broadcasting the seed. According to McCarthy (1993) fire was used throughout California to promote the health of oak groves and individual trees. She indicated that the Karuk Indians used fire to scorch the trees each year and that the Mono people used fire to burn manage the underbrush around the trees to limit the future effects of natural fires. As noted in Chapter 1 and above, Father Crespi during the Portola expedition of 1769-1770 from San Diego to San Francisco indicates he saw burned over grasslands. As Bean and Lawton indicated (1993:39), "the fires may well have been a product of rabbit hunting, but it should be noted that Crespi at no time actually witnessed a rabbit drive in progress". Instead, this burning may well have been to change other aspects of the landscape.

The diet of the Luiseño/Juaneño included both plant and animal foods. The relative importance of plant versus animal food and also the types of plant and animal foods was a seasonal factor. In general, the plant foods were high in fat, carbohydrates, and protein, and provided a high-energy diet. Gathering of foods followed an annual cycle from coast to higher elevations following the ripening of utilized plants. During this seasonal round two or three family units would camp together where they would gather, process and cache certain foods (Luomala, 1978:599). Acorns and pinon nuts were gathered at higher elevations from September to November (Luomala, 1978:599). Acorns also come into season beginning in September in coastal and upland groves of Camp Pendleton. Acorns were gathered by women who placed them in carrying nets and stored in baskets set on posts about 0.25 meters off the ground. The acorns were usually stored until February when they were sufficiently dried (Spier, 1923:334). From March to May, movement was through the lower foothills and canyons where buds, blossoms and herbs were collected. In May, some people went east for the agave harvest, while in June; cactus fruits were collected, dried and stored. From June to August wild

seeds were collected. During the winter months the people returned to the foothills and valleys (Luomala, 1978:599). The Luiseño/Juaneño used a multiplicity of plant species. At least six species of oak were exploited (Luomala, 1978:600) including the small acorn from the scrub oak. Acorns were hulled, pounded in a mortar with a pestle and leached to remove the tannic acid. The meal was then made into a mush. Pine nuts were also ground into flour and mixed with water and honey to make pinole (Cuero, 1970:30). Hale (2010) makes an argument that acorn processing on any large scale did not begin until 250 B.P. He states “An extensive acorn economy does not take hold until around A.D. 1700...” Hale 2008:14). He comments that “the San Diego Region is relatively static characterized by a generalized processing and gathering economy from before 3500 BP until 250 BP” (Hale 2009:14).

Other common foodstuffs included fresh foods such as watercress, sage and buckwheat seeds, miner's lettuce, two kinds of clover, yucca, grasses, shrubs, manzanita berries, elderberries, mesquite beans and fruits such as plums and cherries (Curtis, 1926:43; Luomala, 1978:600). Harvesting grass seeds involved nondestructive techniques. “For example, seed gathering was conducted in much the same manner by many tribes. Whether it involved Cahuilla women collecting chia seeds (*Salvia columbareae*), Pomo women beating the stalks of seedbearing grasses (*Elymus sp.*)...” (Anderson 1993:156). In 1846 Edwin Bryant reported California India women harvesting grass seeds: “This process is performed with two baskets, one shaped like a round shield and the other having a basin and handle. With the shield the top of the grass is brushed, and the seed by the motion is thrown into the deep basket held in the other hand. (Bryant 2007: 56).

Many types of shellfish and other marine resources were collected (Delfina Cuero 1970:28-29). Fishing was accomplished in three ways: spearing with a cactus thorn attached to a long stick, catching with a line and hook, and trapping with agave fiber nets. Reed boats were made by the Kumeyaay (Kroeber, 1976:722) while the Luiseño/Juaneño used dugout canoes and as

well as reed boats. Steelhead trout and other fish, when available in inland drainages and mountain streams, were exploited with traps, nets, or poison. Shellfish were an important part of the Luiseno diet (Lightfoot and Parish 2009) The shellfish varieties collected included *Argopecten sp.*, *Chione sp.*, and *Tegula sp.* The generally dominate shellfish variety, *Donax gouldii*, generally post dates 1200 B.P. and with the majority of sites exhibiting *Donax gouldii* post dating 600 B.P. (Hale 2010; Hale and Becker 2006; Reddy 1996; Byrd 2003).

Mammals exploited for food included deer, antelope, bear, rabbit, jackrabbit, woodrat, mice, ground squirrels, valley and mountain quail, doves, ducks and other birds, fish, and marine shellfish. Animal meat was consumed through simple preparation, which involved baking, boiling, or roasting depending on the type of animal (Sparkman 1908).

2.9.6 Settlement Pattern

The traditional archaeological views of Luiseno/Juaneno settlement patterns are that they were flexible and rarely represented by year-round sedentary villages (e.g. True 1970). Instead communities utilized one to three camps per year. Beals and Hester (1974) present another picture of Luiseno/Juaneno residency suggesting that inland Luiseno used only about 5% of their total territory. White (1963) indicates that intensively-used areas by individual villages were about 85 square km. According to Keeley “two-thirds of archaeological sites in the adjacent Kumeyaay territory are found in coastal valleys and foothills and the remainder are in the mountains. He goes on to say that “Average elevation was 750 m and 64% of the sites were located in what currently is chaparral or coastal sage scrub vegetation. On average, sites were within 135m of a water source, although 74% of these are currently seasonal streams” (Keeley 2002: 307).

2.9.7 Tools and Other Manufactured Items

The Luiseno/Juaneno manufactured many types of specialized tools. Stone tools were frequently made as needed from rocks found lying on the ground (Cuero, 1970:30). At Camp Pendleton there is a source of a rare type of chert known as Piedra de Lumbre (Pigniolo 1992). Due to its fracture characteristics only small tools can be made. The material colors that include gray/translucent, waxy yellow, and red may be more important than the fracturing. Colors had importance for the Luiseño/Juaneno and likely for earlier inhabitants. Colors are oriented to the cardinal directions and to particular stories and myths (Dubois 1903). More importantly color held greater significance for the Luiseno neighbors to the south, the Kumeyaay (see below). As such, it will be suggested that this particular type of chert may have had a special significance in particular as a trade item and in acquiring *ayelkwi* (Chapter 5).

Stone projectile points were made from Piedra de Lumbre chert, basalt, porphyry and other material to kill big game. It was reported that merely a sharpened arrow foreshaft would suffice in deer hunting (Spier, 1923:352). *Olivella* shell necklaces were worn for adornment. Smoking pipes “6 or 8 inches long” were tubular in configuration and made from stone, pottery or cane (Kroeber, 1976:723). Portable grinding stones and other tools were reportedly carried during the seasonal cycle (Cuero, 1970:30). Bedrock mortars were also common in many areas of southern California, but are rare on Camp Pendleton (Hale 2009). This may be due to limited amounts of good granitic bedrock or from a cultural preference. Fire drills, made from the stalk of a desert bush were made, as well as mush paddles from oak branches, approximately 50 cm. long and 2 cm. thick (Kroeber, 1976:722; Spier, 1923:342, 348).

2.9.8 Pottery

For ceramic manufacture, clay and rock were crushed with the aid of a mortar and pestle, sifted in a basket and mixed with water. Pottery was of the coiled

type that was shaped with a stone and wooden paddle and anvil and fired. Sometimes it was painted in red with linear designs. Common forms included cooking pots, bowls, platters, water jars (including double mouthed) and ladles (Curtis, 1926:43-44; Kroeber, 1976:722; Spier, 1923:348). Good sources of clay were highly valued, being collected from creek and riverbanks. The clay had to have the proper elastic characteristics to withstand the firing process. If a village did not have a clay source it would be necessary to trade for the material. As a result it could be a driving force for how the residents of southern California perceived and organized their landscape. Ceramics came into the area very late. Various dates have been proposed, and one of the earliest dates of 400 B.P. comes from Camp Pendleton (Cheever *et al.* 2006).

2.9.9 Basketry

Basketry was the same general type found throughout Southern California and of very high quality. These items were very important to the inhabitants since they were used to carry everything from seed grains, clay, water, etc. and to store foodstuffs.

“Although the method of manufacture varies across the state, from stately twined baskets of Northwest California to the preference for elegant coiled baskets in southern California, every Indian community produced a broad range of basket types — even those who manufactured pottery vessels (Lightfoot and Parrish 2009:19-20).

Common types and usage included carrying or seed gathering baskets, hats, or caps, hoppers for mortars, leaching vessels, seed beaters, winnowers, cradles, and vessels for carrying water (Farmer 2004). Banded designs were made utilizing material dyed with elderberry, porosela (*Dalea sp.*) and sea blight (*Suaeda sp.*). Where the reeds and catsclaw that provided the raw material for manufacturing baskets grew was very important to the Luiseño/Juaneño, and would have very definitely been organized into their perception of the landscape.

2.9.10 Social Organization

The Luiseno social organization was based on autonomous patrilineal and patrilocal clans. The kin group was the basic political unit among many southern California Indians (Reddy 2005). According to Bean and Shipek (1978) and True (1966), the Luiseño kin group/lineage maintained two permanent base camps, or villages, one in a valley and another in the mountain region. This model was developed using inland/upland sites focused around the San Luis Rey River. According to those researchers the result of this organization was bi-modal resource exploitation. This system permitted the uses of a wide variety of resources. The villages consisted of a focal point and areas for resource exploitation,

"...each *rancheria* [village] is comprised of (*sic*) several definite topological units arranged so that all necessary types of terrain are included within its territories, for example, oak groves, chaparral-covered slopes, river bottoms, springs, and so forth. None is so large that a man could not reach any part of it on foot in about half a day starting from the major dwelling site or village..." (White 1963: 23).

Villages among the Luiseño were politically autonomous and generally the seat of a clan, although it is thought that aboriginally some clans had more than one village and some villages had more than one clan. The village territories were managed, and intensively-used access was restricted closely and rights held by the clan. Each lineage had exclusive hunting and gathering rights in their procurement ranges and violation or trespass was seriously punished (Bean and Shipek 1978). It will be argued in Chapter Five that these villages were more permanent and the inhabitants experienced a more sedentary lifestyle.

Among the Luiseño/Juaneño lowland village houses were conical structures covered with bundles tied into thatching, with floors set below the ground surface and with central hearths. Other structures included sweathouses,

ceremonial enclosures, *ramadas*, and acorn granaries. Houses in the mountains also included structures built of cedar planking (Sparkman 1908; True 1986; Drucker 1937).

2.9.10.1 Beliefs

Much of the information on Luiseno and Juaneno religious beliefs came well after the Spanish colonized Alta California: as a result the tribes struggled to maintain their traditional beliefs. Constance Dubois carried out ethnographic studies of the Luiseno and Juaneno in the early 1900's. She indicated that "Acquaintance with Luiseno mythology reveals a loftiness of conception, a power of definition and of abstract thought which must give these people claim to a place among the dominate minds of the primitive race" (Dubois 1908:74).

Religious leaders and elaborate ceremonies characterized Luiseño religion. According to White (1963) ceremonial knowledge was secretly maintained. This knowledge was generally passed on to only one heir. Rock art sites, dance *ramadas*, mountains and other elements of the physical world were often religious and ceremonial. How the people organized the landscape into their cosmology could lead to understanding how they perceived their landscape. The European decimation of the Luiseno and Juaneno population after contact caused the loss of some religious specialists. This could have resulted in changes to various ceremonies (Winterrowd and Shipek 1986). Dubois discussed a reciprocal influence between the Luiseno and the adjacent Kumeyaay:

"It is extremely interesting to trace the reciprocal influence of the two tribes, Luiseno and Diegueno [Kumeyaay], each upon the other as shown in the surviving fragments of their ancient worship. To one who has long studied the subject it becomes increasing evident that many of the ceremonials used among the Dieguenos were acquired directly from the neighbors the Luiseno, as the latter declare" (Dubois, 1908:232).

According to Waterman (1910:343) “We may, in conclusion carry away definite facts concerning the religion of the Diegueno ([Kumeyaay] people. One fact is, that a certain part of their religious practices are, so far as externals are concerned, common also to the Luiseno and Cahuilla.” Significant to both the Luiseno and the Kumeyaay was color. The Luiseno cosmology associated colors with the Milky Way as displayed in their sand paintings. White was the Milky Way, red the sky, black the spirit and white our spirit (Dubois 1908). According to T.T. Waterman the Kuymeyaay directly associated colors with cardinal directions, “north is associated with red, east with white, and south with blue or green... and west with black” (Waterman 1910:333). Within their story of the first mourning or clothes-burning ceremony: “From the north he (the first man making the ceremony) brought a red rock, from the east a gleaming white rock, from the south a green rock, and from the west a black rock because the sun set there” (Waterman 1910:333).

White (1957) indicated the Luiseno/Juaneno religion was bound in their theory of knowledge. Kroeber likened knowledge as used by the Luiseno to the Algonquin Manitou and English supernatural (1925:679). White says that knowledge, or *ayelkwi*, regulates the differences between animate and the inanimate. “As a feature of social status, the acquisition of knowledge-power forms a measure of the degree to which the individual achieves mastery over his material and social environment” (White 1957:2). Eighteen religious ceremonies were used to control *ayelkwi* (White 1957:2). As White has indicated the Luiseno cosmogony centered on Wiyot, culture hero and dying god. He was the teacher of the *Ka^hmelum*: “These *ka^hmelum* were the first people, prototypes of humans, animals, birds, rocks, trees, and the like.... Each of the *ka^hmelum* was unique, and each was endowed with unique nature and powers (innate *ayelkwi*)” (White 1957:8 and 9). Wiyot had great knowledge and became father of the people. He was killed by witchcraft. While dying he set out on travels: The stories describe that after his death the *ka^hmelum* faced three crises food, overpopulation and death. “The solutions reached included adoption of the present spatial organization of “species” for

living space, of 'cannibalism' for acquiring food and the development of mortuary ceremonies in response to death" (White 1957:10). Such beliefs are important for archaeologists and this thesis because, among other things, the Luiseno Theory of Knowledge or *ayelkwi* has effects on food quests and the people's social structure (White 1957). *Ayelkwi* determined the hierarchy of the types of people including who would be eaten by whom. Subsequent to Wiyot's death the "first people" came together in a Great Conclave to find solutions that would intertwine life forces with death. According to Shipek:

All of the first people gathered to determine spatial arrangements for living (in the air, on the ground, and under it) and how to feed themselves. They decided upon eating each other and debated which would be predator and which prey. The contests were determined in favor of those which had the most power, or knowledge, about the parts of the body or potential weapons. The creatures with more knowledge preyed upon those with less (Shipek 1977:34).

Ayelkewi informed decisions made by the Luiseno and likely their ancestors. Use of the physical landscape would be informed by the spatial organization presented by the theory of knowledge. This addresses why some bedrock outcrops that would seem to the archaeologist to be well suited to milling activities display no such activity, why a campsite is located where it is, or why PDL chert is found in late, Late Holocene sites. This latter question will be addressed in this thesis by examining the flow of the chert material and the directionality of that flow. This will be done by logging densities of PDL chert within sites on Camp Pendleton.

There are factors in the decision making process to use a particular area for a task that go beyond just geography, distance to water, soil type, etc.. The Wiyot stories may reflect real issues of over-population and food supply that were addressed by the Luiseno ancestors. The late, Late Holocene site placement may be an outcome of the populations outstripping the capacity of the land to support a growing population using an Early and Middle Holocene land use pattern. A future study may well be focused on these Late Holocene

sites to determine some of the factors that the prehistoric inhabitants used to site them on the physical landscape.

2.9.11 Ethnobotany

The ethnohistoric Luiseno/Juaneno exploited many of the floral species observed or expected to be found in the project area. Macro botanical and pollen records are extracted from sites to substantiate what plants were available during occupation (Reddy 1999 and 2004). Understanding the use of plants can lead to better understanding the archaeological landscape. Archaeological sites and other-locations can be based on a deliberate choice of the inhabitants to exploit plants for food, medicine, housing, tools, etc.

For foodstuffs, the traditional order of preference for the Luiseño was acorns, seeds, cactus pods, fruits, bulbs, roots and tubers (Bean and Shipek, 1978: 522). However Hale (2010) has shown that an acorn-based economy was very late in appearing in San Diego County. More than 20 species of plants were known to have been employed by the ethnohistoric peoples for medicinal purposes (Bean and Shipek 1978).

Plants were used to construct houses, manufacture bows and arrows, and provide fibers for women's skirts, baskets and dyes (Kroeber, 1976:650-651). The following is a summary of the ways in which the floral species present within the project area may have been utilized. Data are included for the Luiseno, Kumeyaay and other neighboring groups, as their utilization patterns were very similar.

1. *Adenostoma fasciculatum* (Chamise) is an abundant shrub in the Southern California Chaparral community. It reaches a maximum height of 4 meters, and has needle-like leaves and small faceted white flowers (U.S.D.A. 2008). Medicinally, oil from this shrub was used for skin infections. It was also utilized for construction material, firewood and arrow foreshafts. A deposit

from the scale insect found on the shrub was used to bind arrows to shafts, and baskets to mortars (Bean and Saubel 1972:30; Kroeber 1925:650).

2. *Arctostaphylos sp.* (Manzanita) is chaparral shrub from 0.6 to 1.2 meters tall with smooth reddish bark and reddish berries (Hickman 1993). This plant had multiple uses. The fruit was gathered from June to September and was mashed and mixed with water to drink, rendered into a gelatin-like substance or dried and stored. The seeds were ground into a meal. For medicinal purposes leaves were mixed with tobacco or steeped in water for a tonic to relieve diarrhea or poison oak. Both the fruits and leaves were crushed for their astringent properties. They were also used for the relief of bronchitis, dropsy and other diseases. Branches were used for firewood and house construction (Balls 1962:38; Bean and Saubel 1972:40-41; Kroeber 1925:649; Sweet 1976:24).

3. *Artemisia californica* (Coast Sagebrush), a low rounded shrub between 0.9 to 2.5 meters tall with grayish leaves, was one of the most important medicinal plants in Southern California. The leaves were chewed to relieve colds and it was taken before a woman's menstrual period. Newborn babies were given the plant one day after birth to flush out their systems. It was also used as a poultice to relieve toothache pain and in a bath to relieve rheumatism symptoms (Bean and Saubel 1972).

4. *Brassica geniculata* (Mustard) is an introduced grass used as greens, either fresh or boiled. Seeds were ground into a mush (Bean and Saubel, 1972:47).

5. *Bromus sp.* (Chess, Brome) are annual or perennial grasses. Over 36 species occur in California and most of these are introduced (Crampton 1974:67-68). The seeds were parched, ground and made into a meal (Kroeber 1925:649; Weiner 1980:179).

6. *Encelia farinosa* (Desert Encelia or Brittlebrush) is a rounded woody shrub between 0.6 and one meter tall with ovate silvery leaves and yellow flowers (U.S.D.A 2008). A gum from the plant was heated and applied to the chest of an ailing patient to relieve pain. Toothache was relieved by a decoction made from blossoms, leaves-and stems held in the mouth (Bean and Saubel 1972:69).

7. *Eriodictyon californica* (Yerba Santa) is an aromatic, evergreen shrub with white or purplish flowers (U.S.D.A. 2008). This plant was highly prized for its many medicinal properties. Its leaves chewed, smoked or brewed into a tea to treat lung problems. The leaves and flowers were steeped in hot water to relieve diarrhea and rheumatism. A strong solution made from the leaves was prepared to relieve sore and fatigued limbs; the leaves were also chewed as tobacco and as a thirst quencher. This plant was also believed to be a blood purifier (Balls, 1962:64; Bean and Saubel, 1972: 71; Sweet, 1976:30).

8. *Eriogonum fasciculatum* (California Buckwheat) is a native shrub about 0.5 to one meter tall, its leaves are egg-shaped and the faceted flowers are white or pink (Hickman 1993). It was used for its medicinal properties. A decoction made from the leaves was used to cure headaches and stomach disorders. A hot tea was drunk for cold and laryngitis. The flowers were steeped in water to make an eyewash or a drink to "clean out the intestines" (Hickman 1993; Bean and Saubel, 1972:72).

9. *Eriophyllum confertiflorum* (Golden Yarrow) is a slightly woody, flowering shrub in the daisy family. It grows up to 0.6 meters in height and has yellow flowers (U.S.D.A. 2008). Its seeds were used as a food parched and ground into flour (Bean and Saubel, 1972:72).

10. *Foeniculum vulgare* (Sweet Fennel, Anise), a 0.6 to two meter high herb with a strong odor of anise or licorice. It has grayish-green leaves and yellow flowers. Although a European introduction, it was used as food and the young

shoots were used as a potherb. The seeds were used for digestive problems and the leaves were chewed for a physic (Sweet, 1976:58).

11. *Opuntia* sp. (Prickly Pear) is a cactus with rounded pads (cladodes) covered with sharp spines. It was used for both food and medicine. The fruits were eaten and the seeds ground into flour. The pads were used as food and were also split and made into a poultice for wounds (Balls, 1962:36; Bean and Saubel, 1972:97; Kroeber, 1976: 649).

12. *Cylindropuntia* (Cholla) is a cactus with cylindrical stem segments with large barbed spines. It has large globe reddish to purple fruit. The individual joints could be diced and eaten and the seeds from the fruit were ground into flour (Bean and Saubel 1972; Balls 1962).

13. *Quercus* (*Quercus agrifolia*, *Quercus douglasii*, *Quercus engelmanni*, and *Quercus Kelloggii*) the coast and mountain oaks are large trees found throughout southern California. Along with scrub oak (*Quercus berberidifolia*), they provided a staple food to the California native people. Acorns were ground, leached and made into a meal or added to soups and stews. Oak ashes were placed in water to produce an antiseptic wash. The red interior bark was used to relieve toothaches. Beyond food and medicine the trees had many other uses: the bark was made into a dye and other parts were used for firewood and in gaming pieces. Acorns were made into necklaces and used as bait to capture small animals (Almstedt, 1977:21; Balls, 1962:12; Bean and Saubel, 1972:127, 129; Kroeber, 1976:649).

14. *Rhus integrifolia* (Lemonade Berry) is an evergreen shrub that ranges in height from one to eight meters. The leaves are leathery and waxy in appearance. The plant has white or pinkish flowers and reddish fruits (U.S.D.A 2008). The berries from this plant were put in water to make a lemonade-flavored drink (Balls, 1962:43; Bean and Saubel, 1972:132).

15. *Salvia apiana* (White Sage) is a tall erect shrub often standing over 1.8 meters high. It was used for both food and medicine (Hickman 1993). Seeds gathered from July to September were parched, ground into flour and eaten as mush often called pinole. The seeds and leaves were also used as flavoring for other foods. For medicinal purposes, a tea was used to cure colds. Dandruff was removed and hair was prevented from turning gray by being washed with a mixture of this shrub. Seeds were used as eye cleansers and the leaves were made into a poultice to eliminate body odors. Ground seeds were also used to prevent the drying of nasal mucous (Almstedt, 1977:26, 28, 30; Bean and Saubel, 1972:136-, Raven, 1970:71; Weiner, 1980:148).

16. *Salvia mellifera* (Black sage), is a very aromatic shrub native to California. Growing from one to two meters tall it is one of the most common species of sage in San Diego County. Black sage was commonly used for food. The seeds were parched and ground into meal and the leaves and stalks used as food flavoring (Bean and Saubel, 1972:138-, U.S.D.A. 2008).

These plants are all found in the coastal sage scrub habitat along the southern California coast. According to Keeley (2002) coastal sage scrub is resilient to fire frequency greater than once every five years; fires at three year intervals promotes herbaceous plant growth and diminishes scrub growth. "Repetition of fires at this frequency will type convert coastal sage scrub to a grass/shrub mixture" (Keeley 2002:309). He also points out that post-fire coastal sage scrub will have abundant examples of annual plants but with a great representation of perennial grasses (Keeley 2002). Without fire coastal sage scrub will convert to dense nearly impenetrable scrub brush.

2.9.12 Use of Fire

"Euro-Americans arrived in North America bearing their folk knowledge that held fire in forests to be destructive and hazardous to humans. This view contrasted sharply with the tradition knowledge of the indigenous inhabitants,

who embraced the benefits of burning and were skilled in application of fire technology” (Kimmerer and Lake 2001:36). “Fire is recognized as one of the most powerful tools available to hunter-gathers.” (Heitzmann 2009:294). He further states that early inhabitants can change the landscape to make it easier for use by humans, plants and animals (2009).

Kimmerer and Lake (2001) indicate that Indian burning was so common place that it shaped the composition of North American forests. Lewis (1993) outlined more than 70 uses of fire by Native Americans including clearing to yield an abundant acorn crop that was easier to harvest; burning riparian areas to attract game to new grass; managing basketry plants; reducing pest populations and to provide easier collecting of edible insects. Fire modified the local habitats to create mosaic successional patches with a variety of species that enhanced food security through a diversity of food plants, medicines, game and subsistence plant materials (Kimmerer and Lake 2001). Heitzmann (2009) has shown that indigenous peoples in British Columbia frequently burned areas to enhance habitats for selected plant species and to enhance abundance. Burning enhanced growth of seventeen documented plant species, in particular, berries and edible roots. Areas burned and the time of burning varied with local conditions and the type of plant production being enhanced.

Much like Lewis, Keeley hypothesizes;

The primary reasons for burning in the coastal ranges were because (1) shrublands dominated much of the landscape, (2) undisturbed chaparral and coastal sage scrub provided few resources, and (3) resources that were present in shrublands were not readily accessible without burning. In addition, undisturbed shrublands had negative qualities related to, (4) their consumption of precious water resources, (5) presence as a fire hazard during autumn Santa Ana wind conditions, (6) harboring of potentially lethal predators and enemies, and (7) as an obstacle to local travel (Keeley 2002:310).

American Indians accelerated fire frequency on shrubland dominated landscapes such as along the southern California coastal plain. Shrubs and scrub vegetation was thinned-out or displaced and with the physiognomy

changing from shrubland to grassland. In 1792 Spanish explorer Jose Longinos Martinez reported “In all of New California from Fronteras northward the gentiles have the custom of burning the brush...” (Simpson, 1938). Heitzmann (2009) has noted that burning affects plant species composition, favoring grasses over forbs. Burning also enhances the available nitrogen. He also indicated that burning can affect phosphorous, potassium and calcium levels in soil. Shrub and scrub lands would be type converted to herbaceous and grass associations. Many significant seed resources, such as *Salvia*, *Madia*, *Clarkia*, *Calandrinia*, and vegetable resources such as foliage, e.g. *Trifolium*, *Lupinus*, and bulbs/corms, e.g. *Dichlostemma capitata*, *Brodieae sp.*, *Calochortus sp.*, *Allium sp.*, *Sanicula sp.*, *Lomatium sp.* (Keeley 2002; Luomala, 1978; Timbrook *et al.* 1982) are enhanced following a fire. Keeley (2002:310) indicates that post-fire, diversity increases in scrub and shrub lands from two dozen per 0.1 hectare pre-fire, to as many as eighty species. These are primarily stimulated, deeply buried seeds. Keeley (2002:307) additionally hypothesizes that

“the quantity of plant material required for the continuous production of baskets gives considerable support to the suggestion that there existed a necessity for management, involving both burning and pruning, at an industrial level. Such a requirement suggests a burning or pruning regime that was very frequent, to keep shrubs at a young growth stage in order to obtain the continual supply of the tremendous quantity of usable shoots needed for the making of the many kinds of baskets that were in daily use.”

Through study of early Spanish explorer journals Dodge (1975) hypothesized that the mix of grassland and shrubland was maintained by the Indians in San Diego by consistently burning. In referring to the Luiseno from the future site of the Mission San Luis Rey to the San Mateo area, Frey Juan Crespi's diary notes on 17 July 1769 north of San Diego ‘we climbed a very grassy hill ... then traveled over mesas that are in part covered with grass and in part by a grove of young oaks, rosemary, and other shrubs not known to us’ (Bolton, 1927). Further north and a few days later the diary continues ‘we ascended a

little hill and entered upon some mesas covered with dry grass, in parts burned by the heathen for the purpose of hunting hares and rabbits, which live there in abundance. In some places there are clumps of wild prickly pear and some rosemary” Another early Spanish account includes: ‘The soil is very good; it is black, well grassed, and mellow; and the fields are thickly dotted with shrubs’ (Fages, 1937).

Like many other southern California Indians, the Luiseno/Juaneno used fire to manage their physical landscape to increase the abundance of food. Fire used in this way may be considered a form of fire/swidden horticulture. Although various methods of cultivation are described in the ethnohistoric and ethnographic literature, the cornerstone of Native California management practices revolved around fires (Lightfoot and Parrish 2009:21).

A key to understanding the use of the landscape by the prehistoric peoples of Camp Pendleton is to see that the prehistoric people like their descendants used, modified and managed the physical landscape. This was done to provide for food and nonfood resources (Lightfoot and Parrish 2009:20). California Indians had a diverse set of perishable items that came from a managed landscape.

2.10 Discussion

The information presented above is important to the development of this thesis. The potential value of adopting ‘landscape’ approaches to the archaeology of this region has been suggested, recognizing the potential importance of cultural perceptions of the landscape, human capacities to transform the landscape, as well as the possible importance of different activities in different parts of the landscape. This latter point echoes some of the concerns expressed in Ingold’s ideas of ‘taskscape’. Landscape approaches may also provide a means to better explore the ways societal values are shaped and maintained (Kuna and Dreserova 2007). With no unified theory landscape archaeology is an approach that best fits the scope laid out by the researcher. In particular, it is a means to move beyond the site-

specific approach so often used by CRM archaeology. Landscape archaeology provides us with the means to look at sites not only as individual “entities” but also as groups that can inform about cultural systems. The data provided by the CRM archaeological studies can be used to expand the site-specific studies into a broader landscape. As called out by Stafford and Hajic (1992: 139-140) topographic relief, soils, water resources, plant and animal communities are among the physical elements that can make up landscapes. This chapter has addressed those physical elements as found on Camp Pendleton. This thesis is proposing to expand beyond those physical elements to include climate, radiocarbon dates, physical materials such as specific stone resources, and ocean resources such as particular shellfish.

The general archaeological background of Paleo-Indian, Archaic, and Late Prehistoric provides a setting for the broad geological terms used including the Holocene - Early, Middle, and Late. The ethnographic background provides strong comparative evidence for the landscape analysis provided in the following chapters.

A research issue driving the landscape(s) analysis conducted by this thesis revolves around what intensive survey and associated investigations can tell us about Holocene occupation in southern California using data derived from cultural resource management (CRM) studies on Camp Pendleton.. Most of the data used to address these questions originate from radiocarbon-dated archaeological sites on Camp Pendleton. The sites used in this thesis have been excavated, analyzed and contain sufficient radiocarbon dates and artifact assemblages to aid in understanding the research issues. Many of the sites have yielded multiple dates that include the periods of concern.

To simplify and help organize the broad database, Camp Pendleton has been divided into five study units: Red Beach, Las Pulgas Creek, Case Springs, Santa Margarita River and San Mateo Creek. Dated archeological sites within each study unit are initially broken down by implied function, into the categories of which have been commonly used in this area, limited activity,

dinner camp, residential base (Byrd 2004). Basic site information is presented including maps of site locations in relationship to topographic features; basic site contents; and charts and tables of radiocarbon dates. A baseline of site data by study unit, dates within the Holocene, and site function is developed to provide information sufficient to evaluate the perceived change from the Middle Holocene to Late Holocene, and in particular the very Late Holocene (post 645 B.P.). The data are expanded by analysis of elements including the shellfish *Donax gouldii*; PDL chert; climate using tree ring data as a proxy; radiocarbon dates; resource intensification and resource exploitation; landscapes of movement; religion/cosmology; and taskscapes. These are used to develop answers to the primary research question and ultimately focus-on the changes from the Middle to the Late and late, Late Holocene.

Chapter Three Studying the Dated Archaeological Sites of Camp Pendleton

3.1 Introduction to Data and Methods

This part of the thesis study will present the basic data relating to the sites whose analysis lies at the center of this study. As a point of departure, an overview of the available data is presented, outlining the history of its collection, the nature and extent of the data, and outlining some key aspects of methodology.

For over 80 years there have been archaeological studies taking place in southern California. This research resulted in the development of the cultural sequences discussed in Chapters One and Two. Very limited systematic research was undertaken on Camp Pendleton until the 1960s (Byrd 1996). Most of the studies carried out in the period from 1960 to 1990 were small cultural resource surveys (Bull 1975; Welch 1975 and 1978; Waldron 1978; Kaldenberg 1982). These studies were generally descriptive and not research driven. From the mid 1990s to the present Camp Pendleton experienced an expansion of cultural resource studies driven by the need to comply with the federal National Historic Preservation Act of 1960. The projects included surveys, site evaluations and data recovery excavation. Each archaeological project was required by the Camp Pendleton CRM to have a research focus. This research orientation was initially formalized in a number of papers and guidelines in the late 1990s (Reddy and Byrd 1997). Each test and data recovery excavation was required to be driven by a work plan and research design specific to the site being excavated. The research orientation and research designs were developed in coordination with the Camp Pendleton CRM. The research designed evolved from site-specific studies into broader landscape studies. The data collected during the studies from the mid 1990s included site descriptive, topography, slope aspect, consistent lithic, pottery, macro botanical and faunal analysis.

3.1.1 Previous Research on Camp Pendleton

Archaeological studies on Camp Pendleton began in the 1960's. They were often carried out in reaction to a discovery on the Base by Marines. More detailed surveys and limited excavation began in the 1970s. Although large-scale surveys were carried out, there were no test projects conducted in the 1980s (Reddy 1997). Test excavation of sites on Camp Pendleton really began in the 1990s with over 21 excavation projects completed by 1997 (Reddy 1997: 10) resulting in 83 sites tested. Reddy found that through the 1990s the focus of testing at prehistoric sites had been at shell middens "... this has directly affected the database and our understanding of the prehistoric settlement of the Base (Reddy 1997:40). During this time inland sites were seldom tested and the understanding of interrelationship between sites and their landscape was not addressed (Reddy 1997). In the late 1990s and 2000s the archaeological studies became broader based and moved from primarily coastal to the inland areas. The Camp Pendleton cultural resource studies were often driven by needs of the Marine Corps to provide more and different training opportunities and by requirements to upgrade and expand the Base's infrastructure. While this compliance work was required, the Cultural Resource Manager required all of the work to be research-oriented to expand our understanding of the use of the prehistoric landscapes.

3.1.2 Research in Study Areas

Five landscape zones on Camp Pendleton (Figure 3.1, Table 3.1) were designed for this thesis based on major topographic features and the presence of clusters of dated sites. These analytical units include Red Beach, the Las Pulgas Corridor, the Santa Margarita and Pilgrim Creek and Case Springs Uplands, and San Mateo Creek. These study units were selected because they provide a heuristic device for controlling the data and represent a cross-section of the type of sites, environmental and resources available along the northern San Diego County coast. The large open inland area between the Las Pulgas study unit and Case Springs and San Mateo Study

Units was not available for study due to it being a live-fire impact area to which access is restricted due to safety concerns.

The Red Beach area of Camp Pendleton includes a broad sandy beach, the Las Flores Creek and Estuary, and coastal margin. Eighteen sites are within the Red Beach vicinity. Research was nearly non-existent here until the mid-1990s. Since then 10 sites have been excavated, with the bulk of the studies on sites CA-SDI-811, 821/H,

10726, 10728, and 15254. Extensive radiocarbon dating has shown this area to have been used from the end of the Early Holocene through to the Late Holocene. Byrd, in a research context of the Red Beach/Lower Las Flores Creek, has shown Red Beach to have had large residential bases (Ca-SDI-15254 and 10728) dating from the Early to Middle Holocene (Byrd 2004:15). He indicates that intensive occupation has taken place in the Las Flores Creek valley floor (CA-SDI-811, 4536, 10726, 10723, 10731) dating from the Middle Holocene. This matches the finding by Becker and Hale at CA-SDI-10723. Terminal Holocene use of the area is seen at CA-SDI-812/H where “the results of these archaeological investigations reveal intensification in the exploitation of littoral resources, both of terrestrial and marine origin, marking the sequence of prehistoric occupation along the Lower Las Flores Creek” (Becker and Hale 2004:21). Reddy in 1999 test-excavated 21 limited activity and dinner camps within the coastal margin generally away from the area of Red Beach. She reported that the majority of the small sites had limited subsurface material and integrity. Radiocarbon dates recovered from 12 sites, with the exception of CA-SDI-14522 and 14494, post-date 700 B.P. Those two sites are Late Holocene in age and predate 900 B.P. Information recovered from the excavation of the 21 sites revealed low densities of artifacts with the majority of the items recovered to be marine shellfish, primarily *Donax gouldii* (Reddy 1999).

In 1997 Reddy tested 12 sites in the Case Springs area. She found that the sites exhibited evidence of regular return demonstrating regular return to the

sites from people living in the lowland/coastal area (Reddy 1997). “One pattern that is clearly indicative of population movement between the lowlands and Case Springs highlands is the presence of high frequencies of Piedra de Lumbre chert at the Case Springs sites” (Reddy 1997:263). The seven dated sites were all late Holocene and according to Reddy the dates were internally consistent (Reddy 1997).

York (2000) excavated two sites in the Las Pulgas Creek drainage and arrived at similar findings as those of Reddy. The sites were repeatedly occupied post 650 B.P. Hale and Becker (2006) test excavated 24 sites within the Las Pulgas Creek area starting at CA-SDI-812/H, and CA-SDI-10723 while at Red Beach was included within this study. The project extended to sites in the uplands part of the Las Pulgas Creek watershed. Only four of the sites contained datable material. Two of the dates from CA-SDI-10723 were Early Holocene in age. This site is on a knoll just overlooking Red Beach and is nearly adjacent to the ocean. All the rest of the dates were from the Late Holocene, and only one of these did not date to post 640 B.P. Becker and Hale point to CA-SDI-10723 during the Late Holocene as being an intensely-occupied residential site. They indicated (2006:493) that other than the residential areas and campsite, the typical sites exhibit sparse or absent subsurface materials. They state the sites fit a general pattern with the overall settlement strategy being generalized and flexible indicating “movement between long-term residential sites on the coast to short-term residential sites in the interior during the Late Prehistoric period” (Becker and Hale 2006:493). They believe the movement was frequent. In 2008 Cheever, Moffitt and Moffitt excavated a large, complex site (CA-SDI-14631) at Aliso Canyon within the area of Las Pulgas Creek. The site was occupied very late in the Late Holocene. Radiocarbon dates from carbon residue of two potsherds, marine shell and charcoal place use of the site after 500 B.P. It was made up of bedrock milling areas, relatively deep midden soil, and ceremonial uses with the presence of a cupule stone. Cheever *et.al.* (2008) reported a wide variety of artifacts from debitage, projectile points, beads, ceramic vessels, ground stone, ceremonial items such as ceramic pipes and quartz crystal. Shell fish

remains were abundant, although the site is over 10 km from the ocean, with *Donax gouldii* being most prevalent. They indicate the site is a dinner camp demonstrating a mixed subsistence strategy.

In 2004 Reddy reported on the excavation of CA-SDI-4466 located on a terrace overlooking the Santa Margarita River. According to Reddy the radiocarbon dates suggested two periods of occupation, Archaic (7500 B.P. – 7255 B.P. and 4250 B.P. – 3835 B.P.) and Late Prehistoric post 500 B.P. She determined the site CA-SDI-4416 was extensive containing a wide range of cultural material. It was occupied intermittently over a 7,000 year period by hunter-gathers seasonally for an undetermined series of years (Reddy 2004:169). Byrd in 2006 carried out excavation and evaluation of a site and area in the Ysidora Basin within the Santa Margarita River Basin. The geomorphological coring element provided a 10,000 year history of a post-glacial marine transgression and regression in the basin. Byrd indicated the site, CA-SDI-13939 represented a “typical” short-term Late Holocene encampment surrounding the Santa Margarita River valley after it became a floodplain. York (2005) in a research context for the Santa Margarita River valley indicates the archaeological record in the valley spans much of the Holocene (York 2005:66). “The data suggests that early and middle Archaic settlement featured residential moves between resource patches around the coastal lagoons and some distance up the major drainages ... within the study area, settlement appears to have continued to be centered primarily on the lower course of the river” (York 2005:66). The Late Holocene occupation identified as the San Luis Rey I (950 B.P. to 200 B.P.) appeared to be more ephemeral with no major habitations from this period recorded. York indicates that the “sudden appearance of the major habitation area at CA-SDI-10156/12599/H during the 17th century appears consistent with the kind of San Luis Rey II [200 B.P. to 100 B.P.] consolidation proposed by True and Waugh [1982] for the upper San Luis Rey River.” York indicates the elements of the sites from this period point to an inland focus (2005).

Byrd, Pallette and Serr test excavated six sites in the San Mateo/San Onofre Creek area. Three of the sites CA-SDI-1074, 4411 and 13325 yielded datable materials. CA-SDI-13325 exhibited occupancy during the Middle and Late Holocene periods with no use after 1250 B.P. CA-SDI 1074 and 4411 both show residential use post 600 B.P. All three sites demonstrate considerable reliance on marine invertebrates and fish. The earlier site CA-SDI-13325 used resources from a variety of niches from open-ocean and coastal marine environments to inland terrestrial areas (Byrd *et. al.* 1995). They indicate the Late Holocene sites CA-SDI-1074 and 4411 have a less diversified economy with less emphasis on marine resources and more on terrestrial-based plant resources. "It is interesting to note that in southern California these grasses occur frequently in late period sites, at a time when population densities were probably increasing and groups were considered to be more sedentary. In order for the late period groups to increase their subsistence base they would have needed to rely on a dependable and prolific food source" (Byrd *et.al.* 1995:159). Grasses and weeds may have provided that reliable food source. In 2008 Iverson and Becker carried out a geomorphological and archaeological testing program in the terraces overlooking the San Mateo Creek. They test excavated three prehistoric sites and looked at the relationship of these Sites CA-SDI-14255, 15122, and 15123. Radiocarbon dates indicate Late Holocene occupation all before 640 B.P. The testing revealed "small-scale, temporary resource procurement and activity areas, representing a broad and generalized procurement strategy" (Iverson and Becker 2008:125).

In 2000 Reddy tested 16 inland sites situated within the Santa Margarita River, Las Pulgas Creek and San Mateo Creek areas. The sites included limited activity, camps, bedrock milling and rock art sites. The analysis of the sites was broad and included geoarchaeology, vertebrate faunal analysis, macro botanical and phytolith. Eleven radiocarbon dates were derived from six sites all post dating 700 B.P. Reddy indicated that regardless whether residents of the 16 sites were described as collectors or foragers "it is clear

that the sites are indicative of repeated occupation, labor investment and long term planning” (Reddy 2000:341).

3.2 Study Units at Camp Pendleton: Landscape Zones and Landscape Elements

This thesis has divided Camp Pendleton into five landscape zones that form the analytical and organizational framework for the analysis of site types that is to follow (Figure 3.1). The study zones are Red Beach, the Las Pulgas Creek, the Santa Margarita and Pilgrim Creek, Case Springs Uplands, and San Mateo Creek. The study region is further sub-divided into eight topographic elements that represent the primary landforms associated with archaeological sites within Camp Pendleton (Table 3.1). For the purposes of this study I have divided the entire study area as being either ‘coastal’ or ‘inland’. Coastal landscapes include the littoral zone and landforms up to three kilometers inland, any landforms greater than three kilometers from the littoral are considered to be ‘inland’.

Landscape elements	Landscape zones				
	Red Beach	Las Pulgas	Case Springs	Santa Margarita River	San Mateo
Coastal Margin	14			15	1
Estuary	7			6	1
Creek	24	8		15	17
River				10	
Coastal Foothill	10	51	42	19	16
Marine Terraces		3		17	5
Cliffs/Canyon				2	
Mountain					

Table 3.1 Sample Site Distribution Study Unit Table.

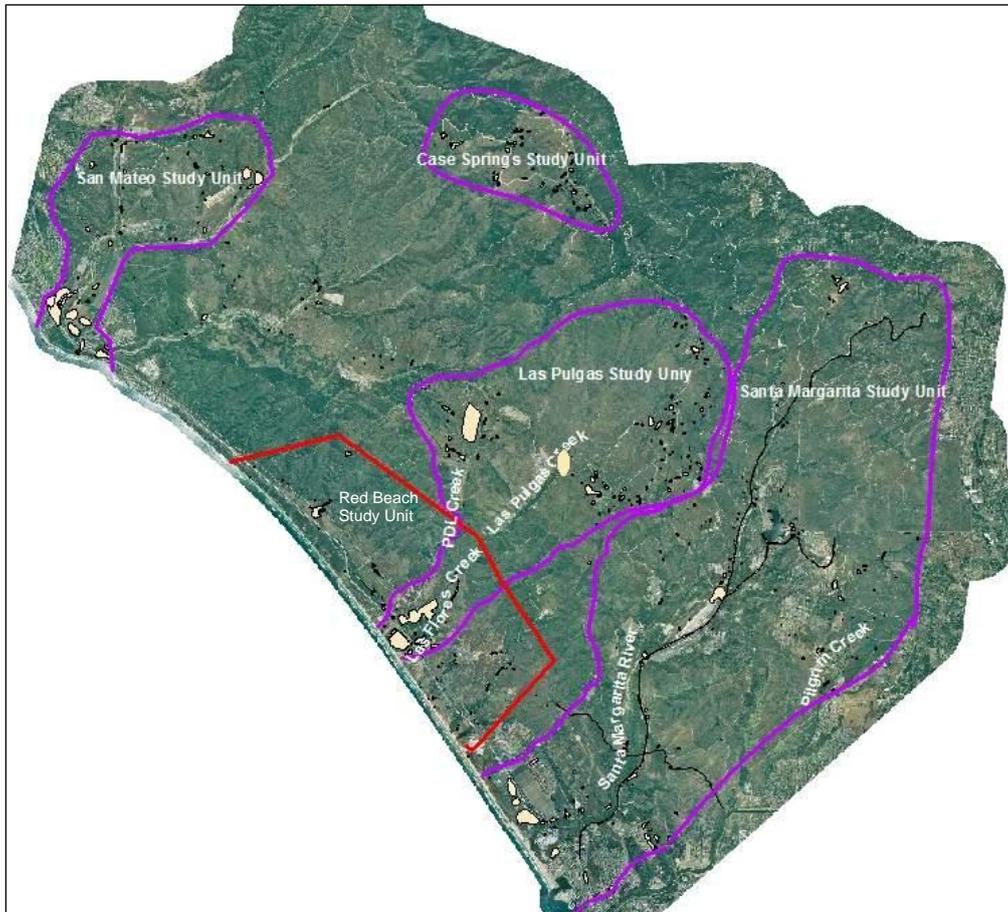


Figure 3.1 Distribution of landscape zones within Camp Pendleton Unit (Map prepared from Camp Pendleton CRM database by Stan Berryman 2014).

3.2.1 Site Typology

Within each landscape zone, the smallest analytical unit employed within this analysis is the site (see Section 1.4.1). The organization of sites follows the site typology devised by Byrd *et al.* (2004). This utilizes a tripartite site typology of for all open sites on the base: 1) limited activity areas, 2) dinner camps and 3) residential bases.

The definitions of site types used in this thesis is as follows:

1. Limited Activity Areas are sites marked primarily by quantities of shellfish remains, little to no faunal remains, and few if any formal artifacts. Inland these sites display limited faunal remains, and few if any formal tool and other artifacts, but may include lithic scatters with evidence for milling with limited to no depth of midden deposit.

2. Dinner Camps along the coast are sites which have shell fish remains as well as terrestrial faunal remains, and with several artifact types present. Inland these sites exhibit faunal remains, formal tool and other artifacts. Inland dinner camp sites include areas of lithic scatters, evidence of more than single use and depth of midden deposit generally greater than 20 cm.
3. Residential Bases are marked by substantial shell middens, likely to have been used for multiple seasons. “They are typically characterized by moderate to thick anthropogenic sediments (35 – 100 cm thick), features, occasional burials, and a diverse range of cultural material that includes substantial assemblages of shellfish, fish, and terrestrial faunal remains, archeo-botanical remains, ground stone, flakes stones tools, and stone tools” (Byrd *et al.* 2004:26). Inland these sites were used for multiple seasons. As with the coastal residential bases these sites display moderate to thick anthropogenic sediments (35 – 100 cm thick), features possibly including bedrock milling, living surfaces, occasional burials, ground stone, flakes, stone tools, occasionally ceramics, terrestrial faunal remains, archeo-botanical remains and depending on age and located shellfish, and fish (Byrd *et al.* 2004).

An important element of this study will be the date/chronological landscape or radiocarbon landscape. The dates do not appear uniformly at most sites but rather with the exception of CA-SDI-811 cluster within the Early, Middle, Late and late/Late Holocene. For example at CA-SDI-10723 and 10728 the dates cluster around 8500 B.P.- 8000 B.P. and again around 1000 B.P.

3.2.2 Radiocarbon Chronology

As noted previously, the focus of this current research is sites for which radiocarbon dates are available. The radiocarbon dates are either derived from primarily sea shell or to a lesser extent carbonized material (see Appendix Radiocarbon Tables).

The study will begin along the Pacific Ocean coast around the area known as Red Beach at the mouth of Las Flores Creek. Las Flores Creek currently flows into a small estuary and is found along the central coast of Camp Pendleton (Figures 1.6 and 3.2).

The data discussed in this chapter all comes from Marine Corps Base Camp Pendleton and is used with permission by the Base. The database was developed mostly between 1996 and 2009 under my direction as the Cultural Resource Manager at the Marine Base. The Cultural Resource Manager is responsible for managing the cultural resources, establishing the overall facility-wide cultural resource research orientation, and establishes the projects, obtains funding, oversees development of the research designs and field work and has final approval authority of the final research outputs. The Cultural Resource Manager, while managing the work of the archaeologists is responsible for developing a unified approach to the research. In the case of Camp Pendleton, the Cultural Resource Manager moved the studies from a site-by-site study to one that was on a broader landscape scale.

The data are derived from reports, site form records, and the cultural resources GIS database at Marine Corps Base Camp Pendleton. The site data was collected from primary sources. These sources consisting of survey, evaluation and data recovery reports, which include information on all radiocarbon dates collected at Camp Pendleton. The presence of radiocarbon dates was a significant criterion used for including specific sites in this study. With 534 recorded sites within the boundary of Camp Pendleton, a total of 88 radiocarbon dated sites will be utilized in this study. The following information about dated sites was of particular importance for this thesis: locational data, general types of artifacts present, presence of PDL chert, presence or absence of shellfish by specie remains, and presence or absence of macrobotanical remains. These data are compiled and presented in this chapter. Field reviews were to either the specific sites or to the area of groups of dated sites.

In terms of methodology, the importance of inconsistencies in the data has been recognized. There is a danger that where data collected by other researchers has been used inconsistencies in field methods and data collection procedures may create problems for more general analysis, and

more synthetic studies such as this thesis. Since the cultural resource manager at Camp Pendleton oversaw the data collection at the 88 radiocarbon dated sites; all dates were conducted at the same radiocarbon laboratory (Beta Analytic) and shell was corrected using the marine reservoir correction. The global marine reservoir correction was applied to all dates derived from marine shell via the Marine IntCal calibration program. This correction ranges between -200 to 500 years. These values take into account that it takes 200-500 years for present-day carbon dioxide in the atmosphere to be incorporated and distributed (equilibrated) through the ocean water column (Beta Analytic 2014 WebSite) . The research orientation and methods, and analytical reports were reviewed and approved by the Camp Pendleton Cultural Resource Manager thus inconsistency is considered a concern but not a significant issue.

Overall the data are presented in this thesis by study unit. The sites within the units are graphically presented on areas photographic maps by date and type. The artifacts and ecofacts recovered are presented in a tabular form. The variables for table reporting artifact material types column presented within the tables may include: debitage - flake and angular debris resulting from tool manufacturing; flaked tools - stone flakes that exhibit microscopic wear; retouched flake tools - flake scrapers and flakes used for cutting; percussion tools - includes hammers, choppers, and abraders; projectile points - arrowheads and dart points; ground stone - artifacts exhibiting use in milling seeds, grass, pulverizing meat and includes *manos*, *metate*, pestles, and mortars or stone bowls; milling features – these are found on bedrock outcrops and include metate and mortar grinding surfaces; fire cracked rock – these are rocks that were subjected to high heat in a fire hearth or other burning feature; and ceramic - pottery sherds or vessels.

The ecofacts include vertebrate faunal remains – these are the bones identifiable as either mammal, avian, and fish and include fragments to complete species specific bones. They are recorded as either present or absent. *Donax gouldii*, *Pecten* sp. and *Chione* sp. generally represented the

majority of invertebrate shellfish remains by weight. When present within a site or a group of sites they are reported as present or absent. If another species including invertebrate, *Protothaca* sp *Anadonta* sp. *Mytilus* sp., Gastropods including *Acanthine spirata*, *Crepidula* sp., and *Tegula* sp. chitins, and crustaceans represents a significant recovery >10% by weight in a site they are shown as present. Invertebrates which account cumulative for <10% are combined and are reported as other invertebrates. The last identified category is macrobotanical remains such as identifiable seeds, preserved wood, and grasses.

The key elements of the sites including location, date, presence of PDL chert, *Donax gouldii* and other types of shellfish, and climate for the period of use are then compared to determine if there is a controlling factor for location of the dated prehistoric sites on Camp Pendleton. The ethnographic data are compared with the archaeological findings to see if there are cultural landscapes used in prehistoric past that compare to those seen in the Luiseno ethnography.

All of this is held together by radiocarbon dates. The dates have been collected from the CRM reports text and radiocarbon laboratory data sheets. All the dates for a given study unit are plotted graphically by site type and listed by site number. The dated sites are then plotted on maps by period (Early, Middle, and Late Holocene) and by type. These maps are used to identify and compare changes in physical landscape use over time and by types. The radiocarbon samples were collected, in the vast majority of cases, from an excavation unit level with a dry screen. To a lesser extent samples were retrieved from macrobotanical column samples recovered from an excavation unit. In both instances the physical control was the decimeter level below the surface. In a few cases, not more than three, radiocarbon samples were recovered from carbon smudges on ceramic vessels and from intact fire hearths.

3.3 Results

3.3.1 Red Beach Study Unit

There are nearly 29 kilometers of coastline on Camp Pendleton. The coastal area under consideration is focused around the Red Beach study unit, located in the central coastal portion of the Base (Figure 3.2). This area consists of a complex of beaches, estuaries, slough, creek and cliffs and coastal terraces extending 12.8 km along the Pacific coast and stretching 4.8 km inland, totaling 51.3 square kilometers.

The mouth of Las Flores Creek, located at Red Beach is blocked by a dune, forming the Las Flores estuary. The Las Flores estuary is the most intensely studied archaeological area of the Camp Pendleton and perhaps for the entire southern California coastline. The Red Beach Coastal Area includes the Las Flores watershed that is divided into two sub-watersheds, the Las Pulgas Canyon and Piedra de Lumbre Creek. Horno Canyon Creek and Gold Beach

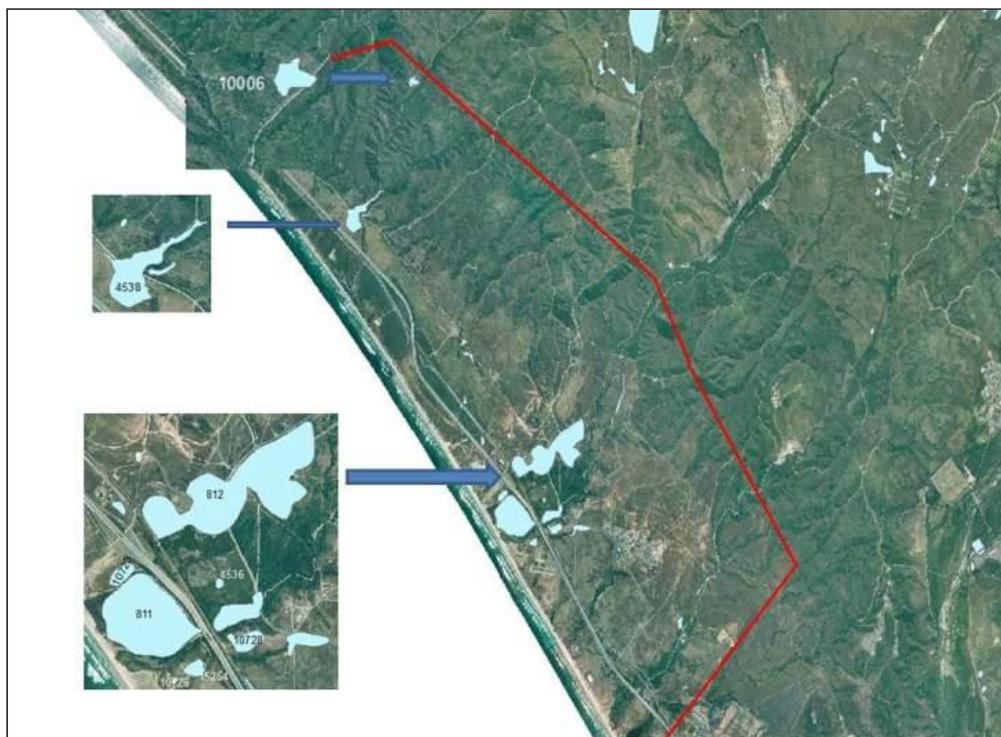


Figure 3.2 Red Beach Study Unit (Map prepared from Camp Pendleton CRM database by Stan Berryman 2014).

are north of Las Flores Creek watershed while Aliso Creek watershed is to the south. French Creek flows west to French Cove and forms a slough. All four of the creeks and their associate watersheds are located totally on the Base (Pearl and Waters 1998). Aliso Creek has 4613 hectares; Horno Creek has 3764 hectares and Las Flores/Las Pulgas has 2767 hectares on the Base. Las Flores Creek is formed less than a kilometer from the Ocean where Las Pulgas Creek and Piedra de Lumbre Creek converge. The headwaters of the creeks begin on the western slopes of the Peninsular Ranges (Pearl and Waters 1998).

3.3.1.1 Archaeological Sites

There are 65 recorded archaeological sites within the Red Beach Coastal Study Unit. Of these, 23 have been dated with a total of 120 radiocarbon samples. The densest concentration of sites is around Las Flores Creek.

The sites range from small shell or lithic scatters (limited activity locals) to large, complex multi-component aggregations of cultural material (residential bases). Byrd (2004) indicates that shell scatters are the most prevalent during the Holocene period. He states that the sites are, “typically small sized, have little anthropogenic sediment, a restricted range and density of cultural remains, and virtually every site is dominated by bean clam (*Donax Gouldii*) shell” (Byrd 2004:26). Radiocarbon dates from these small shell scatter sites, as will be shown later, post-date 750 B.P.

3.3.1.2 Limited Activity Areas

The tasks at the “limited activity-shell scatters” appear to be related to people transiting from the interior to the coastal area, going down to the beach, collecting *Donax sp.* and at times other species, coming to the limited activity area, performing the tasks related to a brief meal preparation and then going back inland to residential sites in the Las Pulgas Creek corridor. Evidence for the collection of shell and transport back to inland sites comes in the large amount of *Donax sp.* shell found at Late Holocene sites along Las Pulgas Creek, into the inland Case Springs area. *Donax sp.* are found at all of the

dated limited activity areas in the Red Beach Study Unit whereas *Chione sp.* (California Venus Clam) and *Pecten sp.* are found only in one-half of the sites. *Donax gouldii*, because it is found in the upper 4 cm of the intertidal zone of sandy beaches is easy to harvest (Laylander and Saunders 1993). It can be found in densities as high as 20,000 individuals in a square meter. There are six species of *Chione sp.* or littleneck clams native to California. It is a species that prefers shallow intertidal areas and is found in soft sediments to a depth of 15 cm. It is often dug out by hand during low tides (Leet *et al.* 2001). There are eleven species of *Pecten* (scallops) in coastal California waters. They are harvested from kelp, rock crevices, under boulders or rock surfaces down to a depth of 80 m. (University of California 2011).

The dated sites generally fall within a time period of 450 B.P. to 150 B.P. (see figure 3.4) which closely matches the development of inland residential base sites. A possible explanation for this behavior is that limited activity sites are related to the large residential bases at Las Flores Creek and Horno Canyon. People living at these sites would not necessarily need to prepare a meal at a site on the coastal terrace; they could transport their harvest back to their coastal residential site. It is possible that many of the more intensive areas for these people living along the coast would be in closer proximity to their residential bases and may actually be focused more closely on their bases. The tasks would be made up of a number of activities such as digging and collecting the small clams and carrying them back home where the tasks of shucking, etc would be carried out. The archaeological evidence for *Donax sp.* collecting is visible in the sites and individual isolated occurrences. The evidence for the gathering area and the trails is inferred.

The tasks associated with Limited Activity Areas or shell scatters, which appear to be primarily concerned with preparing and consuming a meal of *Donax sp.*, may actually be broader than first considered. There are a number of individual tasks that take place or can be implied to take place including sharpening a tool, shucking the clams, preparing them and consuming the meal. Ideally the landscapes associated with limited activity areas include the

collecting area, the trails to the Limited Activity Area, the actual defined site location, and the trails leading back to a residential base site. Another consideration is that the entire group of sites represented as shell scatters may represent a landscape that cuts across time and space. Each site, although spatially and potentially chronologically distinct, may be considered as a component of the generalized landscape. These limited use areas may have no relationship to other sites within the area other than they occupy a similar space.

Within the Red Beach Study Unit, there are 34 dated sites that include milling sites, “dinner camps”, lithic scatters, and small shell scatters. The six milling limited use areas represent small sites that have been revisited over a period of years as seen in dates that span 263 B.P.-143 B.P. and 153 B.P.-135 B.P. The tasks carried out would be primarily grinding seeds, grains, and other

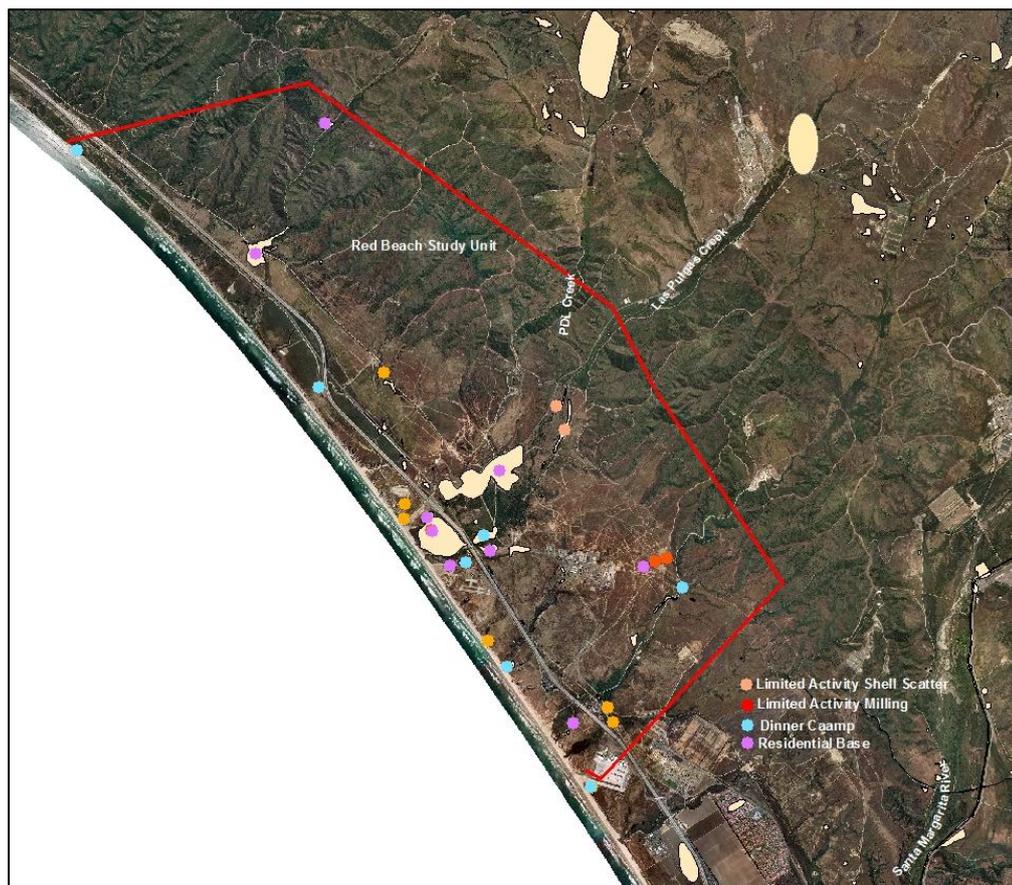


Figure 3.3 Dated Red Beach Sites by Type (Map prepared from Camp Pendleton CRM database by Stan Berryman 2014).

plants. At those three milling sites with artifacts present, the tasks would include tool sharpening, grinding the seeds and grains, pounding plant parts or pulping small animals.

There are 23 sites classified as shell scatters and which correlate with Byrd's Limited Activity Areas (1997). These sites are found primarily on the coastal terrace (fifteen of the 23 sites); three are in a coastal flood plain, three on the

Site number	Debitage	Vertebrates	<i>Donax gouldii</i>	<i>Pecten sp.</i>	<i>Chione sp.</i>	Other Invertebrates
CA-SDI-15558	N	N	Y	N	N	N
CA-SDI-14520	N	N	Y	N	N	Y
CA-SDI-14519	Y	Y	Y	N	N	N
CA-SDI-14516	N	N	Y	N	N	N
CA-SDI-14506	N	Y	Y	Y	N	N
CA-SDI-14504	Y	Y	Y	Y	Y	Y
CA-SDI-14503	Y	N	Y	Y	Y	Y
CA-SDI-14501	N	N	Y	Y	Y	Y

Table 3.2 Material Recovery Coastal Shell Scatters.

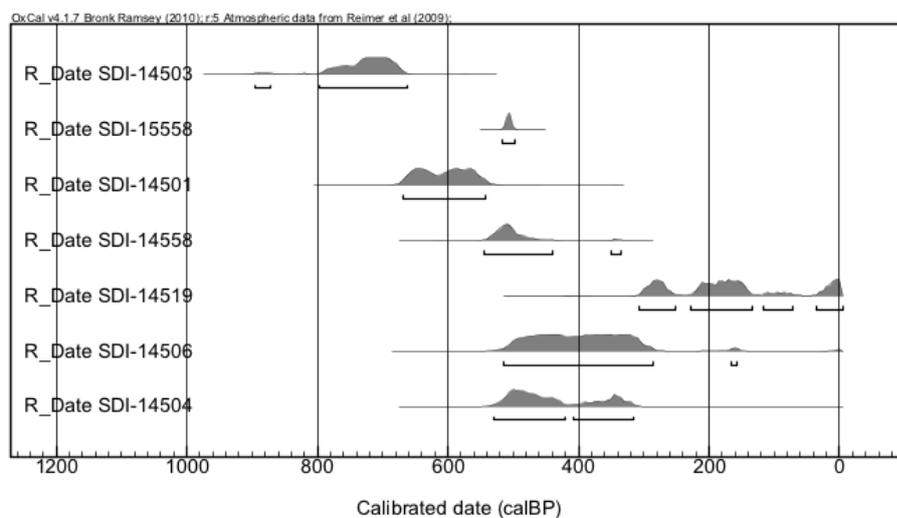


Figure 3.4 Dated Limited Activity Shell Scatters, Red Beach Area – Dates are from unit levels (See Appendix Table B).

steep coastal bluffs overlooking the ocean, and two are on ridges at the base of the coastal foothills.

All of the sites are on loamy soils ranging in elevation from three meters amsl to 66 meters amsl with an average elevation of 23.7 meters. The distance from the modern tide line varies from less than a few meters (0.03 meters) to 0.57 kilometers inland with an average distance of 0.18 kilometers. Seven of the sites have been radiocarbon dated and are within the Late Holocene extending from 720 B.P.-540 B.P. to 290 B.P.–0 B.P. Looking at the 2 Sigma (Figure 3.4) dates there is overlap that suggests a regular pattern of usage that would likely be more fully demonstrated if all the limited activity area shell scatter sites were dated. The sites are represented by very limited shell scatters with minimal depth of less than 10cm and little to no variation within the shellfish species. The dominant species found in these sites are only found together in three of the sites (CA-SDI-14504, 14503, and 14501). Three sites (CA-SDI-14519, 14506, and 14504) show evidence of vertebrate species in the soil matrix and three (CA-SDI-CA-SDI-14519, 14504, and 14503) had only lithic artifacts present. Only site CA-SDI-14504 exhibited lithics, vertebrate and invertebrate species.

3.3.1.3 Dinner Camps

There are 21 sites, six which have been dated (Table 3.3) that can be classified as dinner camps. Nearly half (n=10) are found on the coastal terrace; six are on coastal ridges; two on knolls; two on a coastal flood plain and one on a coastal bluff. All of the sites are on loamy soils ranging in elevation from 8.5 meters amsl to 109.7 meters amsl with an average elevation of 21.3 meters amsl. The distance from the modern tide line varies from less than 0.03 meters to 4.9 kilometers inland with an average distance of 0.8 kilometers inland (Figure 3.3). Six of the sites have been radiocarbon dated (Figure 3.5) and all show use within the Late Holocene/Late Prehistoric Period extending from 500 B.P. to 293 B.P. CA-SDI-15254 is interesting in that it also has dates that are well within the early part of the Middle Holocene showing what would have been an inland use as a dinner camp. The Middle

Holocene dates range from 7585 B.P. - 7365 B.P. to 7385 - 7050 B.P. After the latter date, there is no evidence of use of this site until the Late Holocene. Beginning around 1075 B.P.-975 B.P. and ending at 530 B.P.-290 B.P. CA-SDI-15254 exhibits use as a late, Late Holocene coastal dinner camp. This site is on a ridge adjacent to and just south of Las Flores Slough.

As shown in Figures 3.4 and 3.5 the dates of the Late Holocene Limited Activity Areas and Dinner Camps are very consistent. They range from over 1000 B.P to approximately 240 B.P. with the majority falling between 550 B.P. to 230 B.P. The distances from the modern shore line are nearly the same. Elevations are within the same range as is the topographic setting. All the sites within these two groups are on similar loamy soils. These sites are all arguably part of the same system of occupation and use of a physical landscape. As shown in Tables 3.1 and 3.2 one commonality between the Limited Activity and Dinner Camp sites is the presence of *Donax sp.*

Site number	Debitage	Ground stone	Flake Tool	Ceramic	Vertebrates	Invertebrate	<i>Donax gouldii</i>	<i>Pectin sp.</i>	<i>Chione sp.</i>	Other invertebrate	Macro botanical
CA-SDI-4413	Y	Y	Y	Y	N	Y	N	N	Y	Y	N
CA-SDI-15254	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N
CA-SDI-14520	N	N	N	N	N	N	Y	N	N	Y	N
CA-SDI-14516	Y	N	N	N	N	Y	Y	N	N	N	N
CA-SDI-14497	N	N	L	N	M	Y	Y	Y	Y	Y	N
CA-SDI-10724	N	Y	N	N	N	Y	Y	N	N	N	N

Table 3.3 Material Recovery Shell and Lithic Scatter Dinner Camps.

The Late Holocene dates point to a narrow period of use and are in line with the dates from the other Limited Activity Areas and Dinner Camps. The Middle Holocene/Early Archaic dates fall within the same range as the Middle Holocene Residential Bases. This component of the site is related to and may actually be an Early Archaic Residential site that was used 7,000 years later

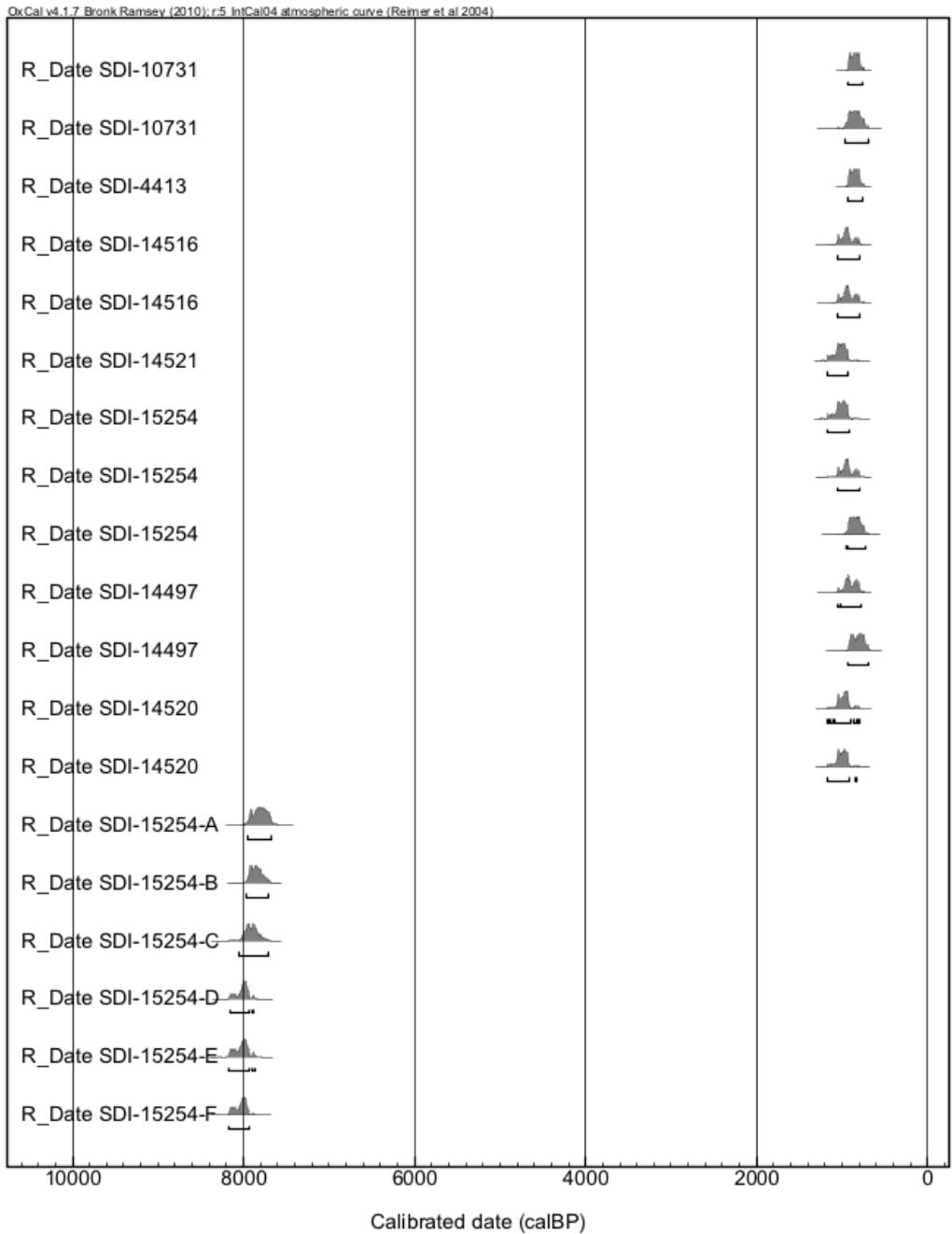


Figure 3.5 Dated Dinner Camps Red Beach Area – Based on dated unit levels. All dates are sequential except for one pair of dates from CA-SDI-15254. One date from CA-SDI-15254 shows a consistency issue with a date of 1075 B.P.-925 B.P. recovered from Unit 5 at 60- to 70 cm, the same level as a 7385 B.P.-7050 B.P. date. This likely an issue with bioturbation. The other dates from this site are consistent (See Appendix Table C).

as a limited task area or dinner camp. It seems that this site occupation may be coincidental in that it was a “good” place to occupy overlooking modern Las Flores Slough and early Las Flores Lagoon. In order to verify this assumption it will be necessary to look at the various features of the landscape in the early and Late Holocene to see what may have been factors in selecting this location for use. Also though, one answer to why this location was used by two very different groups of people may be that archaic artifacts were visible and attracted the Late Prehistoric people to use the site (Binford 1980). The attraction may have been that because earlier people’s “ancestors” were recognized to have used the location, then it would be a protected area. This use of a previously occupied site occurs elsewhere on Camp Pendleton and will be discussed later in this section. Figures 3.5 and 3.6 show a range of dates which when reviewing the individual radiocarbon dates calibrated at 2 sigma leads to an interpretation of coeval use of the Limited Activity Areas and Dinner Camps.

3.3.1.4 Undiagnostic Lithic Scatters

There are two limited activity area/surface lithic scatter sites. Both are found on ridges about 2.4 kilometers from the coast line. Both sites are on loamy soils ranging in elevation from six meters amsl to 64 meters amsl. Neither of the sites had datable material nor chronologically identifiable artifacts. So, it is impossible to make a generalization about the age of either site.

3.3.1.5 Milling Sites

Six limited activity areas/milling sites are within the Red Beach Coastal Study Unit. Three sites are on ridges; two are on the coastal terrace; and one is on a coastal flood plain (Figure 3.3). All of the sites are on loamy soils ranging in elevation from 10 meters amsl to 85 meters amsl with an average elevation of 47 meters amsl. The distance from the modern tide line varies from 0.5 kilometers to nearly five kilometers inland, with an average distance of 2.33 kilometers. Two of the sites have been

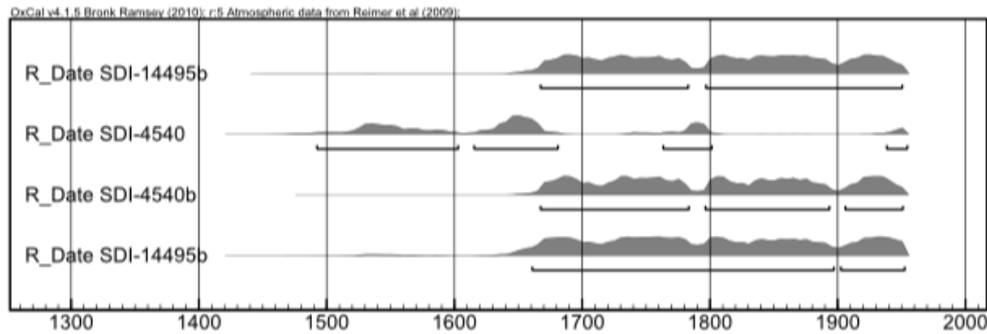


Figure 3.6. Dated Milling Sites, Red Beach Area - Based on dated unit levels sequential dates (See Appendix Table D).

radiocarbon dated and fall within the Late Prehistoric Period extending from 395 B.P-130 B.P. to 270 B.P-0 B.P. These Late Holocene dates are consistent with other dated milling sites on

SITE number	Debitage	Ground stone	Flake tool	Percussion tool	Ceramic	Milling feature	Vertebrate fauna	<i>Donax gouldii</i>	<i>Pecten</i> sp.	<i>Chione</i> sp.
CA-SDI-14495	Y	N	N	N	N	Y	N	N	N	N
CA-SDI-4540	N	N	N	N	N	Y	N	N	N	N

Table 3.4 Material Recovery Milling Sites.

Camp Pendleton and with the Limited Activity Area Shell Scatters and Dinner Camps showing a milling station use in the late, Late Holocene. There are no invertebrate or vertebrate remains and very limited stone materials present on either site (Table 3.4).

3.3.1.6 Residential Bases

Thirteen sites in the Red Beach Coastal Study Unit can be classified as residential bases. Eight of the residential bases are adjacent to Red Beach and modern Las Flores estuary (Photo 3.1). Nearly half (n=5) are on the coastal plain. One of these sites also extends onto the coastal terrace; five are on coastal ridges; and one is on a coastal bluff. All of the sites are on loamy soils ranging in elevation from three meters amsl to 192 meters amsl

with an average elevation of 40 meters amsl. The distance from the modern tide line varies from 0.16 kilometers to 4.5 kilometers inland with an average distance of 1.7 kilometers inland (Figure 3.5).

Nine of the sites have been radiocarbon dated and all but one have Late Holocene dates extending from 1100 B.P. to 108 B.P. One of the sites CA-SDI-14522 exhibits only a single Late Holocene date and site CA-SDI-812 age is based on 18 radiocarbon samples (Figure 3.7) and dates only to the Late Holocene. CA-SDI-10723 and 10728 have multiple dates that include Early and Late Holocene dates. Site CA-SDI-811 is also based on a suite of 18 samples (Figure 3.7) and has nearly continuous dates from the Middle Holocene to the beginning of the Late Holocene. There is clearly much evidence that shows Late Holocene sites located to re-use of earlier sites in this area, a pattern that is also seen elsewhere.

Site number	Debitage	Ground Stone	Flake tools	Percussion tool	Ceramics	Vertebrate fauna	Invertebrate fauna	<i>Donax gouldii</i>	<i>Pectin sp.</i>	<i>Chione sp.</i>
CA-SDI-811	Y	Y	Y	Y	N	Y	Y	Y	N	N
CA-SDI-812	Y	Y	Y	Y	N	Y	Y	Y	N	N
CA-SDI-4538A/B	Y	Y	Y	Y	N	Y	Y	Y	N	N
CA-SDI-10006	Y	Y	Y	Y	N	Y	Y	Y	Y	N
CA-SDI-10723	Y	Y	N	N	N	N	Y	Y	N	N
CA-SDI-10726	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
CA-SDI-10728	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
CA-SDI-14492	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
CA-SDI-14494	Y	Y	Y	Y	N	Y	Y	Y	N	Y
CA-SDI-14522	Y	N	Y	Y	N	Y	Y	Y	Y	Y

Table 3.5 Material Recovery Residential Bases.

Site CA-SDI-811 (Photo 3.2) demonstrates a shifting occupation of a desirable area by members of a population of people coming to perform various tasks. This occupation shifted, within what are now defined as the archaeological site boundaries, for 6,000 years during periods of aggradation in the Las Flores flood plain, creating a site with a depth of at least 5 meters. CA-SDI-811 is an extensive site adjacent to Red Beach and at the inland portion of prehistoric Las Flores Lagoon. It exhibits depth of over 150 cm and a range of artifacts that includes evidences the full range of residential activities (Figure 3.4). It was consistently used from the earliest part of the Middle Holocene to the Late Holocene (7840 B.P - 7500 B.P. to 1220 B.P. - 980 B.P. It is likely that for much of its occupation CA-SDI-811 was used by small groups of people carrying out tasks in what has become to be defined as a large archaeological residential base camp.



Photograph 3.1 Residential Bases at or near Red Beach (Google Earth).

CA-SDI-10723 is in the Las Flores flood plain, and not on the terrace just above the creek bed, and could be considered part of CA-SDI-811. Site materials from SDI-10723 suggest a pattern of use over time and space which may be coincidental or may be the result of similar siting criteria of choice that resulted in use of the same location separated by 7000 years. The earliest occupation occurred in the Early Holocene from 8285 B.P. to 8040 B.P. The site was not again occupied until nominally 650 B.P. to 435 B.P. This gap in time points to coincidental use of the same space.

CA-SDI-812 is a large site partly in the Las Flores flood plain extending for over 80 hectares. The site dates solely to the Late Holocene from 1062 B.P. to 165 B.P. It includes a named ethnohistoric village that was occupied at the time of European incursion in the area. The village points to this site having at



Photograph 3.2 CA-SDI-811 as seen from CA-SDI-15254 (photograph taken by S. Berryman 2009).

least one area of large residential occupation. However, Becker (2005) points out that the northern portions of the site exhibit very sparse scattered evidence of occupation. As was the case with CA-SDI-811, it is likely that for

(post 700 B.P.) this site became a large residential base named in the ethnohistoric record as Huisme (Johnson and O'Neill 1998).

CA-SDI-4538 A and B is a large site at the mouth of Horno Canyon extending approximately 875 meters north/south by 480 meters east/west. It lies across the canyon extending from the ridges to the coastal terrace. It is made up of two loci. The largest, A, is within the alluvial fan. Locus B is on the ridge top forming the south side of Horno Canyon. Horno Canyon is formed by the slopes of the San Onofre Mountain. "To the south lie a series of irregular transverse ridges. These are bisected by east-trending drainages that formed alluvial fans onto the coastal plain" (Byrd 1994:117). SDI-4538 is an extensive site which according to Byrd (1995) displays evidence of uneven occupation spread over the site area. The site was used during the Late Holocene as a residential base. However, evidence again points to there being a series of occupation events that were spread out over time and occurred over different areas of the site, as seen in Figure 3.7. However the dates present a pattern of 965 B.P.- 700 B.P., 780 B.P.- 545 B.P., 660 B.P.-500 B.P., and 605 B.P.- 435 B.P.

Site CA-SDI-10726 is a small compact site that measures 62 by 40 meters, of which the subsurface deposits are restricted to an area of 52 by 28 meters. It is on a bench on the south side of a generally east/west trending ridge just overlooking the sandy Red Beach. Artifacts and ecofacts from the site indicate a range of activities including food processing including cooking, consumption and discard, flaked tool manufacture, and the use of objects for personal adornment (Byrd 2003:271). It falls within the Late Holocene and dates solely within that period from around 800 B.P. to the ethnohistoric present at about 107 B.P. The oldest determination is 960 B.P. - 690 B.P. This is followed by a gap in the time of occupation. The latest determination is 493 B.P.- 265 B.P.

Site CA-SDI-15254 is on the same ridge as SDI-10726 and had originally been recorded as a part of one larger site designated as CA-SDI-10726. This site follows the shape of the top of the coastal ridge and is 165 by 125 meters

with an intact portion measuring 95 by 20 meters. The cultural deposits range in depth from 30 cm to over 100 cm. There are two distinct cultural deposits. Deposit 1 is a Holocene/Archaic component with dates that display a range of about 200 years, predominately Late Prehistoric, and does not extend beyond the Late Holocene. It exhibits residential uses with artifacts and ecofacts including bean clam, modified shell and bone, flaked stone tools, ground stones, ceramics and fire affected rock. Deposit 2 is a Middle Holocene midden showing occupation that may not be broken. *Argopecten sp.* and *Chione sp.* shell dominate the midden deposit. Large numbers of fire-affected cobbles point to multiple hearths. The artifacts and fire-affected rock point to residential uses. The artifacts include a wide range of tools and lithic debitage, flaked stone cores, percussion tools, ground stone, bone, and shell artifacts. The Late Holocene dates have a nearly coeval date with CA-SDI-10726 of 1075 B.P.-925 B.P. after this date there is a break to late, Late Holocene. It seems likely that CA-SDI-15254 and CA-SDI-10726 represent a consistent use of the ridge and points to the cultural resource management conundrum of splitting or lumping sites.

CA-SDI-10728 is east of CA-SDI-15254 and 10726 on what appears to be the same ridge separated by the excavation needed for Interstate Highway 5 and the Santa Fe Railroad. The site measures 270 meters east/west by 170 meters north/south. It has two loci demonstrating concentrations of artifacts and ecofacts. The site dates to the Early Holocene with evidence of Early Archaic occupation which is found primarily in Locus A (Byrd 1997). This component spans a 3,000 year period dating from 8095 to 4780 years B.P. However due to factors of farming and bioturbation the dates are not horizontally sequential. Late Holocene occupation in the Late Prehistoric is found in Locus B and in a small area of Locus A. This occupation dates to an approximately 250 year period from 618 B.P.-370 B.P. and points to a consistent late, Late Holocene use. The artifacts from both periods point to residential uses.

CA-SDI-10731 is a Late Prehistoric, Late Holocene site located in the Las Flores alluvial flood plain. It is just north of the creek and is east of and is separated from CA-SDI-811 by Interstate Highway 5 and the Santa Fe Rail line. It is in a highly disturbed context resulting from agriculture, growth of large riparian trees and Marine Corps uses. It is 420 meters north/south by 170 east/west. The site dates show 160 years of use dating from 530 B.P. to 370 years BP. There is no evidence to suggest that it is continuous occupation over the entire site, but rather points to shifting occupation. The artifacts and ecofacts indicate this site could be considered a residential base.

3.3.2 Discussion

3.3.2.1 Radiocarbon Dates

The 80 radiocarbon dates for the Red Beach Study Unit are derived from levels within excavation units. Sites CA-SDI-811 and 812 are the only exceptions with dates coming both excavation units and from levels within geomorphological cores. Six of the dates were from carbon or charcoal and one from bone. The multiple dated sites generally show internal consistency however two dates from CA-SDI-15254 exhibit some date inversion with one Late Holocene date within a unit level dated to the Middle Holocene. The dates point to occupation or use of the area from the Early Holocene to the Late Holocene (primarily after 700 B.P.) The dates for the limited activity shell scatters demonstrate consistency in the time period with most falling around 400 B.P. to 600 B.P. (Figure 3.4). Only one site, CA-SDI-14519, has a determination after 200 B.P. Limited Activity Area Milling sites are consistently very late along the coast with dates ranging from 395 B.P.-130 B.P. to 270 B.P.-0 B.P. The dates for this set of dinner camps display a very high level of consistency. Only CA-SDI-15254 shows use during the terminal Early Holocene and beginning of the Middle Holocene. The patterning of the dates demonstrates a high level of internal consistency of site use. The Late Holocene sites are all clustered around 400 B.P. demonstrating a use of the coastal area for a closely defined time period. There is also a gap of nearly 3,500 years for small sites being used along this part of the southern California coast. The residential base dates displayed in Figure 3.7 show a

consistent use of the coast as a residential area. Early Holocene occupation is seen at CA-SDI-10728 and 10723; Middle Holocene occupation is seen at CA-SDI-811 along Red Beach, and which demonstrates a nearly unbroken occupation from the Middle Holocene through to the early portion of the Late Holocene. CA-SDI-10728 and 15254 show use during the Middle Holocene with a significant break in time and occupation again in the Late Holocene. The limited activity sites and dinner camps are used mostly during the Late Holocene post dating 700 B.P. CA-SDI-4413, 4538 and 15254 are exceptions to this with Late Holocene dates that pre-date 700 B.P.

3.3.2.2 General Discussion

The “dinner camps” represent a more varied and/or complex set of tasks with multiple activities taking place. The sites are more complex than the shell scatter limited use areas and would be used on a more regular basis for longer periods of time. The “residential bases” are defined by Byrd as having anthropogenic sediments (35 – 100 cm thick), features, occasional burials, and a diverse range of cultural material (Byrd *et al.* 2004: 26). They are described as showing evidence of more complex uses than the dinner camps and displaying use over longer periods of time. The residential bases appear to be palimpsests of multiple tasks that have blended together over the hundreds and thousands of years that people have been going to the same site location or perhaps locale. These large residential sites are places where multiple taskscapes overlap spatially and are used repeatedly. The activities that make up the tasks can shift location within a residential base. There is some ethnographic support for these kinds of processes. Upon the death of an ethnohistoric Luiseno their house and possessions would be burned and that location would not be used again within memory for housing (Du Bois 1908). Later that house site might be used for tool manufacture, basket making, etc.

A number of researchers have suggested that the pattern of increasing numbers of sites during the Late Holocene along the coast represents resource procurement intensification (Byrd 2003, York 2007). This increase in

site density, they argue, points to a larger population exploiting the coast. However, there are problems with linking this pattern directly to a process of intensification in this way. If Byrd and York are correct we might expect that if the number of small limited activity area sites within the Red Beach Study Unit is indicative of population size and associated resource exploitation, then a larger population would be expected to result in a relatively greater number of limited activity areas being used. Those sites might be expected to be either larger with more material scattered, or more numerous, or both.

In the Red Beach Study Unit there are 35 recorded limited activity sites and of this number 23 are shell scatters set 0.16 kilometers to three kilometers from the beach. These small sites have very limited scatters of shell consisting of *Donax gouldii*, pointing to one-time or at most two-time use, and generally suggesting rather minor episodes of consumption. Of the full range of 35 limited activity sites that include both simple shell scatters and shell scatters with limited milling, 32% have been dated from 630 B.P to 115 B.P. Assuming this is a representative date range there are only 35 ephemerally-used limited activity sites within a 515 year period. It seems that something beside local intensification of coastal use is going on.

The 21 Late Holocene dinner camps appear to exhibit more consistent use. Nine sites (43% of the total) are dated between 605 - 390 B.P. and 450 - 135 B.P., and are 0.16 kilometer to five kilometers from the coast. These sites are larger than the shell scatters and exhibit a wider variety of activities taking place. If intensification is occurring, and assuming all things being equal, the



Figure 3.8 Early and Middle Holocene Dated Sites Red Beach Study Unit (Map prepared from Camp Pendleton CRM database by Stan Berryman 2014).

number of dinner camps and shell scatters should be increasing as the radiocarbon dates get younger. However, this does not appear to be the case. Only one site exhibits a radiocarbon date more recent than 450-135 B.P. The greatest number of dated sites cluster around 530-290 B.P. Comparison of these dates with limited activity site dates suggest that use of the small limited use shell scatter and milling sites was relatively consistent and continuous up to the ethnographic present, whereas use of dinner camps does not exhibit such a pattern.

The limited activity site and dinner camp site radiocarbon dates generally overlap, showing a pattern of dates from 720 to 540 B.P. and 290 to 0 B.P. at

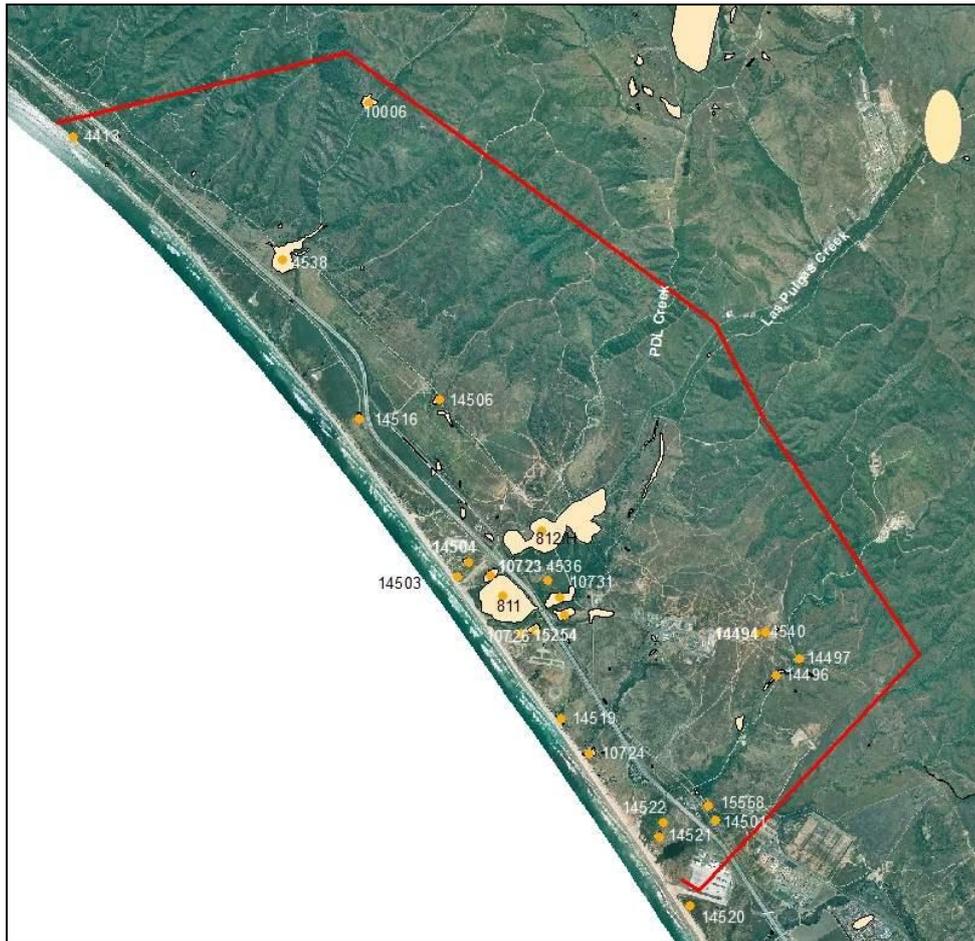


Figure 3.9 Late Holocene Dated Sites Red Beach Study Unit
 (Map prepared from Camp Pendleton CRM database by Stan Berryman 2014)

2 Sigma. The pattern appears to be one of steady, but limited use of the coastal area during the Late Holocene. No surges in use are apparent. This lack of evidence of intensification is seen in sites CA-SDI-811, 812, and 10723 (see Tables 3.4 and At first glance it appears that CA-SDI-811 has a repeating pattern of occupation. The dates come from multiple locations and a variety of depths, supporting the idea of consistent use. However, there has been a pattern of shifting use within the bounds of the contemporary archaeologically recognized site. The changes in site use can also be correlated with the changing nature of the shore line: 9000 years ago Las Flores Creek drained onto a rocky shore that was three kilometers west of its present location, while 1000 years later, the same area was covered by a

saline bay at the mouth and a slough with an inland freshwater lagoon. The shoreline had advanced one km more inland. Las Flores Creek changed to a saltwater lagoon as the shoreline continued another one kilometer decline inland over the next 2000 years. By 4,000 B.P. the shore advanced to within 0.5 km of the modern one and the lagoon was closed off. For the next 4,000 years the shoreline continued a slow advance until the modern shore was developed (Byrd 2004:11). This change in the shoreline altered the resources available for procurement and the sustainability of residential occupation. The desirability of the location for residential activities also changed.

3.4 Las Pulgas Study Unit

Leaving Red Beach we move northeast up the Las Flores watershed basin into the Las Pulgas Study Unit (Figure 3.10). This unit is in the central part of Camp Pendleton and is between the larger Santa Margarita and San Mateo River basins (Figure 1.6). It stretches from the coast at the Las Flores estuary northeast to the Santa Margarita Mountains. It is made up of Las Flores Creek, Las Pulgas Creek and Piedra de Lumbre Creek. Approximately 1.6 kilometers from the ocean, Las Pulgas and Piedra de Lumbre creeks join to form Las Flores Creek. Las Pulgas Creek, which is the major creek in this basin, originates approximately 16 kilometers from the ocean in the Santa Margarita Mountains” (Palmer: 2010:32). According to Palmer (2010), Pleistocene marine and non-marine terrace deposits are found along the coastal plain, the southwestern slope of the San Onofre Mountains which form the back drop to the coastal terrace, and in Las Pulgas Canyon. Quaternary alluvial deposits are found in the Piedra de Lumbre Creek valley and Las Pulgas canyon well into the most northern extension of these creeks. The upper reaches of Aliso Creek in this study unit begin in the Santa Margarita Mountains. It is 13.56 kilometers long and drains the foothills as well as the coastal plain before emptying into the Pacific Ocean. Its lithology is a mix of

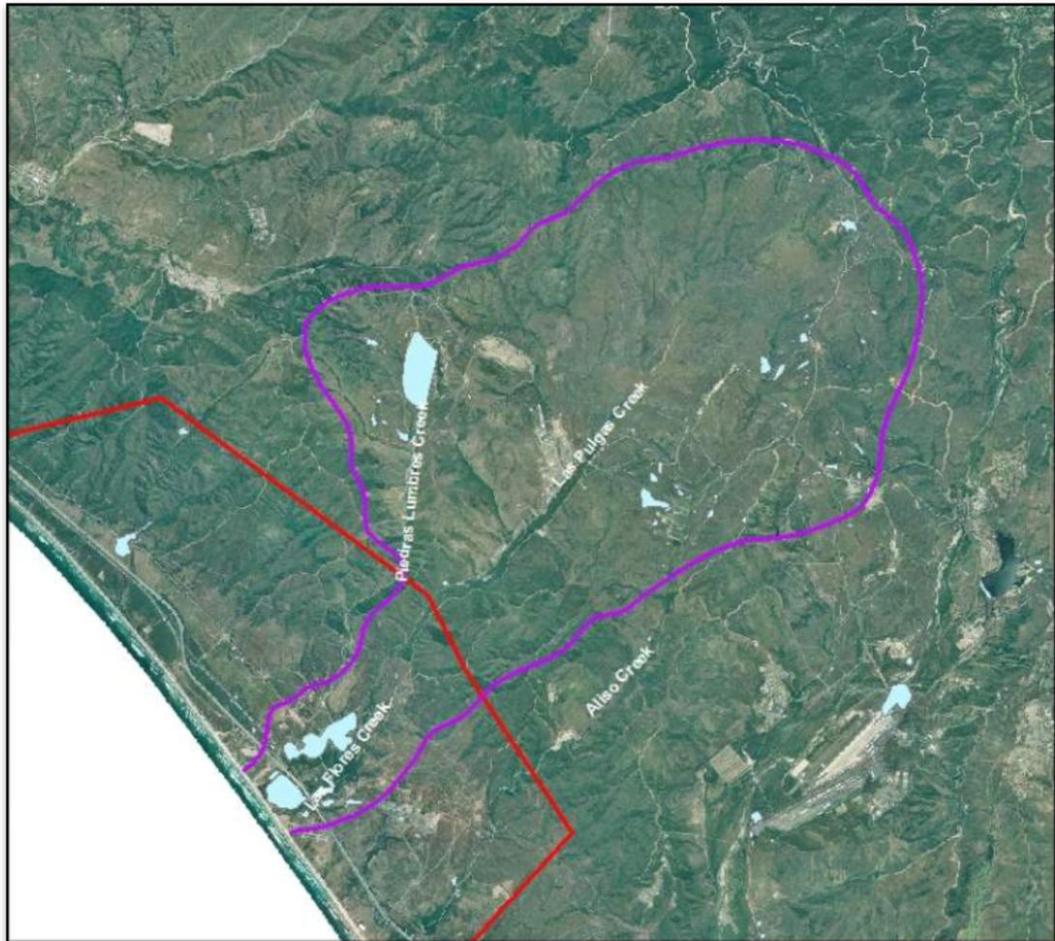


Figure 3.10 Las Pulgas Study Unit Intersecting with Red Beach Coastal Study Unit. (Map prepared from Camp Pendleton CRM database by Stan Berryman 2014).

marine and granitic sands (Pearl and Waters 1998:19). For purposes of this thesis, the Las Pulgas unit ends at the northeast end of CA-SDI-812 (ethnohistoric village of Huisme) and overlaps with the Red Beach Study Unit (Figure 3.10).

3.4.1 Archaeological Sites

There are 84 recorded archaeological sites within the Las Pulgas Creek Study Area. Of these, 18 have been dated with a total of 36 radiocarbon samples. As we move inland the site typological scheme proposed by Byrd *et al.* (2004:26) is continued to be used. The densest concentration of sites is in the upper reaches of Aliso Creek as is shown in Figure 3.11. The sites include small lithic scatters, milling and residential bases. The most common are the

Limited Activity Area/lithic scatters (Figure 3.11). These types of site are often surface scatters of stone flakes often referred to as sparse lithic scatter and generalized lithic tool and flake scatters with very limited anthropogenic soil.

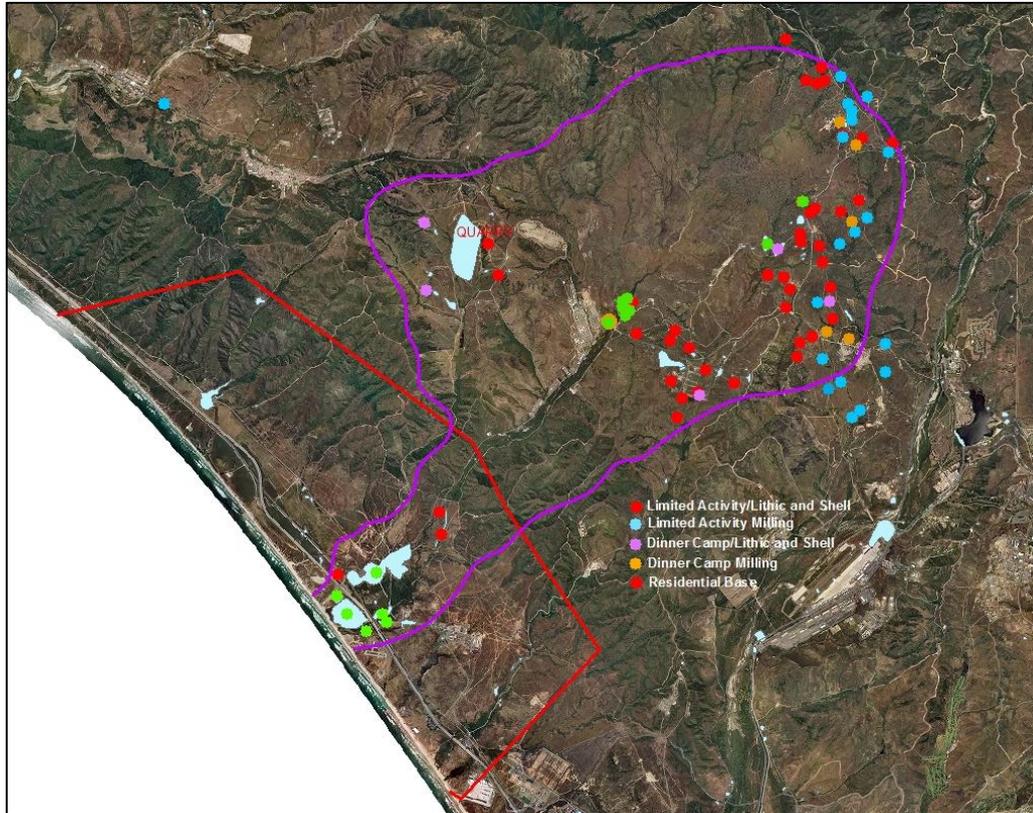


Figure 3.11 Site Distribution Las Pulgas Study Unit (Map prepared from Camp Pendleton CRM database by Stan Berryman 2014).

build up. The next most common site type in this study unit is the Limited Activity Area/milling. These sites consist of bedrock milling outcrops with very limited artifact content and no anthropogenic soil.

The dinner camp/lithic scatter sites are more like the dinner camps along the coast. They can demonstrate strong anthropogenic soil build up (35 to 100 centimeters) showing a more complex set of activities with multiple tasks taking place. The sites are more complex than the lithic scatters or milling limited use areas and would be used on a more regular basis for longer period of time. Dinner camp/milling sites may be a subset of the overall site grouping

of dinner camps and have the same characteristics of the Dinner Camp/lithic scatter sites, except for the presence of bedrock milling. Residential bases

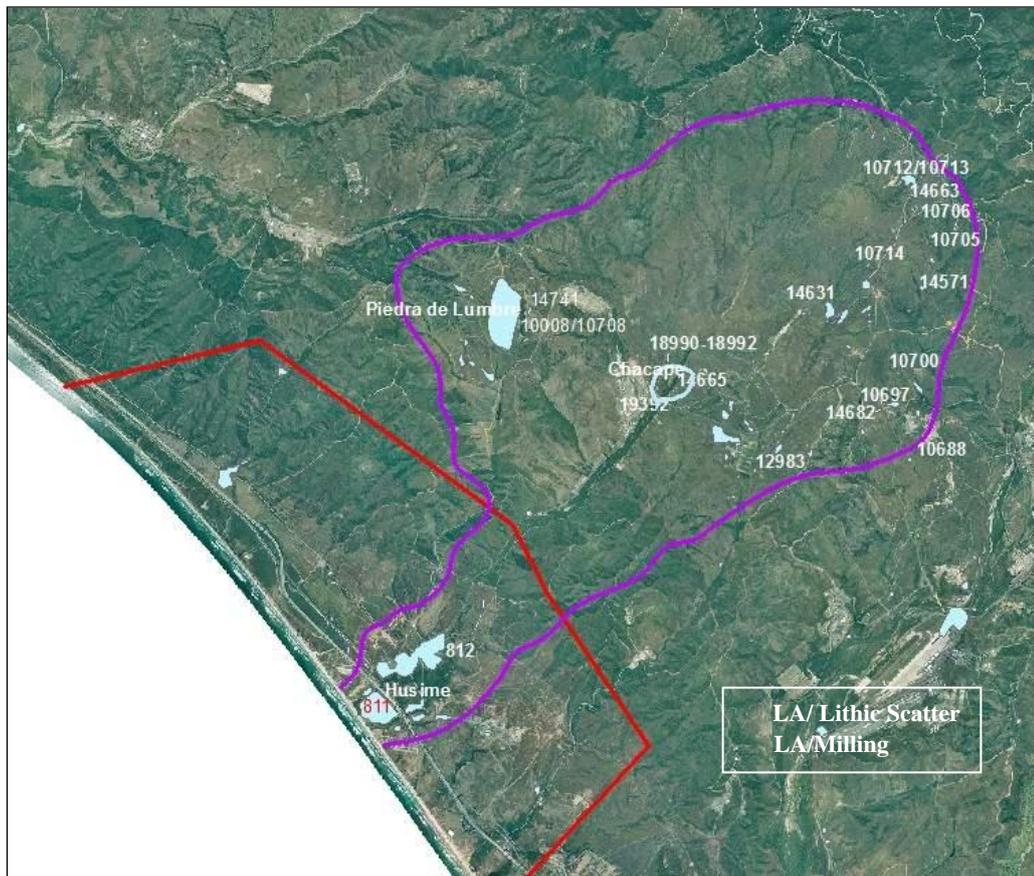


Figure 3.12 Dated sites within Las Pulgas Study Unit (Map prepared from Camp Pendleton CRM database by Stan Berryman 2014).

have a strong build-up of anthropogenic soils with a diversity of artifacts and features within the midden features, occasional burials, a diverse range of cultural material, and surface features such as milling, rock art and cupule stones.

The northern portion of this study unit includes portions of Las Pulgas Creek. It is within two of Camp Pendleton's live fire maneuver areas. As a result of safety issues these areas have minimal and generally no archaeological survey.

3.4.1.1 Limited Activity Areas

The limited activity-lithic scatters are primarily along Aliso Creek (Figure 3.13) and to a much lesser extent Las Pulgas/Las Flores Creeks and Piedra de

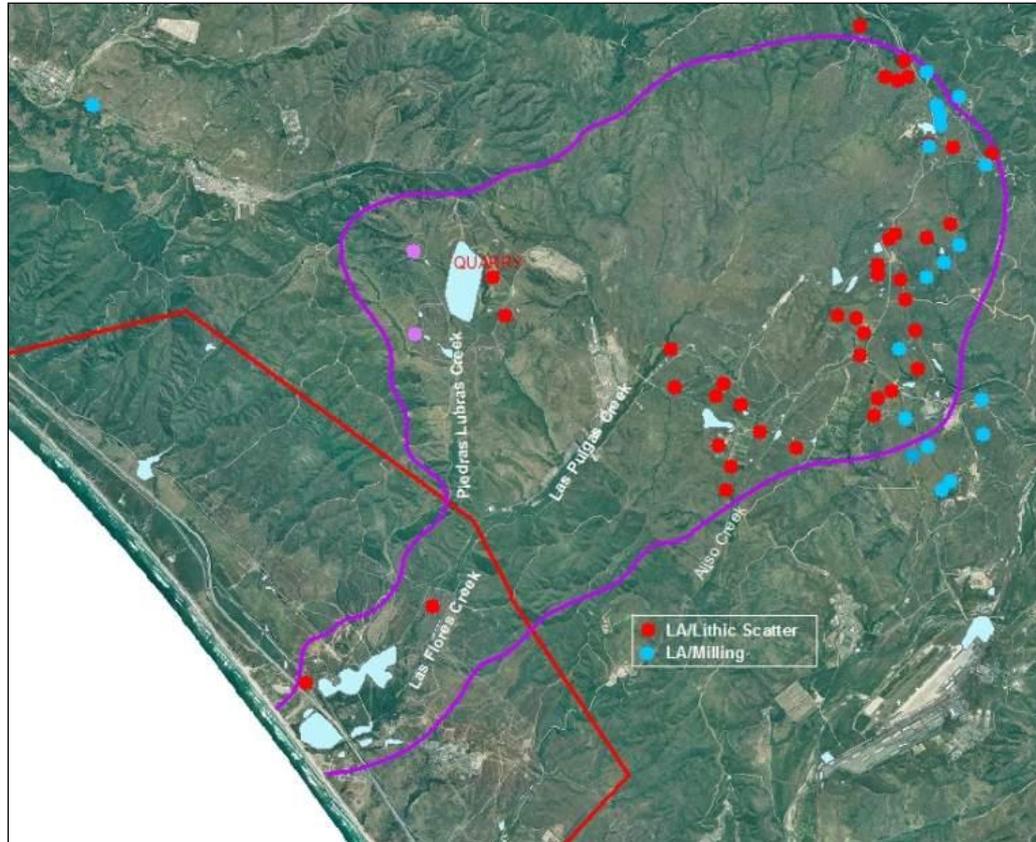


Figure 3.13 Limited Activity-Lithic Scatter/Milling, Las Pulgas Study Unit (Map prepared from Camp Pendleton CRM database by Stan Berryman 2014).

Lumbre Creek. Within this study unit no evidence is found of this site type outside the reaches of the creeks. Of the 41 LA/LS sites present three had material sufficient for dating resulting in four C14 dates with ranging from 900 B.P.–850 B.P. to 730 B.P.–650 B.P. (Figure 3.14). As shown in Figure 3.14 these dates are Late Holocene and are nearly 500 years prior to the major European incursion into the area. It is unfortunate that the sample of dated limited activity sites is small. This has much to do with the nature of the sites which are often small lithic scatters with no datable material. However, when comparing these sites to the others within the study unit, no apparent inconsistency can be found.

3.4.1.2 Limited Activity Milling Sites

There are 16 Limited Activity Milling sites four of which are radiocarbon dated from 395 B.P.–130 B.P. to 200 B.P.–115 B.P. putting these sites in the Late Holocene. As is seen in Figure 3.13 the Limited Activity Milling sites are clustered around the northern extent of Aliso Creek drainage and the far northern reach of Las Pulgas Creek. These sites consist of single or multiple granitic bedrock outcrops with basin *metates*, mortars, or slicks present. The artifacts present are very limited and usually consist of lithic flakes, groundstone, and occasional pottery sherds (Table 3.6) scattered on the

Site number	Debitage	Ground stone	Flake tool	Ceramic	Vertebrate fauna	<i>Donax gouldii</i>
CA-SDI-12983	Y	N	N	N	N	N
CA-SDI-14682	Y	N	Y	N	N	Y
CA-SDI-14741	Y	N	N	N	N	N

Table 3.6 Material Recovery Las Pulgas Study Unit.

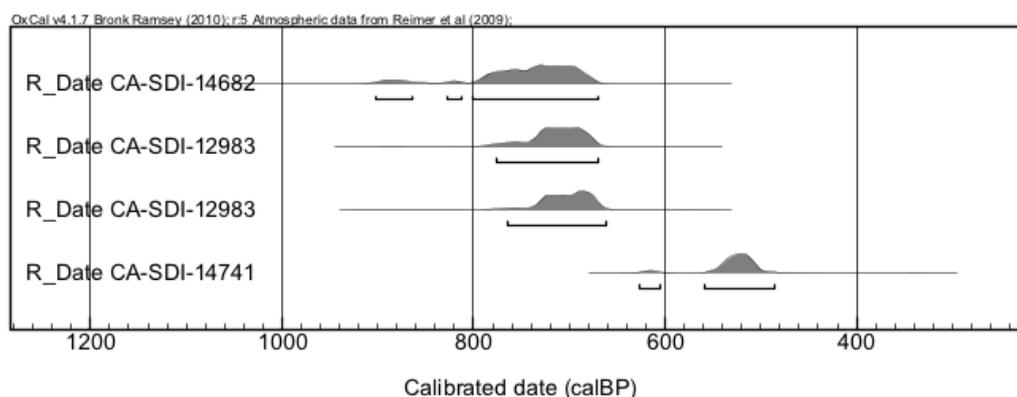


Figure 3.14 Las Pulgas Study Unit Limited Activity/Lithic Scatter - Based on dated unit levels - sequential dates. The date for CA-SDI-14682 is from a bulk soil sample (See Appendix Table E).

surface or near surface (0 to 10cm deep). These sites would presumably be focused on providing seed preparation for transport back to a camp or

residential base. The milling locations could also be used to process or pulverize small animals prior to cooking. It is likely the sites were used multiple times for food processing.

When combining the two types of limited activity sites together a pattern of dates emerges (with a single exception): a relatively consistent pattern of site use after the drought (see 2.7.2.3). It is interesting to note that the inland limited activity sites dates do not fully correspond with Limited Activity shell processing sites found along the Red beach Coastal Area which have a mean date of 448 B.P. One of the Las Pulgas limited activity area milling sites (CA-SDI-10705) is dated 305 B.P. - 0 B.P. which establishes it at the very Late Prehistoric or early ethnohistoric period. This is also the only site to have ceramics and a more robust suite of artifacts. At 14.5 km from the coast it also has shell fish remains (Table 3.7). All of the other dated limited activity area

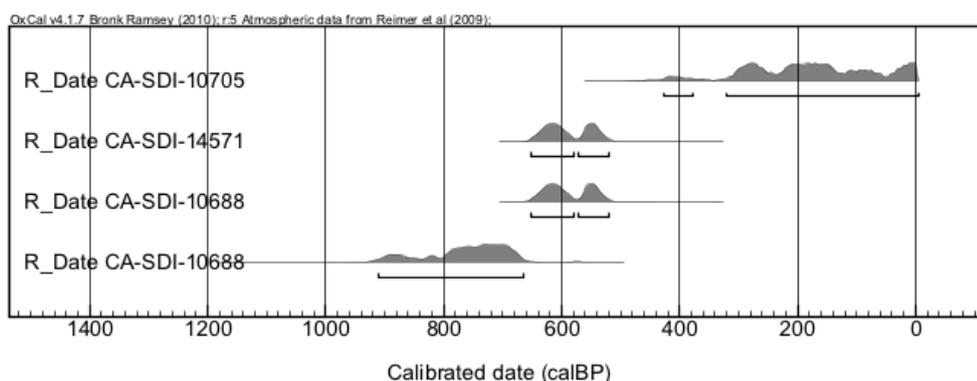


Figure 3.15 Las Pulgas Study Unit Limited Activity/Milling - Based on dated unit levels with sequential dates (See Appendix Table F).

Site number	Debitage	Ground stone	Flake tool	Ceramics	Vertebrate fauna	<i>Pecten sp.</i>
CA-SDI-10688	Y	N	N	N	N	N
CA-SDI-10705	Y	Y	Y	Y	Y	Y
CA-SDI-14571	Y	Y	N	N	N	N

Table 3.7 Material Recovery Las Pulgas Study Unit Milling.

sites have mean dates at least 100 years earlier. The dates for CA-SDI-12983 show a fairly tight pattern and likely point to relatively short-term episodic use.

3.4.1.3 Dinner Camps

There are 12 sites classified as Dinner Camps within this study unit. Six are lithic scatters and six are milling sites. All the milling sites and four of the lithic scatters are in general association with Aliso Creek and two are in the area of Piedra de Lumbre Creek and Piedra de Lumbre Quarry.

3.4.1.4 Dinner Camp/Lithic Scatters

The dinner camps with lithic scatters within the Las Pulgas Study Unit can be seen in Figure 3.16. One of the sites have been radiocarbon dated. The C14 dates of CA-SDI-10700 have a narrow range showing at least two episodes of occupation 450 B.P- 250 B.P. and 370 B.P.–0 B.P. (Figure 3.17). The dates of the site show it was occupied after the end of the major drought episode.

3.4.1.5 Dinner Camp/Milling

There are five Dinner Camp/Milling sites in the Las Pulgas Study Unit. Five of the sites have been dated ranging from 640 B.P.–590 B.P. /560 B.P.–510 B.P. to 300 B.P.–0 B.P. There is a wide variation in the dates for this site type, but all the dates point to a use after the mega-drought episode.

Combining the two types of Dinner Camp sites together a pattern of dates emerges. The earliest Dinner Camp site is 640 B.P. - 590 B.P. and the most recent is 210 B.P. - 140 B.P. when the dates of 0 B.P. are discarded (Figure 3.18). However, in the case of CA-SDI-10712 the date of 300 B.P.– 0 B.P. still points to a late use in the ethnohistoric present and may represent the last occupation by Luiseno prior to their removal to modern reservations. It should be noted that no Dinner Camp Milling sites are present in the study unit before 640 B.P. The Dinner Camps, like the Limited Activity sites cluster around the upper reach of Aliso Creek and two are in the area of Piedra de Lumbre Creek. However the driving factor for the location of the sites is probably the

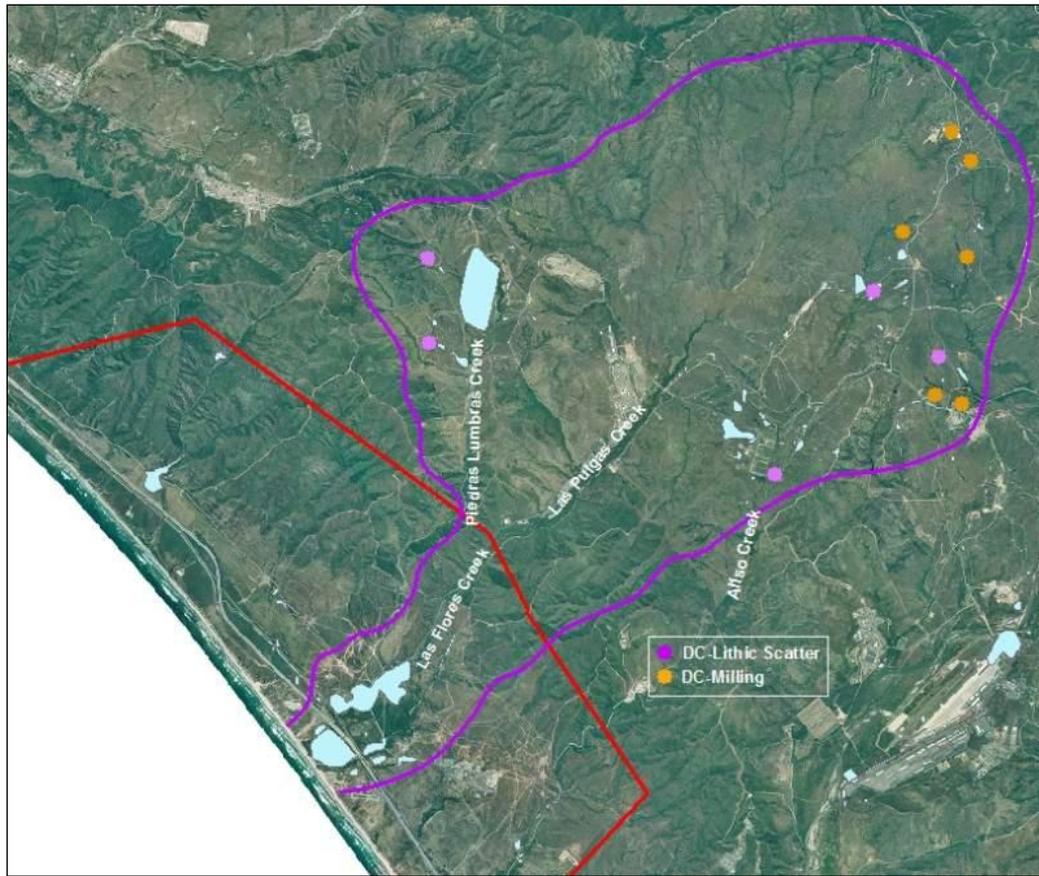


Figure 3.16 Dinner Camps-Lithic Scatter/Milling, Las Pulgas Study Unit (Map prepared from Camp Pendleton CRM database by Stan Berryman 2014).

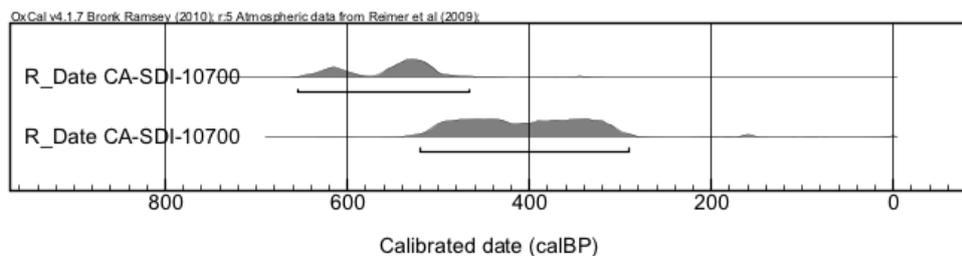


Figure 3.17 Las Pulgas Study Unit Dinner Camp/Lithic Scatter - recovered from separate excavation units. No date inversion present (See Appendix Table G).

the large Piedra de Lumbre (PDL) chert quarry. Two Dinner Camp Lithic Scatters, CA-SDI-10700 and 10710 are both located in proximity to the Piedra de Lumbre chert quarry. They show a preponderance of PDL chert in their midden deposits. At CA-SDI-10700 over 90% of all lithic recovered during

testing was PDL. At CA-SDI-10710 the percentage of PDL was nearly 80% overall (York 2004). It seems likely that a primary reason for the two sites is to

Site number	Debitage	Ground stone	Flake tool	Percussion tool	Ceramic	Fire cracked rock	Vertebrate fauna	Invertebrate fauna	<i>Donax gouldii</i>
CA-SDI-10700	Y	Y	Y	Y	N	Y	Y	N	N

Table 3.8 Material Recovery Las Pulgas Study Unit Dinner Camp/Lithic Scatter.

facilitate extraction of the raw chert. material. According to York (2004:37) PDL at CA-SDI-10700 amounted to 497 pieces of debitage or 91.5% of the entire recovered amount. The primary stone technology appeared to be core reduction while less evidence of biface thinning and pressure flaking was noted. Sufficient other types of artifacts coupled with anthropogenic soils points to this as a Lithic Dinner Camp.

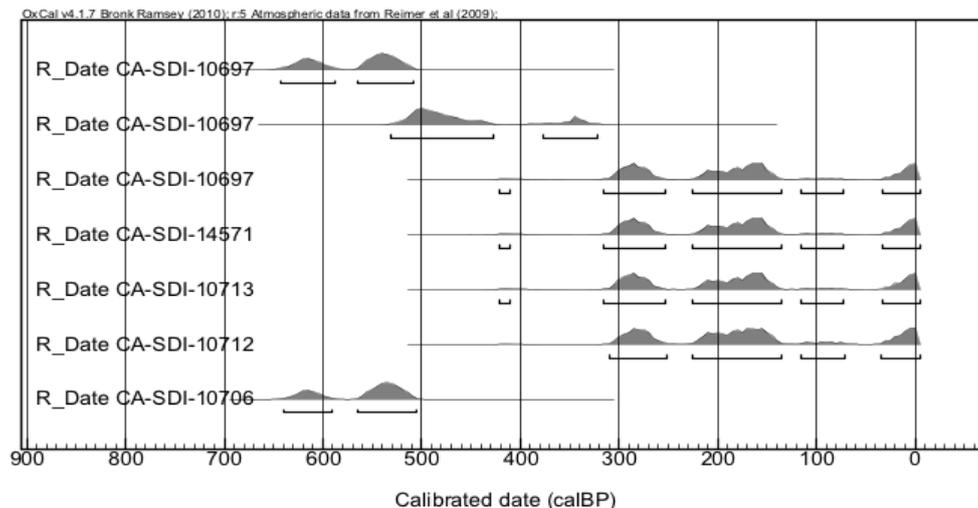


Figure 3.18. Las Pulgas Study Unit Dinner Camp/Milling - Based on dated unit levels with sequential dates (See Appendix Table H).

Site Number	Debitage	Ground stone	Flake tool	Percussion tool	Ceramics	Fire cracked rock	Milling feature	Vertebrate Fauna	<i>Donax gouldii</i>	<i>Pecten sp</i>
CA-SDI-10697	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
CA-SDI-10706	Y	N	Y	N	N	N	N	N	N	N
CA-SDI-10714	Y	Y	Y	N	Y	N	Y	N	N	N
CA-SDI-14571	Y	Y	Y	N	N	N	N	N	N	N
CA-SDI-10710	Y	Y	Y	Y	N	N	N	N	N	N

Table 3.9 Material Recovery Las Pulgas Study Unit Dinner Camp/Milling.

At Site CA-SDI-10710 the evidence of exploitation of the PDL quarry is also strong and “nearly all of thedebitage, 94.2 %, was made on PDL while 81.8 % of the tools were made of PDL” (Becker and Andrews 2006:57). Again there is evidence of core reduction as the major activity, followed by thinning flakes and bifacial thinning. York believes that occupation of the sites was not intensive but they were rather used on an occasional short-term basis (York 2004). Of these two sites only CA-SDI-10700 was datable with the dates of 490 B.P.–250 B.P. and 370 B.P.–0 B.P. CA-SDI 10710 was not datable by C14 however a single projectile point indicates a Late Holocene use (Becker and Andrews 2006). Little else is seen (Table 3.9). Based on the other dated Dinner Camps it is likely that the site was occupied during the Late Prehistoric/holoceneHolocene.

CA-SDI-10714 is an example of a Dinner Camp milling site (Hale and Becker 2006). The site consists of three distinct artifact concentrations connected by a scatter of lithic flakes. It measures 95m N/S by 90m E/W with a depth of midden deposit of approximately 50cm. Based on test excavation the site has a full range of artifacts including bifaces, cores, flakes,debitage, groundstone, ceramics, and bone and shell artifacts (Table 3.9). Of the 660 stone artifacts

recovered 200 were made from PDL chert, with the largest amount being 333 metavolcanic items. Other material included quartz, quartzite, obsidian and silicified wood. Five milling features were recorded consisting of two basin *metates* and three slicks. Two cupule petroglyphs were identified on two granitic boulders.

CA-SDI-10697 is another dinner milling camp site. It is relative large, measuring 90 m by 120 m with three loci (Doolittle 1998). It has over 60 milling features (Berryman *et al.* 2009:5) including mortars, *metates*, and slicks (Photographs 3.3 and 3.4). There are also two rock art panels consisting of geometric designs and one anthropomorph. A wide range of stone artifacts are present including flakes, percussing tools, flake tool, milling handstones, and fire affected rock. Ceramic sherds were also reported from this site. CA-SDI-10697 dates from 640 B.P. - 590 B.P., 560 B.P.-510 B.P. and 210 B.P.-140 B.P.

3.4.1.6 Residential Base

There are seven Residential Base sites within the Las Pulgas Study Unit. As is shown in Figure 3.19 the sites are distributed across the unit from the coast to the upper reaches of Las Pulgas Creek. All of the sites are within the Las Pulgas/Las Flores Creek Terraces. The 19 dates come from six of the sites with only two not having multiple dates (Figure 3.20). The mean date of all Residential Base sites is 273 B.P., well after the end of the major drought episode and younger than the mean dates for the lithic scatters and milling sites.

The oldest site date is 540 B.P. to 405 B.P. and the youngest is 290 B.P. to 0 B.P. which perhaps suggest initial residential use of this area beginning just prior to the arrival of the Europeans. Five of the sites are clustered around an area defined by the intersection of Basilone Road and Las Pulgas Road. They are all on the terrace straddling Las Pulgas Creek. This cluster of sites likely represents a single residential base. These sites are CA-SDI-14665/14666, 18990, 18991, 18992, and 19392. Although they have been recorded as

separate sites, a function of CRM studies that have taken place over a span of five years, these sites could be considered loci of a single large residential base. Based on test excavations at each site (York 2004, York *et al.* 2009, and Berryman *et al.* 2009), they are characterized by deep anthropogenic soils of at least 90 cm in depth, and the presence of large quantities of artifacts made from PDL chert including debitage flakes, cores, tools, bifaces and projectile points (Table 3.10). Over 50% of the material was PDL chert.

Fourteen projectile points were recovered, all of the Cottonwood Triangulate type, a style of arrowhead that only occurs in the Late Prehistoric. Potsherd fragments of Tizon Brownware were also recovered as well as marine shell in large quantities, the primary variety being *Donax sp.* Large and small mammal bones; bird, frog and turtle bones; and remains of near shore marine fish were also recovered. The greatest variety of faunal remains came from CA-SDI-19392. Dates for these sites are consistent and range from between 640 B.P. -305 B.P. to 280 B.P.-40 B.P. Dates were derived from marine shell, charcoal, and soot from a single potsherd. It is probable that this site is the village of Chacapa as identified by Johnson and O'Neil (2001).



Photograph 3.3 Milling Feature at CA-SDI-10697 (Photograph taken by S. Berryman 2009).



Photograph 3.4 Looking South from CA-SDI-10697 (Photograph taken by S. Berryman 2009).

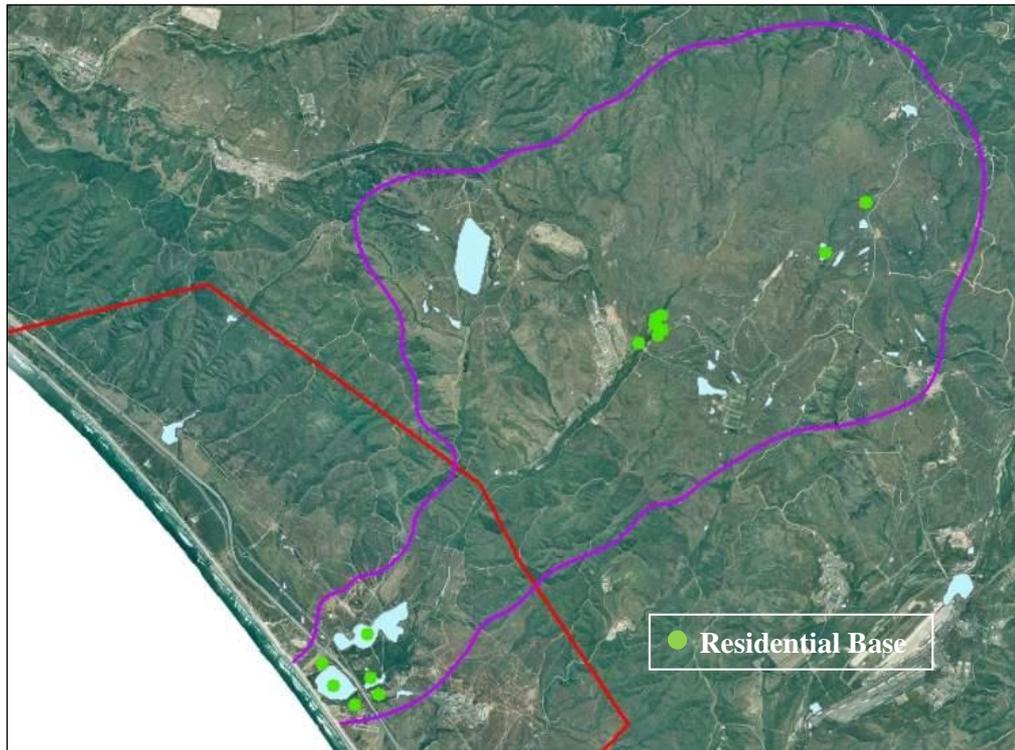


Figure 3.19 Las Pulgas Study Unit Residential Base (Map prepared from Camp Pendleton CRM database by Stan Berryman 2014).

CA-SDI-10712/10713 is a Residential Base located north of the CA-SDI-19392 just discussed above. It is in the upper reaches of Las Pulgas Creek. It has deep anthropogenic soils of over 80cm deep and is represented by a wide variety of tools that points to residential uses. The stone artifacts include debitage (50.5% PDL chert), tool shaping and sharpening flakes, six Cottonwood Triangulate projectile points, and Tizon Brown Ware potsherds. Bedrock milling is incorporated into the site and includes 20 mortars, one *metate*, and nine slicks along with four *manos*, one pestle, one pestle fragment, and two portable *metates*. The site has a 2 Sigma date of 280 B.P. to 50 B.P.

CA-SDI-14631 is a Residential Base located in the northern reaches of Aliso Creek and straddles the creek. Radiocarbon results from four samples show a range of site occupation 530 – 420 B.P., 440 – 350 B.P., 430 – 110 B.P., and

Site number	Debitage	Ground stone	Flake tool	Percussion tool	Ceramics	Fire cracked rock	Milling feature	Vertebrate fauna	Invertebrate fauna	<i>Donax Gouldii</i>
CA-SDI-10712/10713	Y	Y	Y	Y	Y	Y	Y	Y	Y	N
CA-SDI-14631	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
CA-SDI-14666	Y	Y	Y	Y	N	Y	N	N	N	N
CA-SDI-14665	Y	N	N	N	N	N	Y	N	N	N
CA-SDI-19392*	Y	Y	Y	Y	Y	Y	N	Y	Y	Y

Table 3.10 Material Recovery Las Pulgas Study Unit Residential Bases
* Includes CA-SDI-18990, 18991, 18992.

270 B.P.-200 B.P. Artifact recovery from test excavations (Cheever *et al.* 2006) included Tizon brownware pottery, Cottonwood projectile points flaked-stone tools, bifaces, shell beads, a ceramic pipe, and a quartz crystal further confirm the Late Holocene/Late Prehistoric period of site use. Extensive bedrock milling including metates, mortars and slicks were recorded. Evidence points to exploitation of both terrestrial and littoral habitats, with an emphasis on *Donax sp.* and small mammals, specifically rabbit. A cupule rock (Photograph 3.6), a type of rock art resulting from grinding small pits into the surface of a boulder, was found, which along with the quartz crystal suggests activity beyond daily residential activities. Approximately 43 individual cupules were found, mostly on the top or horizontal face of the boulder. The cupules are small cup-shaped or concave depressions that were ground, pecked, or carved into rock surfaces. Generalized dimensions for the individual features are 5.2 cm × 5.1 cm in size and 2.3 cm in depth, although there is considerable variation in size and depth of these elements. These elements are distinguished from milling elements both by their position on a boulder surface (present on vertical or angled surfaces, as well as on flat surfaces) and by the absence of grinding evidence. The natural stone surface is retained in and among a collection of cupules.

-



Photograph 3.5 Excavating at CA-SDI-14631 (Cheever *et al.* 2004:6-10).

The Residential Bases all have large quantities of shell present in the midden soil, although the sites range from approximately nine to 21 kilometers from the coast at Red Beach. This clearly demonstrates a very strong tie to and use of littoral resources. Even though these sites are well inland the inhabitants continued to rely on a shell fish as a major dietary supplement. Also, inland residential bases did not come into use until the very Late Holocene: the earliest radiocarbon date is 640 B.P.–305 B.P. to 280 B.P.–50 B.P. These dated sites will provide an interesting and different view of the two major models of coastal intensification and coastal decline during the Late Holocene/Late Prehistoric and the relationship of inland sites to the climatic landscapes.

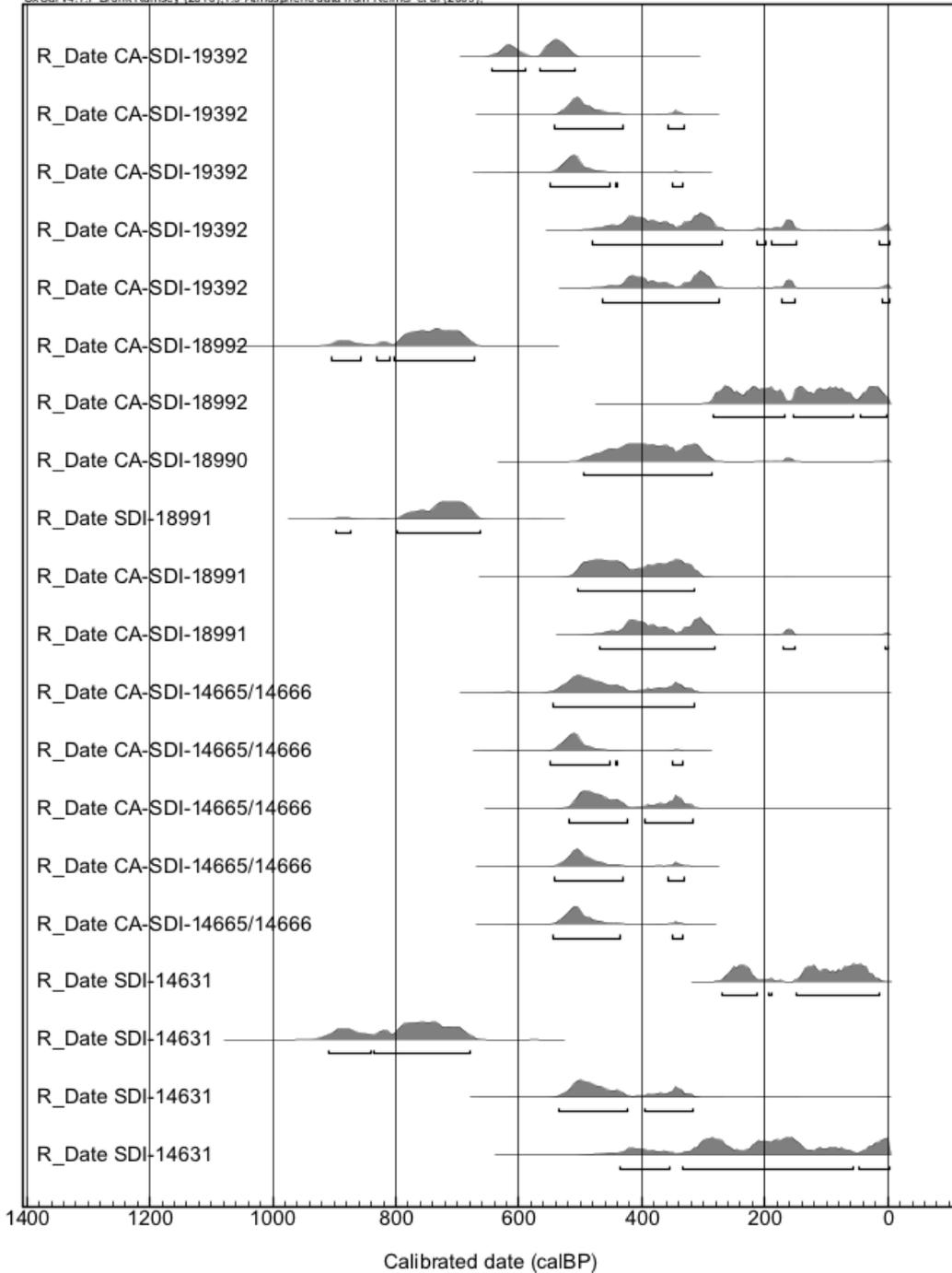


Figure 3.20 Las Pulgas Study Unit Residential Base. Based on dated unit levels, bulk soil and soot on ceramic sherds. The dates are internally consistent which may be the result of the short period of occupation (See Appendix Table I).



Photograph 3.6 Cupule Stone CA-SDI-14631 (from Cheever *et al.*2004).

3.4.1.7 Special Use Site

The Piedra de Lumbre quarry (CA-SDI-10,008/10,708) is a geological formation of interest. It is on a north/south trending ridge with an elevation of 183 meters amsl at the head of Piedra de Lumbre Canyon. The PDL chert was extracted from several large outcrops located near the top of the ridge as well as from nodules found on the flanks of the ridge. It is the sole source of the material referred to Piedra de Lumbre chert or PDL chert. Thin-section studies of the stone have variously indicated either a volcanic or sedimentary origin (Pignolo 1992:29) although the material is described as chert. The PDL chert material is distinctive in color ranging from gray, to yellow or red. It is very fine grained with a waxy texture. Its fracture characteristics seem to limit tool size.

The PDL chert quarry is the only known Californian source of this material which is found in sites throughout southern California. It was used extensively for tool making by prehistoric inhabitants of this area. The artifacts most

commonly associated with PDL are projectile points and bifaces. It is probable that the color of the PDL was important to its use (see Section 4.2).

3.4.2 Discussion

3.4.2.1 Radiocarbon dates

All of the 18 radiocarbon-dated sites in the Las Pulgas study unit fall within the Late Holocene, with three of the sites pre-dating 700 B.P and the majority (n=14) showing use after 640 B.P. The two earliest dates from CA-SDI-10688 (910 B.P.-650 B.P.) and CA-SDI-14682 (900 B.P.-850 B.P.) come from bulk soil organic material. Two dates from CA-SDI-14631 were collected from soot on potsherds found during excavation one of which was in the 0-10 cm level. Both dates showed a tight pattern (440 B.P.-350 B.P. and 430 B.P.-110 B.P.) that reflects the introduction of pottery into northern San Diego County, postulated by True *et.al.* (1974) as occurring between 450 B.P. and 350 B.P. Overall comparing the dates across site type throughout the Las Pulgas Creek Study Unit shows a very consistent pattern with use and occupation beginning after 640 B.P. or post the mega-drought. There is no radiocarbon evidence for use of the inland Las Pulgas area during the Middle or Early Holocene. As will be shown in the analysis section of this thesis, these dates line up with significant events within the climatic landscape.

3.4.2.2 General Discussion

The radiocarbon dates point to a time when the pre-historic people made a significant change in their use of the landscape. The PDL chert quarry also seems to hold great significance in the Late Holocene, with a distinct directionality in the movement of this stone for trade. These dates compare to the Red Beach Study Unit sites in that a number of coastal sites show evidence of residential use within the Late Holocene.

The Las Pulgas Study Unit sites point to a coalescing of people into more interior areas very late in the Holocene. There is a diversity of use of the physical landscape that is not present along the coast. The sites in the Las Pulgas Unit are found in a wide range of elevations along major creeks and

streams, on hill tops and ridges. The sites are sited to take advantage of the greater diversity of resources inland than are found along the coast.

When looking at Figure 3.22 there is seen a distinct clustering of Late Holocene sites upland and away from the coast. Comparing this Figure with 3.3 which depicts Late Holocene sites within the Red Beach Study Unit, the Red Beach Late Holocene sites are with the exception of CA-SDI-14494, 14497, 14496 4540, 14506 and 10006 are all within close proximity of the

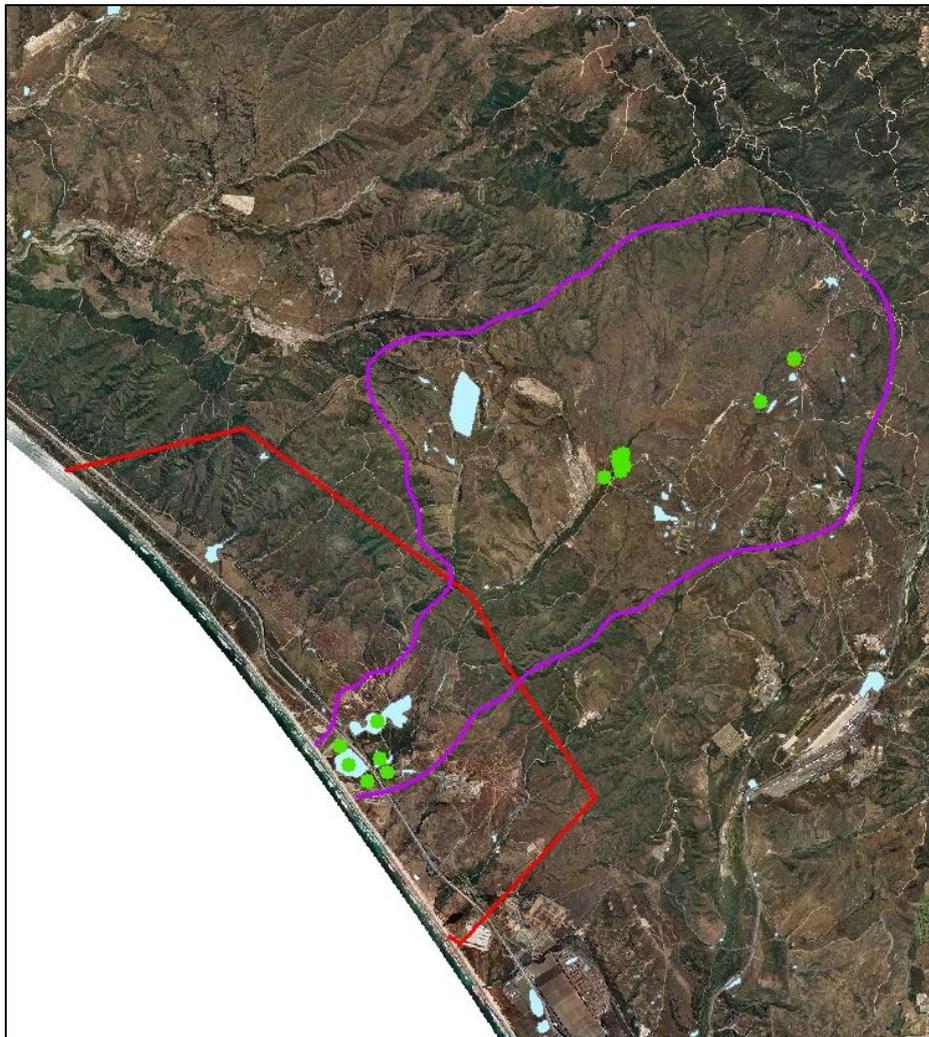


Figure 3.21 Late Holocene Residential Bases Las Pulgas Study Unit (Map prepared from Camp Pendleton CRM database by Stan Berryman 2014).

3.5 Case Springs Study Unit

Case Springs is in the northern central uplands part of Camp Pendleton (figure 3.1). It is separated from the other study units by a large 12,000 acre live-fire impact area and due to the presence of unexploded ordinance is a "no man's land" (Figure 3.22). The terrain comprises rolling hills and stream-cut flat marine and non-marine terraces. The average elevation is 762 meters amsl. The Santa Margarita Mountains rise to the north and east with the highest elevation being Margarita Peak with an elevation 972 meters AMSL. This area of Camp Pendleton forms the head waters of the San Onofre Creek. The soil is generally building in place and is clayey silt with angular to subangular gravels. The modern vegetation is dominated by grasslands, riparian woodlands, oak woodlands and coastal sage scrub pant communities.

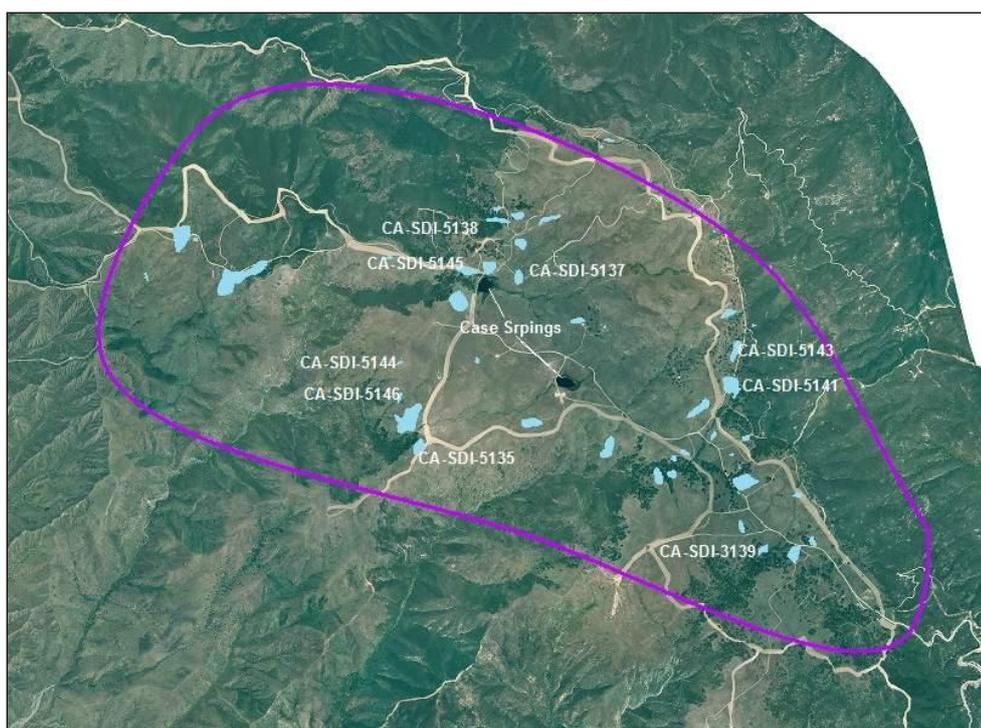


Figure 3.22 Case Springs Study Unit Archaeological Sites (Map prepared from Camp Pendleton CRM database by Stan Berryman 2014).

There are 45 recorded archaeological sites within the Case Springs Study Unit (Figure 3.22). Of these, seven have been dated with a total of 17 radiocarbon samples. Twenty-eight sites are Limited Activity Lithic Scatters;

14 are Limited Activity Milling sites; two are Dinner Camps Milling; and one is a Dinner Camp Lithic Scatter. The sites are spread over the rolling hills and terraces that make up this study unit. The soil within the unit appears to be forming *in situ* from a granitic bedrock material and it ranges from 30 to 90 centimeters in depth. As shown in Figure 3.23 the majority of sites are Limited Activity/Lithic Scatters followed by Limited Activity Area/Milling. There are two Dinner Camp/Milling and one Dinner Camp/Lithic Scatter sites. The limited activity areas appear to have a greater diversity of artifacts than those in the Las Pulgas Study Unit, although the sites are small with some anthropogenic soil build up. The dinner camps are moderate sized with strong anthropogenic soil build up averaging approximately 80 cm in depth. All of the sites are situated at the headwaters of the San Onofre Creek.

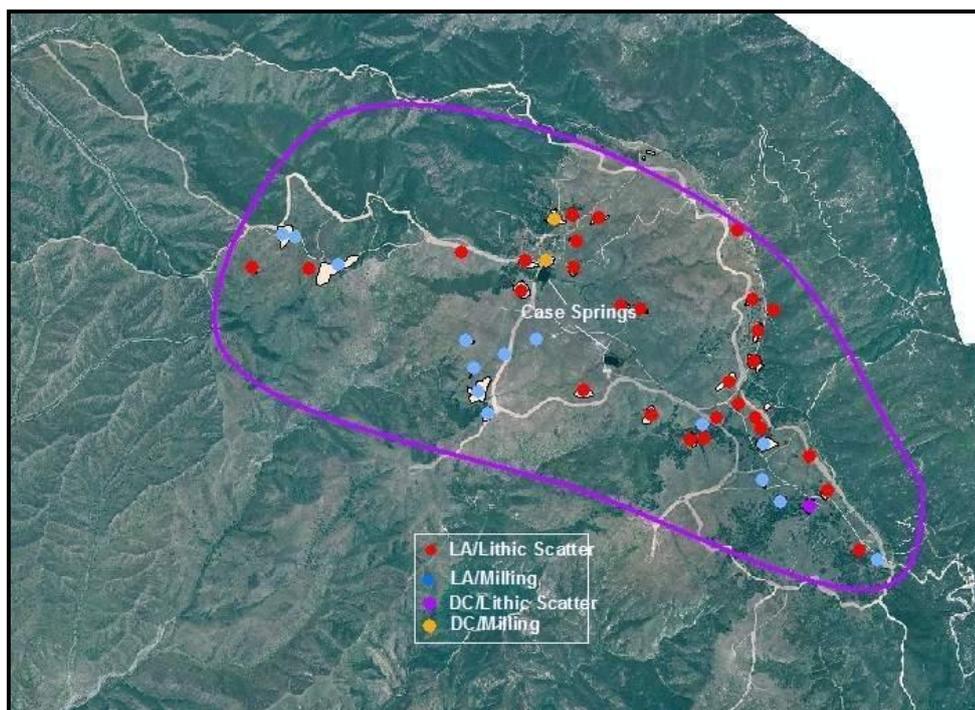


Figure 3.23 Site Distribution Case Springs Study Unit (Map prepared from Camp Pendleton CRM database by Stan Berryman 2014).

3.5.1 Limited Activity/Lithic Scatters Areas

The limited activity-lithic scatters are spread across the study unit on the rolling terraces overlooking the headwaters of San Onofre Creek primarily

along Aliso Creek and to a much lesser extent Las Pulgas/Las Flores Creeks and Piedra de Lumbre Creek (Figure 3.23). Within this study area no evidence is found of this site type outside the reaches of the creeks.

Only one Limited Activity Lithic Scatter site has been dated resulting in one C14 date. As shown in Figure 3.24 the date is Late Holocene. CA-SDI-5137 is a 6,859 square meter site on a grass-covered eastern slope of a wide valley (Reddy 1997). The site was test evaluated and shown to be a sparse surface and subsurface scatter of lithic debris and tools with a depth of 50 cm. Based on the presence of a rock ring fire hearth found intact at 40 to 50 cm., this appears to be the original soil surface (Reddy 1997:79). A charcoal sample

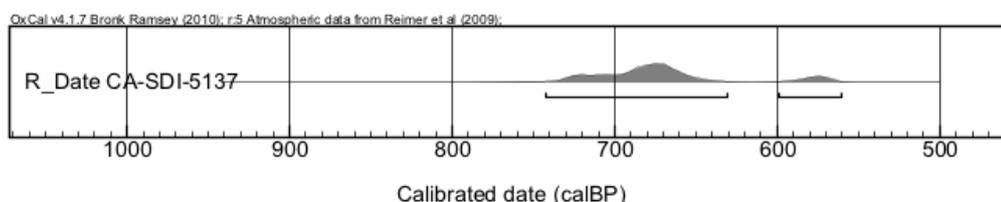


Figure 3.24 Case Springs Limited Activity/Lithic Scatter – Date from fire hearth (See Appendix Table J).

Site number	Debitage	Ground stone	Flake tool	Percussion tool	Ceramic	Vertebrate Fauna	Invertebrate fauna
CA-SDI-5137	Y	Y	Y	Y	N	N	N

Table 3.11 Material Recovery Case Springs Study Unit Lithic Scatters.

from this feature revealed a date of 730 B.P. - 575 B.P. at 2sigma. The test recovered 101 stone artifacts made up of primarily lithic debitage, two retouched flakes and one ground stone (Table 3.11). The primary source stone was metavolcanic followed by, PDL chert, other chert and then granite, quartz, quartzite and obsidian. Assuming the hearth is on the prehistoric living

surface, there is substantial soil build up on this site and presumably on most of the Case Springs sites.

3.5.2 Limited Activity Milling Sites

There are 15 Limited Activity Milling sites, three of which are radiocarbon dated, resulting in dates that are (Figure 3.25) are very Late within the Holocene period. As with the Limited Activity Lithic scatter sites the LAM sites are spread throughout the Case Springs Study Unit. These sites consist of single or multiple granitic bedrock outcrops with basin *metates*, mortars, or slicks present. The artifacts present (Table 3.10) are very limited and usually consist of lithic flakes, groundstone scattered on the surface or near surface (0 to 10cm deep). One site CA-SDI-5141 shows a variety of shellfish remains. These sites would be focused on providing seed preparation for transport back to a camp or residential base. The milling locations could also be used to process or pulverize small animals prior to cooking. It is likely the sites were used multiple times for food processing. The shellfish remains in CA-SDI-5141

Site number	Debitage	Ground stone	Flake tool	Percussion tool	Ceramic	Milling feature	Charcoal	Vertebrate fauna	Invertebrate fauna	<i>Donax gouldii</i>	<i>Chione sp.</i>	Other invertebrate	macrobotanical
CA-SDI-5146	Y	Y	Y	N	N	Y	Y	Y	N	N	N	N	Y
CA-SDI-5144	Y	Y	Y	Y	N	Y	N	Y	N	N	N	N	N
CA-SDI-5143	Y	Y	Y	Y	N	N	N	N	N	N	N	N	N
CA-SDI-5141	Y	N	N	N	N	Y	N	N	Y	Y	Y	Y	N
CA-SDI-5135	Y	N	N	N	N	N	N	N	Y	N	N	Y	N

Table 3.12 Case Springs Study Unit Lithic Scatters Limited Activity Milling.

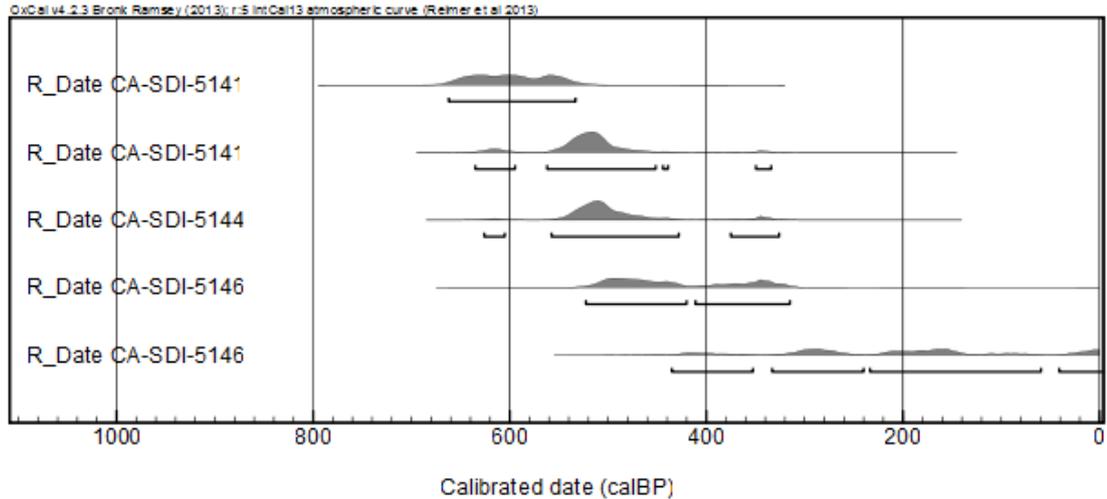


Figure 3.25 Case Springs Limited Activity Milling – These are charcoal dates derived from unit levels. Reddy (1997) indicates the dates are sequential and internally consistent (See Appendix Table K).

may indicate a relationship to one of the coastal residential sites. The presence of *Donax sp.* points to CA-SDI-812 as the possible point of origin. It would not be a difficult trip from the coast up the Las Pulgas Creek to CA-SDI-5141 may indicate a relationship to one of the coastal residential sites. The presence of *Donax sp.* points to CA-SDI-812 as the possible point of origin. It would not be a difficult trip from the coast up the Las Pulgas Creek to CA-SDI-5141.

When combining the two types of limited activity sites together a pattern of dates emerges that clusters around 600 BP. All of the Limited Activity Milling site post-date 700 B.P., the end of the Medieval Climatic Anomaly. It is interesting to note that the inland Limited Activity Sites dates correspond with Limited Activity shell processing sites found along the Red Beach Coastal Area which shows the earliest use at 720–540 B.P.

CA-SDI-5143 is made up of two granitic bedrock milling features (three mortars, one basin metate, one slick) and artifact scatter on the bank of a steep cut creek. A total of 141 lithic artifacts were recovered from the surface and subsurface during evaluation of the site. The artifacts consist of 94%

debitage, unifacially retouched tools, bifacially retouched tools, and one Cottonwood projectile point. The material was predominately metavolcanic (n=103) with limited amounts of PDL chert (n=23) and lesser amounts of obsidian and quartz. Maximum depth of the site deposit is 50 cm. (Reddy 1997).

CA-SDI-5141 is a Limited Activity/Milling site associated with surface subsurface scatter of artifacts to a 70 cm depth. Bedrock milling in the form of two basin *metates* and one collared mortar were found on two separated granitic boulders. A total of 541 artifacts were uncovered including lithic debitage, cores, uniface, bifaces, and milling equipment. The bifaces included two Cottonwood triangulate projectile points and two projectile point preforms. The Cottonwood points combined with the radiocarbon dates confirm the Late Holocene date for this site (Reddy 1997).

According to Reddy (1997) CA-SDI-5135 is on a grass covered ridge surrounded by hills dissected by streams. It covers an area of 139 m by 66 m with a maximum depth of 50 cm. A total of 335 artifacts was recovered from the site during an evaluation excavation. Nearly 25% of the recovered lithic material was PDL chert. The artifacts included debitage (n=276), unifacially and bifacially retouched tools (n=9), percussing tools (n=4), and ground stone. The ground stone or milling artifacts included eight "portable" *metates* and seventeen *manos* and pestles. Two Early Archaic projectile points were identified including an Elko point and a broken shouldered projectile base of a style found in the Early Archaic. A total of six bifaces including the two projectile points were identified. This site has two radiocarbon dates of 790 B.P. - 680 B.P. and 1160 B.P. - 950 B.P. Based on the large number of "portable" *metates* CA-SDI-5135 is considered a limited activity/milling site. The two Early Archaic points were both picked up and curated by the Late Prehistoric inhabitants, or they demonstrate use of the Case Springs by Early Archaic people.

CA-SDI-5144 site is on a knoll with a view to the Pacific Ocean shoreline. It has milling features on three granitic bedrock boulders and a lithic scatter consisting of 310 pieces of debitage and five bifacially retouched tools. PDL chert was the second most prevalent lithic type consisting of 101 or 32% of the recovered artifacts. The bedrock milling included three basin *metates* and six milling slicks. The average depth of the soil deposit was 40 cm. This site is dated to 545 B.P.-455 B.P.

3.5.3 Dinner Camp/Milling

There are three Dinner Camp milling sites in Case Springs Study Unit. As shown in Figure 3.23, two are located in close proximity and one is in the far southwest portion of the Case Springs area. The dates show a spread of not more than 200 years and may well be nearly coeval (Figure 3.26). If that is in fact true then Case Springs was used on a semi-permanent basis after the end of the prolonged period of drought in the Late Holocene and abandoned not more than a few hundred years after the first use. A wide range of artifacts are present at the Dinner Camps (Table 3.13). The depth of the midden deposit was approximately 85 cm.

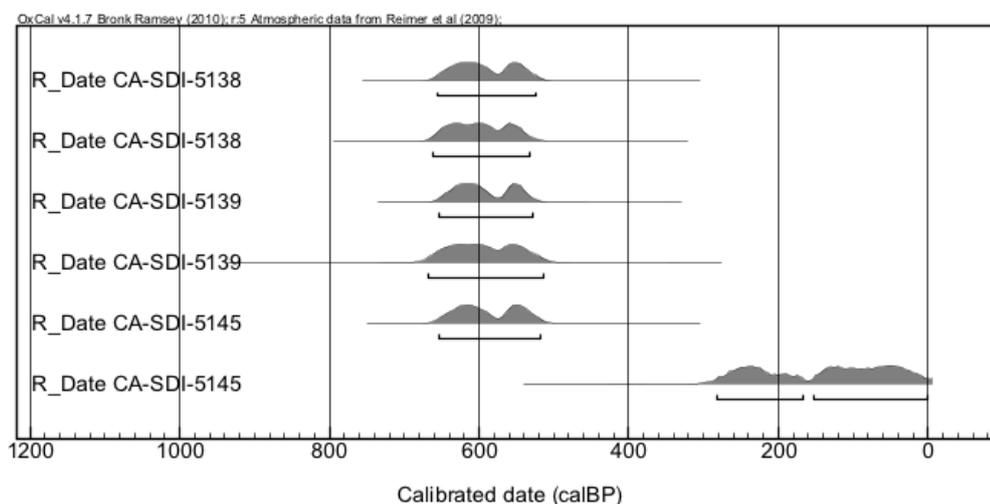


Figure 3.26 Case Springs Dinner Camp/Milling. The dates are from unit levels and are sequential (See Appendix Table L).

CA-SDI-5138 is located in a narrow east/west trending valley where the headwaters of the San Onofre and San Mateo Canyons join. The site is in and adjacent to a Coastal Live Oak grove and was test excavated for National Register evaluation. CA-SDI-5138 measures 30 by 180 m and has artifact bearing soil to a depth of 83 cm. It dates 691 B.P. – 520 B.P. to 640 B.P. – 595 B.P.

Site number	Debitage	Ground stone	Flake tool	Percussion tool	Ceramic	Milling feature	Vertebrate fauna	<i>Donax gouldii</i>	<i>Pecten sp.</i>	Macrobotanical
CA-SDI-5145	Y	Y	Y	Y	N	N	Y	N	N	Y
CA-SDI-5139	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
CA-SDI-5138	Y	Y	Y	N	Y	N	Y	Y	N	Y

Table 3.13 Material Recovery Case Springs Dinner Camp/Milling.

Surface collection, shovel test pits and one meter square unit excavation resulted in recovery of 589 artifacts includingdebitage, two cores, 16 bifacially and unifacially retouched tools (with one complete Cottonwood triangular projectile point and two projectile point preforms), and two mano grinding stones. A 4.6 cm long by 4 cm diameter ground stone tube was found. These artifacts are most generally associated with shaman activities and referred to as sucking tubes (O'Neill 1983). A ceramic object was recovered measuring 2.6 cm long by 1.1 cm wide by 0.9 cm in thickness. Flattened, it tapers to one end, with both ends broken. Reddy speculates that it possibly was part of a figurine (Reddy 1997: 103). A crescentic was identified on the site surface. These are lunate shaped bifacial tools typically associated with Middle Holocene occupation. The dominate lithic material was metavolcanic (73% of the assemblage) followed by PDL with 14% of the assemblage.

Eleven taxa of marine bivalves were found including *Donax gouldii*, *Mytilus sp.*, and *Protothaca staminea*. Gastropods including *Acanthine spirata*, *Crepidula sp.*, and *Tegula sp.* were recovered along with miscellaneous chitins, crustaceans and other invertebrates (Reddy 1997:94).

CA-SDI-5139 is on a steep knoll 2 km southeast of Case Springs dates 640 B.P.–595 B.P. to 665 B.P.– 05 B.P. This extensively test-excavated site consists of bedrock milling, surface artifacts, and artifacts recovered to a maximum depth of 85 cm. (Reddy 1977). The artifacts included 1466 pieces of debitage, three cores, one used flake, 41 unifacially and bifacially retouched tools, one percussing tool, three Tizon brownware potsherds, three beads (one from shark vertebrae and one from *Olivella sp.* shell), and one antler tine pressure flaker. One Cottonwood Triangular point and three Dos Cabezas Serrated points were recovered. All but one were made from PDL chert. Eleven projectile point tips and nine base fragments were recovered, five made of PDL chert. Seventy-two grams of shellfish including *Argopecten aequisulcotus*, *Donax gouldii*, *Protothaca staminea* and *Tegula sp.* were recovered. There are 14 milling features on three bedrock outcrops consisting of 10 mortars, three mortar/basins and one mortar slick.

CA-SDI-5145 is on a sloping area rising north of Case Springs measuring 110 m by 100 m. It dates 525 B.P. – 310 B.P. to 545 B.P. – 455 B.P. The site elevation ranges from 664 to 677 meters AMSL. It is 0.16 km north of Case Springs. A total of 670 artifacts were recovered from the site during evaluation excavation. The recovered specimen include debitage, cores (N=6), used flakes (n=1), unifacially and bifacially flaked tools (N=10) including an early Archaic Elko projectile point base, percussing tools (n=3), and 12 milling equipment including five *metate* fragments and seven *manos*. As with the other sites in this area the dominate material was metavolcanics (n=528) followed by PDL chert (n=101). Reddy felt the presence of the large amount of PDL chert was of interest (Reddy 1997) although the site is only 9.6 km from the PDL quarry, as will be discussed late in the PDL Chert Section. In addition to the artifacts a quartz crystal was recovered in association with human

bone. This site is interesting as Reddy indicated in 1997 due to its proximity to Case Springs, recovery of human remains with a crystal and the Elko projectile point base. These items point to a possible ritual use at the site.

3.5.4 Discussion

3.5.4.1 Radiocarbon Discussion

There are 13 radiocarbon dates from the Case Springs Study Unit. Each of the dates was retrieved from unit excavation at different depths below ground surface. All were from carbonized material. The sites with multiple dates show internal consistency with the earliest dates retrieved from the lowest

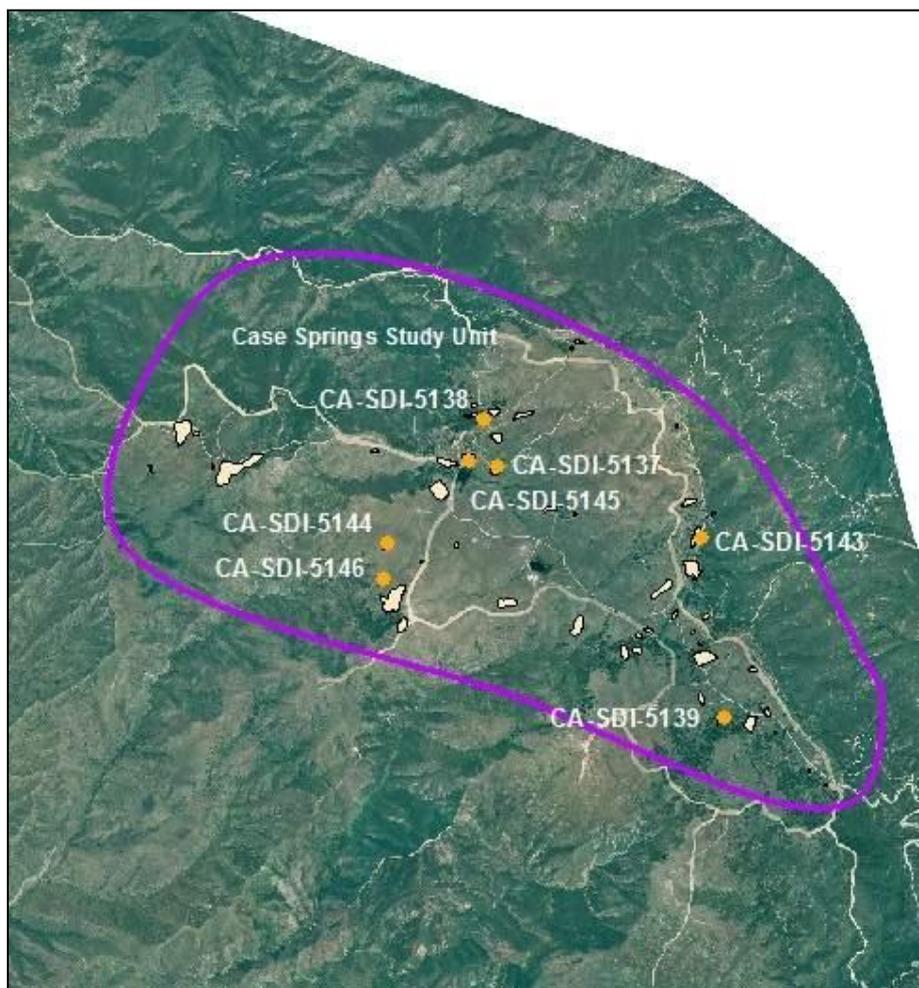


Figure 3.27 Late Holocene Dated Sites Case Springs Study Unit (Map prepared from Camp Pendleton CRM database by Stan Berryman 2014).

excavation levels. Looking at the dinner camps (CA-SDI-5145, 5139 and 5138) there is a consistency with the dates leading to the conclusion that Case Springs was used, if not continuously, then regularly. There is a single date from CA-SDI-5137 that date range predates 700 B.P. but still within the Late Holocene. All of the other dates from the sites range from 525 B.P. - 310 B.P. to 445 B.P. - 0 B.P. The time intervals do not show lengths of site use or occupation, but time blocks within which use or occupation occurred with a 97% accuracy. All of Case Spring sites with one exception show a date range beginning after 700 B.P. and with one exception (CA-SDI-5146 not generally occurring post 300 B.P. When these sites are added to those from the Las Pulgas Study Unit a pattern of Late Holocene expansion into the interior away from the coast and major rivers and streams becomes apparent. This expansion will be shown later to be related to, but not necessarily determined by the climatic landscape. However, it needs to be pointed out that the Case Springs sites are used prior to most of the Las Pulgas Creek Study Unit residential bases and dinner camps. This may be the result of the coalescing into larger and more complex residential sites.

3.5.4.2 General Discussion

The presence of PDL chert and quartz in significant quantities shows a choice by the occupants of these sites to use materials that, due to their fracture characteristics, can only be used in small projectile points and occasional small scrapers. With the frequencies of PDL chert present in the Case Springs sites it is possible the site occupants were processing the lithic material for use elsewhere, for trade, or for use at Case Springs. With the quantities of *Argopecten aequisulcatus*, *Donax gouldii*, *Protothaca staminea* and *Tegula* sp. at two sites the occupants of these sites were either trekking to the coast to directly harvest the shellfish or were trading for them. There is a continuation of using coastal resources at inland sites.

3.6 Santa Margarita River Unit

The Santa Margarita River Study Unit (Figure 3.1) is dominated by the Santa Margarita River channel (Figure 3.28). The river is the largest drainage on

Camp Pendleton (Pearl and Waters 1998) and is the last undammed river in Southern California. It drains an area of 1460 square km and is 50 km long, flowing from the northeast. On the base it is 27.6 km long. Its major tributaries on Camp Pendleton are De Luz/Roblar Creek and Wood Canyon. The northern reaches of the river are dominated by steep hills and ridges. As the

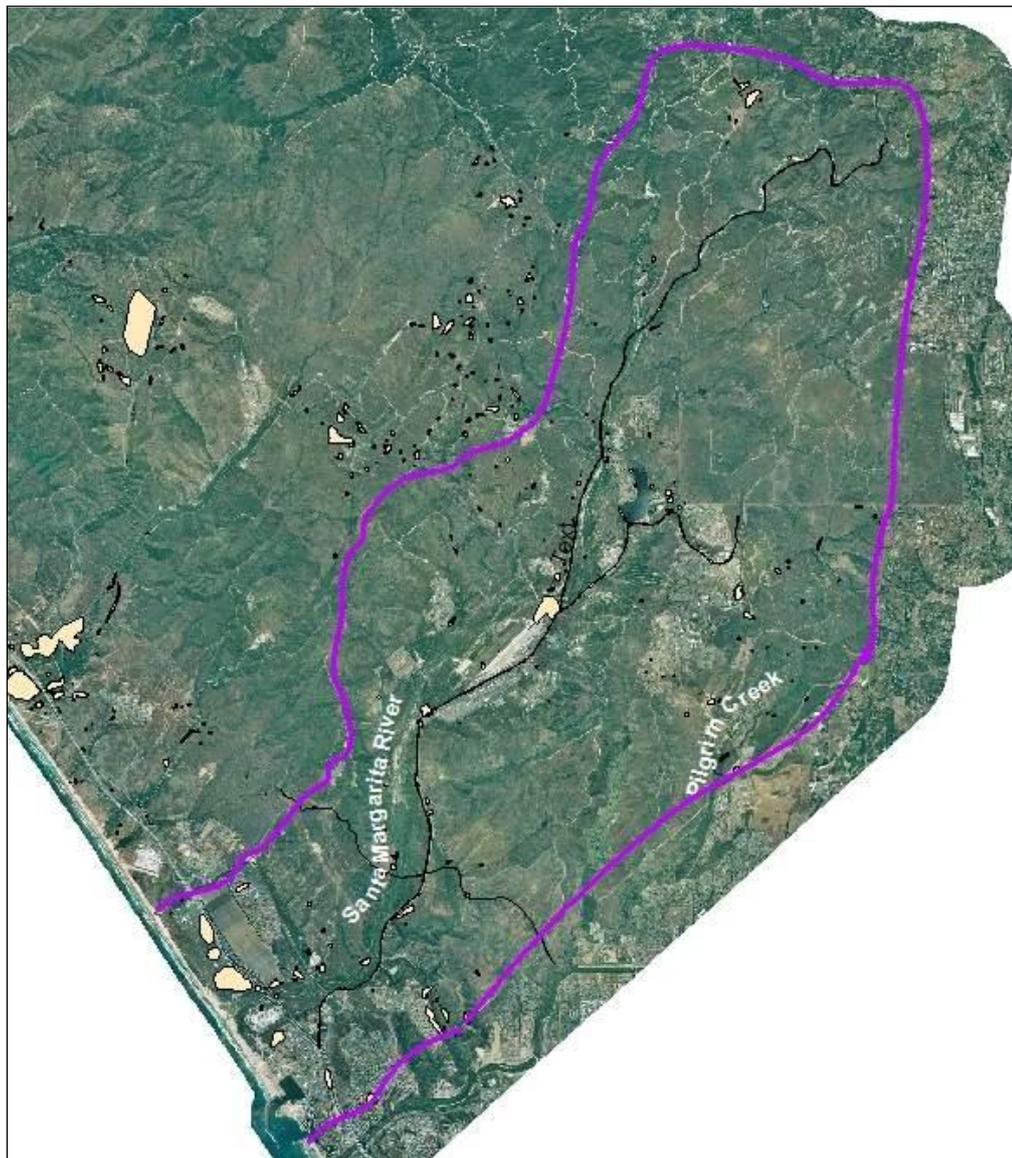


Figure 3.28 Santa Margarita River Study Unit. (Map prepared from Camp Pendleton CRM database by Stan Berryman 2014).

river flows southward the floodplain broadens and is bounded by hills and stream terraces. Near the southern drainage basin it widens into the Ysidora Basin. Steep sided cliffs and narrow terraces are approximately at 2km from

the mouth of the river where it widens into a broad flood plain intersected by Interstate Highway 5. “Now occupied by a salt marsh estuary, prehistorically this area was covered by an extensive lagoon” (York 2005:4).

The sites within the Santa Margarita study area cover the full range of sites types including everything from limited activity areas and dinner camps to residential bases. The period of occupation is demonstrated in 76 radiocarbon dates from 19 sites. These dates vary from Early and Middle to Late Holocene sites with Early Holocene sites dating from between 8720 B.P. to 8220 B.P., the Middle Holocene sites dating from 6930 B.P. to 6320 B.P. The Late Holocene sites date from 3700 B.P. to 3541 B.P. to 280 B.P. to 170 B.P. There are also two ethnohistoric villages recorded within this unit, Topomai and Zanche (Figure 3.29). According to York (2005), 41 sites have been the subject of archaeological test evaluation.

3.6.1 Archaeological Sites

As shown in Figures 3.30 and 3.31 the sites cluster around the Ysidora Basin and Santa Margarita estuary in the southern portion of the unit. They range from Early to Late Holocene in age. There is broad cluster of sites approximately 4.5 km north of the Ysidora estuary cluster. Another small site cluster is found 13.3 km north along a wide part of the De Luz Creek tributary to the Santa Margarita River and near Pilgrim Creek (Figure 3.30). The sites in the Santa Margarita River Study Unit include Limited Activity Area sites broken down into lithic scatters and milling sites. Because of the proximity to the coast and the prehistoric lagoon many of these sites also have associated shell scatters. Dinner Camps are broken down into six lithic/shell scatters and two milling. Residential Bases account for six of the total sites in the Santa Margarita River Study Unit.

3.6.1.1 Limited Activity Area

Because there are so many moderate to large sized dinner camps with well developed anthropogenic soils, few limited activity areas have been test excavated in this study unit. However two have recently been excavated and

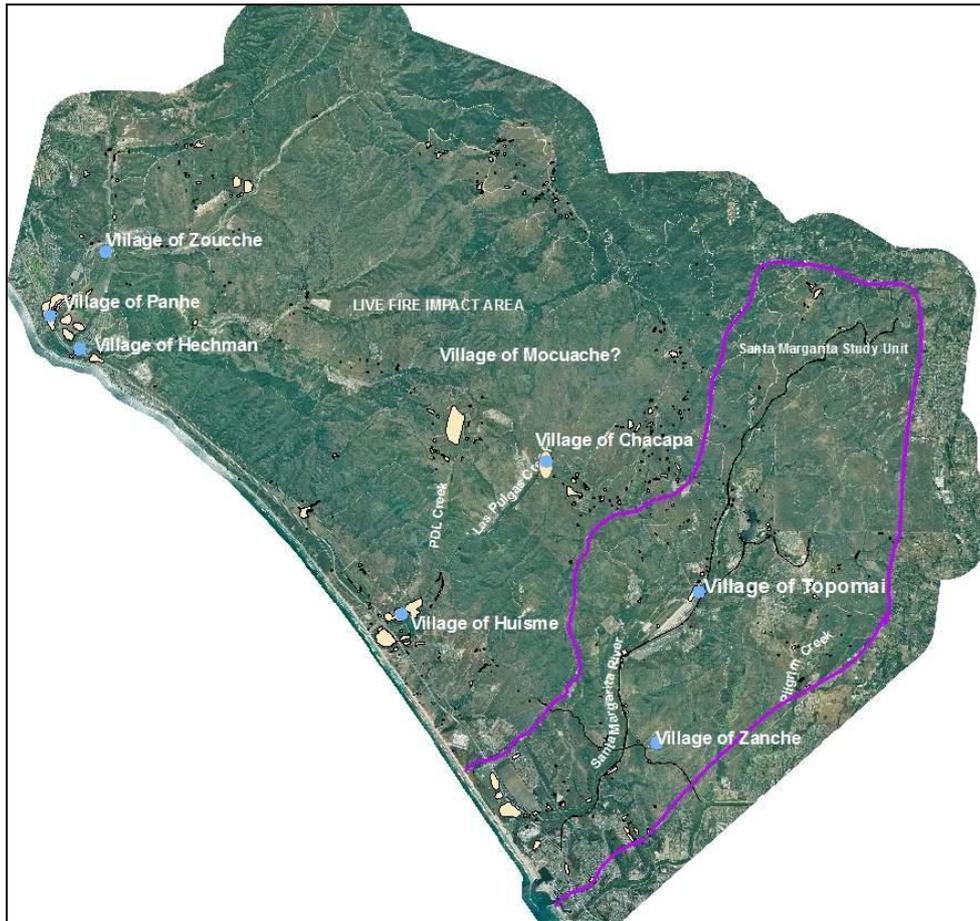


Figure 3.29 Santa Margarita River Study Unit Ethnohistoric Villages (Map prepared from Camp Pendleton CRM database by Stan Berryman 2014).

radiocarbon dated. Both sites are on the terraces west of the Santa Margarita River. They are between two and four kilometers from the Pacific Ocean. They date to the Middle and Late Holocene.

Site CA-SDI-12632 is 2.4 km east of the ocean. It is on a northeast/southwest trending ridge overlooking the Santa Margarita River. It was test-excavated in 2010 and 2011 by York (2011). The testing revealed a very sparse lithic scatter on the surface and a sparse subsurface deposit and a limited variety of lithic artifact types (Table 3.14). The artifacts recovered include 30 pieces of debitage and over 14 pieces of fire-affected rock. The lithic material consists of quartz, quartz, basalt, and generalized metavolcanic. Three pieces of marine shell were recovered including one each of *Donax gouldii* and

Chione sp. and one small unidentifiable fragment. Based on a shell date the site dates 4830 B.P.– 4560 B.P.

Site CA-SDI-14007 is a small low density shell and lithic scatter site (Table 3.14) located 4.8 km from the ocean. It is on a terrace of the Santa Margarita River adjacent to the dinner camp site CA-SDI-4416. The site was test excavated in 2010 (York 2010). The testing revealed a buried deposit that showed the greatest density at 40-50 cm with a break in soil type at 30-40 cm suggesting two separate uses of this site (York 2011: 237). Ten pieces of debitage, one flaked stone tool and two pieces of groundstone and 50 pieces of fire-affected rock were recovered (York 1911:236). The lithic material consisted of metavolcanic, quartz and volcanic. Fifty grams of shellfish remains were dominated by *Chione sp.*, followed by *Donax gouldii*, and *Ostrea sp.* The site is radiocarbon dated at 770-630 B.P. and 420-370 B.P. which matches the timeframe of Limited Activity Areas in the Red Beach Study Unit (See Appendix Table M).

Site number	Debitage	Ground stone	Flake tool	<i>Donax gouldii</i>	<i>Chione sp.</i>	Other Invertebrates	Macrobotanical
CA-SDI-12632	Y	N	N	Y	Y	Y	N
CA-SDI-14007	Y	Y	N	Y	y	N	N

Table 3.14 Material Recovery Santa Margarita Study Unit Limited Activity Area.

3.6.1.2 Dinner Camp Lithic and Shell Scatter

There are eight dated Dinner Camp/Lithic/Shell sites in the Santa Margarita River Study Unit. As shown in Figure 3.30 they are along the Santa Margarita River and Pilgrim Creek. All but one, (CA-SDI-13936) of the dated Dinner Camp sites have Late Holocene dates. Three (CA-SDI-13936, 12628, and 4416) have either Early and/or Middle Holocene components (Figure 3.32).

The Late Holocene dates show a period of use, then abandonment, and then re-use. Based on the spread of dates a number of the sites may have been used nearly coevally. If that is in fact true then all the sites were used on a semi-permanent basis in the river basin.

Site CA-SDI-15936 is the only dated dinner camp site to have been not occupied during the Late Holocene. As Figure 3.32 shows this site was intermittently used during the Early and Middle Holocene with use beginning at approximately 8400 B.P. and ending approximately 6390 B.P. Test excavation revealed this site measures approximately 80 m north/south by 90 m east/west. According to York (2010:172) “revealed the site soil to consist of three distinct strata.” The 60 cm deep test unit revealed a light density of artifacts throughout the midden consisting of 14 lithic artifacts, one shell bead, and 1,713 g of shell primarily *Argopecten sp.* and *Chione sp.* Surface artifacts consisted on debitage, three cores, three flaked stone tools, seven fragments of groundstone, and fire-affected rock. York (2010:178) indicates the site was likely used by family groups following the edges of the coastal lagoons.

Site CA-SDI-14751 is an example of a dinner camp with lithic and shell. This site is on an eastern terrace of the Santa Margarita River. Data recovery was carried out in the portion of this site to be affected by pipeline construction. Three 1x1 m units were excavated and found to be buried by nearly a meter of alluvium. The material collected by the excavation was found as deep as 150 cm below the original soil surface. The recovered material (Table 3.15) included debitage flakes, fire-affected rock, a Cottonwood projectile point,

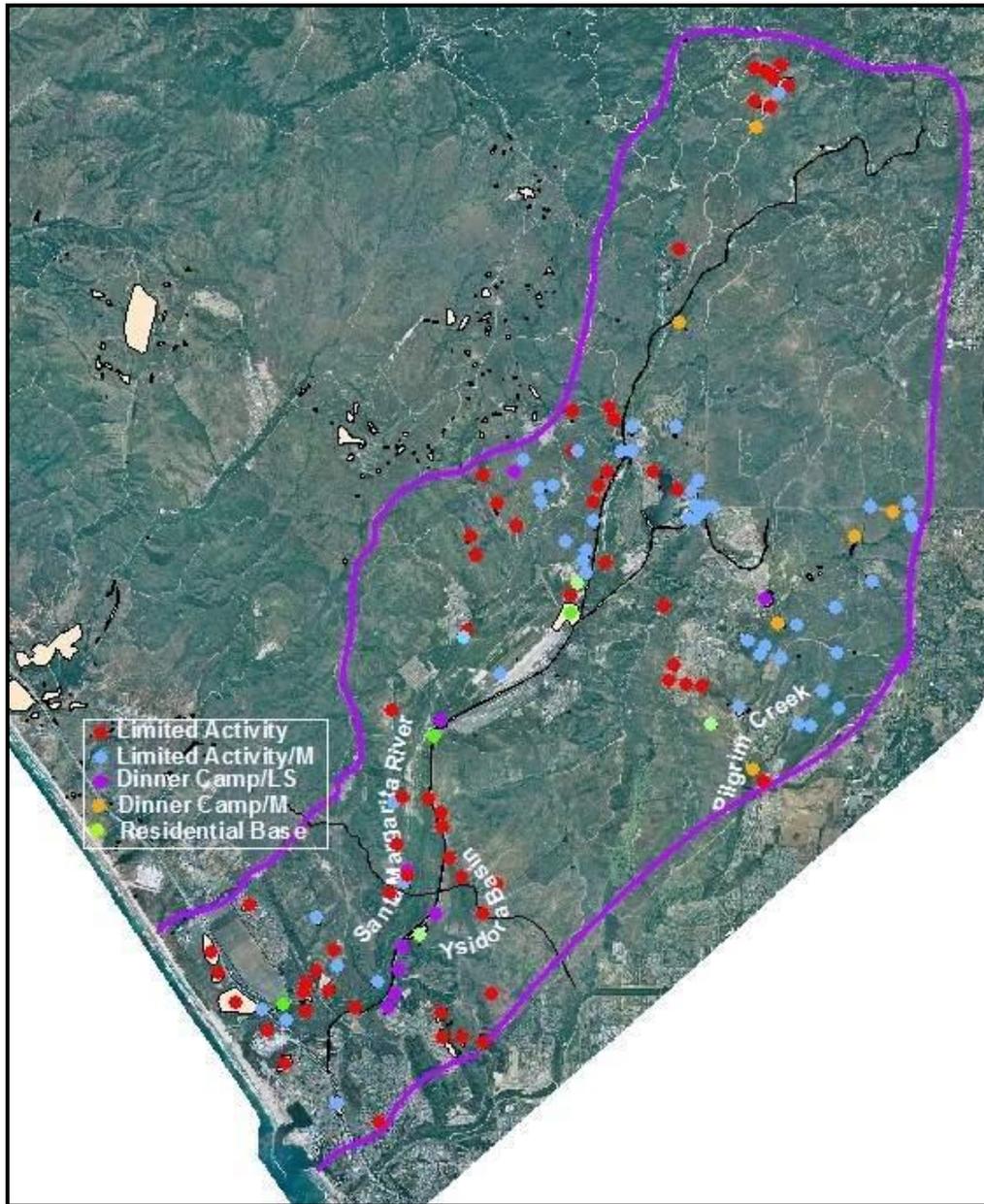


Figure 3.30 Santa Margarita Study Unit Archaeological Sites (Map prepared from Camp Pendleton CRM database by Stan Berryman 2014).

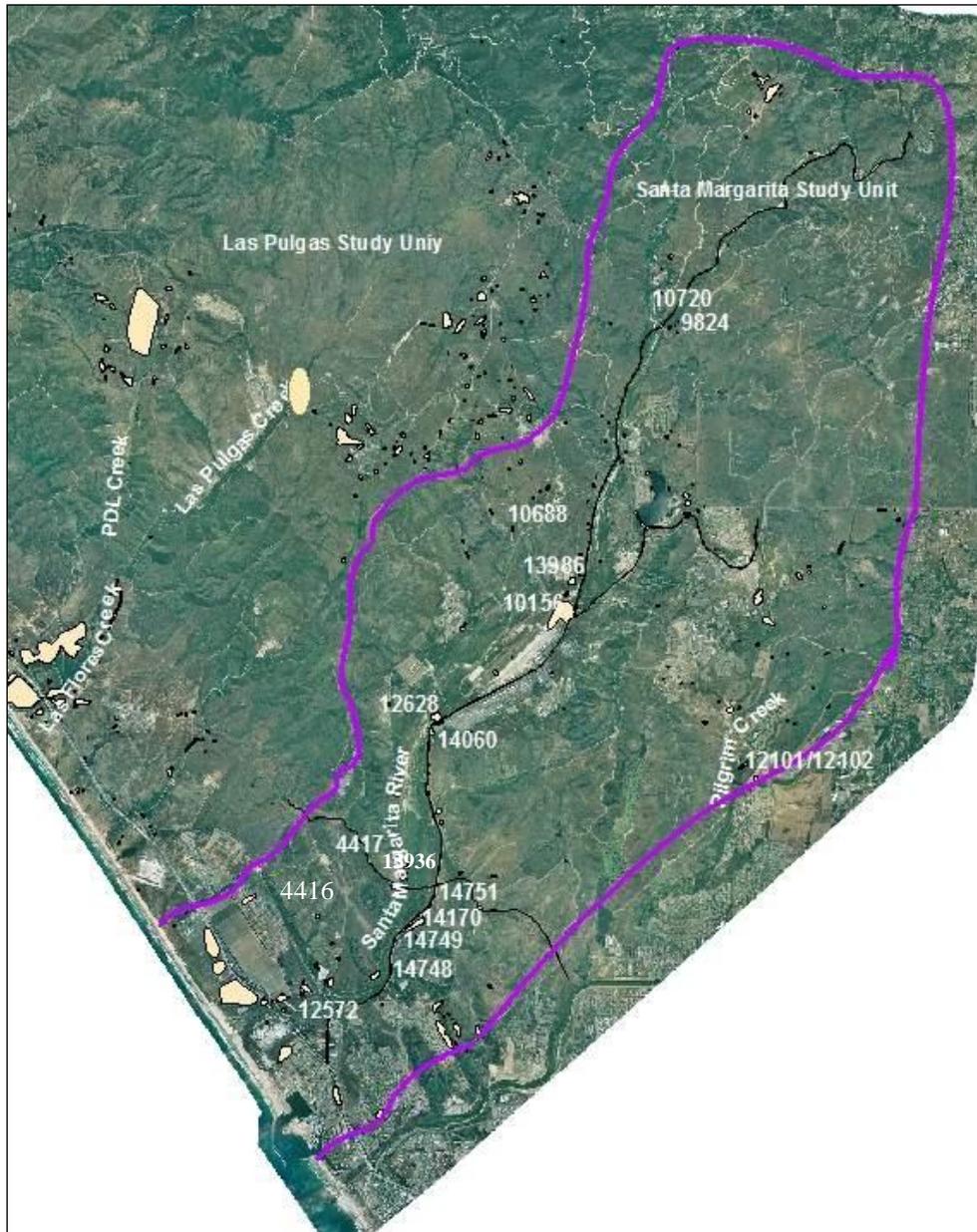


Figure 3.31 Santa Margarita River Study Unit Dated Sites (Map prepared from Camp Pendleton CRM database by Stan Berryman 2014).

charcoal, and shell. The test units revealed the majority of the items were from PDL chert which amounted to 84.4 % (n=157) of the total recovered lithic items (York and Wahoff 2009). Metavolcanic was the next recovered material type accounting for 9.1 % (n=17) of the debitage. These numbers are an interesting difference between this coastal area and the upland Las Pulgas and Case Springs study units. The projectile point was also made from PDL

chert. Marine shell recovery included *Chione sp.*, *Argopecten sp.*, *Ostrea sp.*, and *Donax gouldii*. Small mammals dominated the recovered faunal material and only two bones of fish were recovered. The dates from this site are consistent with the Later Holocene ranging from 770 B.P. – 520 B.P. to 680 B.P. – 550 B.P. and indicate it was used over relatively short period of time and then abandoned. Based on the C14 dates the site was occupied at the end of the extended drought episode.

Site number	Debitage	Ground stone	Flake tool	Percussion tool	Projectile point	Ceramic	Vertebrate fauna	<i>Donax gouldii</i>	<i>Pecten sp</i>	<i>Chione sp</i>	Macrobotanical
CA-SDI-4417	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N
CA-SDI-4416	Y	Y	Y	Y	N	N	Y	Y	N	Y	Y
CA-SDI-14751	Y	N	N	N	N	N	N	N	N	Y	N
CA-SDI-14749	Y	N	N	N	N	N	N	Y	Y	Y	N
CA-SDI-14748	Y	Y	Y	N	N	N	N	N	N	Y	N
CA-SDI-12569	Y	N	Y	N	Y	Y	Y	Y	Y	Y	Y
CA-SDI-12628	Y	Y	N	Y	N	N	Y	N	Y	Y	N
CA-SDI-13936	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y
CA-SDI-15936	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y

Table 3.15 Material Recovery Santa Margarita Study Unit Milling Dinner Camps.

Site CA-SDI-12569 is a fairly large (60 m by 30 m) Dinner Camp site. It was test-excavated using 31 shovel test pits and three standard one meter square test units. Based on the excavation results the midden soil depth is between 30 to 70 cm. (York 2011). A wide range of artifacts were recovered (Table 3.15) including 2059 pieces ofdebitage, two bifaces, 21 whole and fragmented projectile points, three flaked lithic tools, 35 ceramic sherds, three fragments of one or more ceramic pipes, one ornament fragment, 404 g of shell (dominated by *Donax sp.* (96 %) and over 11,000 g of fire affected rock.

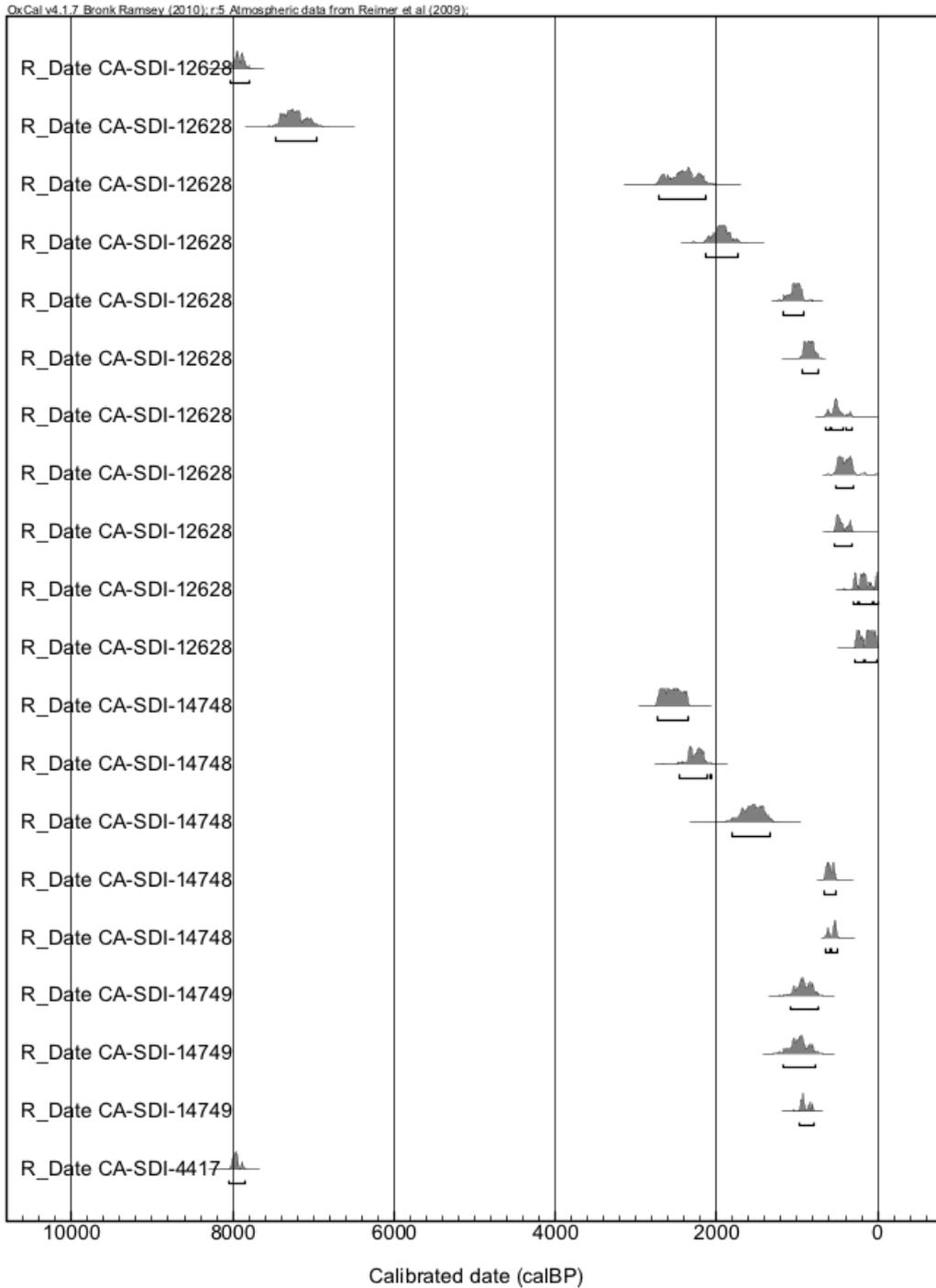


Figure 3.32 Santa Margarita River Dinner Camp –The dates are from unit levels and column samples. CA-SDI-4417 shows a single date inversion of a Late Holocene date at the same level as a Middle Holocene date. The other dates are internally consistent and are consistent between the sites (See Appendix Table N).

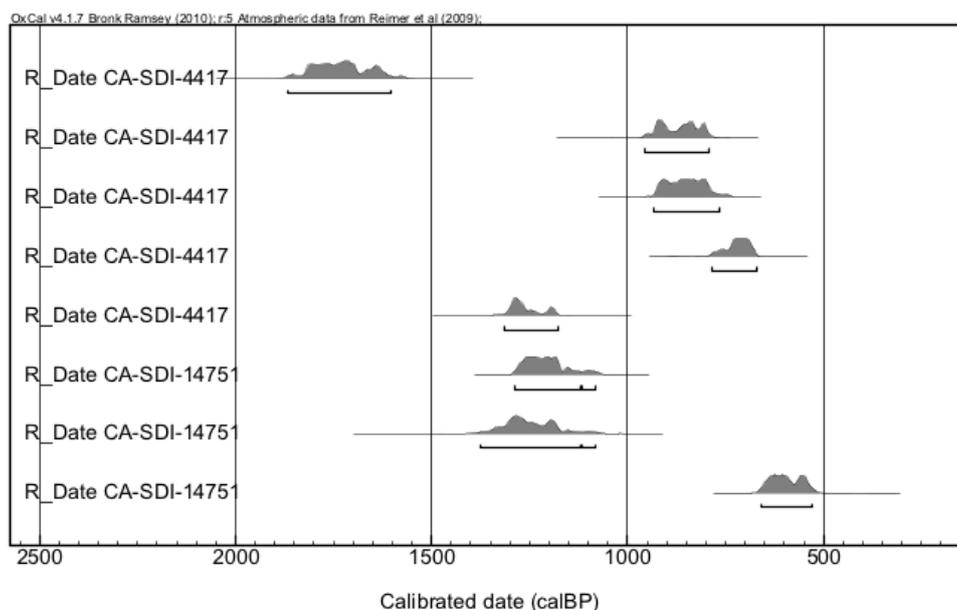


Figure 3.32 (continued) Santa Margarita River Dinner Camp.

Quartz dominated the lithic types found at the site ($n=68.3\%$) followed by PDL chert at 18.3% (York 2011:8-4). The ceramic pipe fragments represent an artifact not necessarily common in Late Holocene sites in northern San Diego County (True *et al.* 1974). The fragments include a flange or perforated lug handle, a portion of the pipe bowl and a fragment of the pipe body. (York 2011:8.9). Faunal remains include coyote, deer, jackrabbit, mouse, pond turtle, and bony fish. Two shell dates place this site firmly in the late, Late Holocene (280 B.P.-50 B.P. /30B.P.-0 B.P and 300 B.P.- 90 B.P. York (2011:8-14) has hypothesized that this site may be a subsidiary site to the much larger residential base and ethnohistoric village known as Topomai (CA-SDI-10156) (York 2011:8-14).

CA-SDI-4417 is one of the largest and most complex of the Dinner Camp/Milling sites along the Santa Margarita River. It is on two terraces west of the Santa Margarita River and measures 170 m north/south by 65 m east/west. The focus of activity is on the upper terrace (York 2010:60). Test excavation by York in 2010 revealed depth of 70 cm. with most archaeological material recovered in the upper 40 cm. including 241 debitage, three projectile points (only one identifiable – Cottonwood triangulate), one core, two

hammerstones, twelve groundstone, five shell beads, nine ceramic sherds, 18,940 g of fire affected rock, 319 g of bone, and 47,531 g of shell (Table 3.15). Metavolcanic material was the dominate lithic type and Piedras de

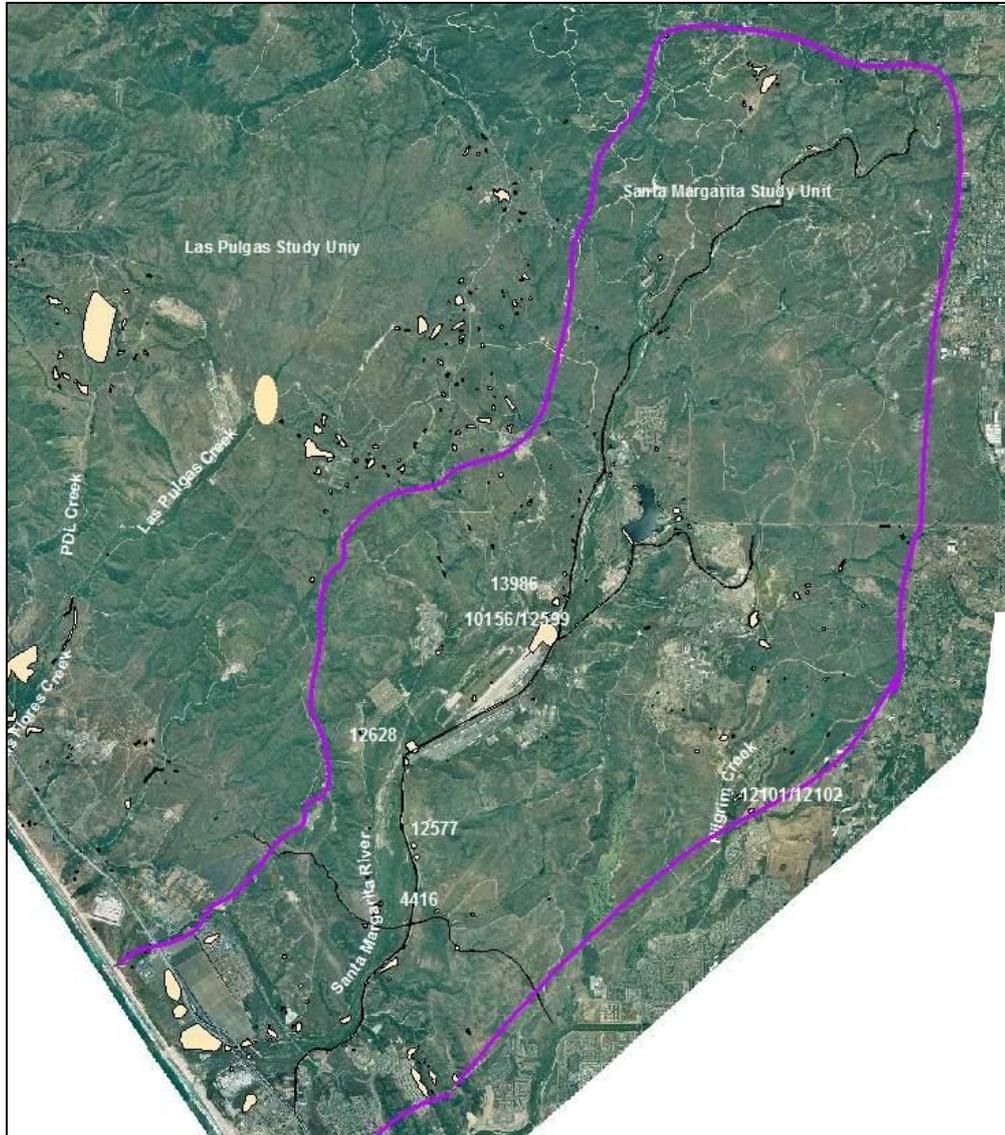


Figure 3.33 Early and Middle Holocene Sites – Santa Margarita River (Map prepared from Camp Pendleton CRM database by Stan Berryman 2014).

Lumbras was the least with 0.8 % of the lithics present. One of the projectile points was PDL Chert and two were quartz. *Donax gouldii* is the dominate

type of shellfish remains (n=52.7%) followed by *Chione sp.* and *Argopecten sp.*

Of the Dinner Camp sites only CA-SDI-4417 (Table 3.15) showed any evidence of ceramics although other sites (CA-SDI-12569, 12628, 14749, and 4416) are dated within the time period for pottery in this region of southern California. Three Dinner Camp sites CA-SDI-12628, 4416 and 4417 exhibit Middle Holocene use. The early dates show a use of the area when the Ysidora Basin was filled with saltwater and ringed by extensive wetlands (Davis 2005). The Middle Holocene dates range in these sites from 7915 B.P. - 7755 B.P. at CA-SDI-4416; from 7540 B.P. - 7320 B.P. at CA-SDI-4417; and from 6825 B.P. - 6265 B.P. at CA-SDI- 12628. A break in occupation of 3,000 to 6,000 years is noted in CA-SDI-12628 and 4416 by which time chaparral vegetation communities have been well established within the river basin (Byrd 2005). There is evidence of date inversion in CA-SDI-4417 where a Late Holocene radiocarbon date of 480 B.P.-290 B.P. was recovered at 60-70 cm the same as a Middle Holocene date. The other four dates demonstrate internal consistency. This inversion may be due to rodent activity.

3.6.1.3 Residential Bases

There are six Residential Bases in the Santa Margarita River Study Unit. Five of these are on terraces or knolls overlooking the river. One is on a hill overlooking the Pilgrim Creek. They range in age from the Middle Holocene 7705 B.P.–7235 B.P. to the late, Late Holocene 280 B.P.–170 B.P. (Figure 3.33).

CA-SDI-14170 located just south of CA-SDI-14751 is on a terrace east of the Santa Margarita River. The depth of site deposit is 150 cm. The greatest recovery was between 50-140 cm depth. Marine shell was recovered in the largest quantity followed by debitage flakes, fire-affected rock and faunal bone. PDL chert accounted for 74.8% (n=338) of the total lithic recovery followed by metavolcanic at 13.9% (n=63) with lesser amounts of quartzite and quartz. Seven groundstone mano fragments were found. Two *Olivella sp.*

shell beads and a single fragment of worked bone was found within the site midden. Over 6,000 grams of *Chione sp.* and 5000 grams of *Donax sp.* shell were recovered with lesser amounts of *Argopecten sp.*, *Ostrea sp.*, and *Tivela sp.* Rabbit (n=659) and other small mammals (n=2004) along with 14 marine fish bones were identified. The radiocarbon dates put this site into the Late Holocene time period from 1285 B.P.–790 B.P. to 670 B.P.–385 B.P., and points to abandonment nearly 400 years B.P.

Site CA-SDI-10156/12599/H is one of the largest Residential Bases on Camp Pendleton. It is the location of the ethnohistoric Luiseno Indian village of Topomai. According to Johnson and O'Neill (1998) Topomai had the largest Luiseno Indian population at the time of the colonization of Alta California. The site (Figure 3.34) consists of four separate prehistoric loci (York *et al.* 2002). Locus A, which measures 1500 square meters, is on top of a knoll that overlooks the bend in the Santa Margarita River and the floodplain to the southwest. This locus has evidence of Late Holocene/Late Prehistoric and Middle Holocene/Early Archaic. The Middle Holocene component dates from 7705 B.P.–7235 B.P. to 6165 B.P.–5885 B.P. Evidence from the excavation of this area indicates that the Late Prehistoric component is superimposed on the Early Archaic component. It is topped by the large Mexican/American Period ranch house, driveways, lawns and flower gardens. The Middle Holocene component is confined to the knoll top Locus A. Locus B, covering 15,700 square meters, is in the floodplain of the Santa Margarita River. It dates from the very Late Prehistoric to the ethnohistoric. Excavation exposed heavy concentrations of *Donax gouldii* and Tizon brownware potsherds (Table 3.16). Locus C is along the western edge of the knoll on which Locus A is located. It covers an area of approximately 6400 square meters and contains Late Prehistoric and historic artifacts. Locus D is located along the Camp Pendleton Air Station runway and is buried under a thick layer (50 to 100 cm deep) of alluvium. Because of its location and the depth of the alluvium the full dimensions are not known. It is estimated to be 175 m north/south dating 665 B.P.–530 B.P. and 280 B.P.–170 B.P.

Excavation results at Locus A by York *et al.* (2002) point to a high artifact density not often seen on Camp Pendleton Sites. Fifteen 1x1 m units were excavated in this locus. Depth ranged from 10 cm to 150 cm. At 3,657 items lithic debitage was the most common artifact (York *et al.* 2002:8-1) followed by 1,231 pieces of Tizon brownware pottery. Because pottery is a late arrival in Northern San Diego County (post 400 B.P.) the large quantity of potsherd points to a very late occupation of the site. Other artifacts included, “ ... five bifaces, six cores, one projectile point fragment, 21 hammerstones, 20 flake tools and 56 pieces of groundstone” (York *et al.* 2002:8-1). The groundstone included *manos*, pestles, *metates*, and mortars. Objects of personal adornment were recovered including six beads. The beads included two *Olivella sp.*, one stone and three historic glass beads. Sixty-four percent (n=2341) of the debitage was metavolcanic, quartz 19.4% (n=709) and 12.7 (n=464) was PDL chert. Thirteen pieces of obsidian were recovered. Geochemical sourcing indicated that four pieces came from Obsidian Butte east of San Diego near the Salton Sea in Imperial County and two pieces came from the Coso Volcanic Field 420 km to the north in the northern Mojave Desert in San Bernardino County (York *et al.* 2002:8-11). The other

Site number	Debitage	Ground stone	Flake tool	Percussion tool	Ceramic	Milling feature	Vertebrate fauna	Invertebrate fauna	<i>Donax gouldii</i>	<i>Pecten sp.</i>	<i>Chione sp.</i>	Macrobotanical
CA-SDI-14170	Y	N	N	N	N	N	Y	Y	Y	Y	Y	N
CA-SDI-14060	N	N	N	N	N	N	N	N	N	N	N	N
CA-SDI-13986	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N
CA-SDI-12572	Y	Y	Y	N	N	N	N	Y	Y	Y	Y	N
CA-SDI-12100	Y	Y	Y	Y	Y	N	N	Y	N	Y	Y	N
CA-SDI-10156/12599/H	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N

Table 3.16 Material Recovery Santa Margarita Study Unit Milling/ Residential Base.

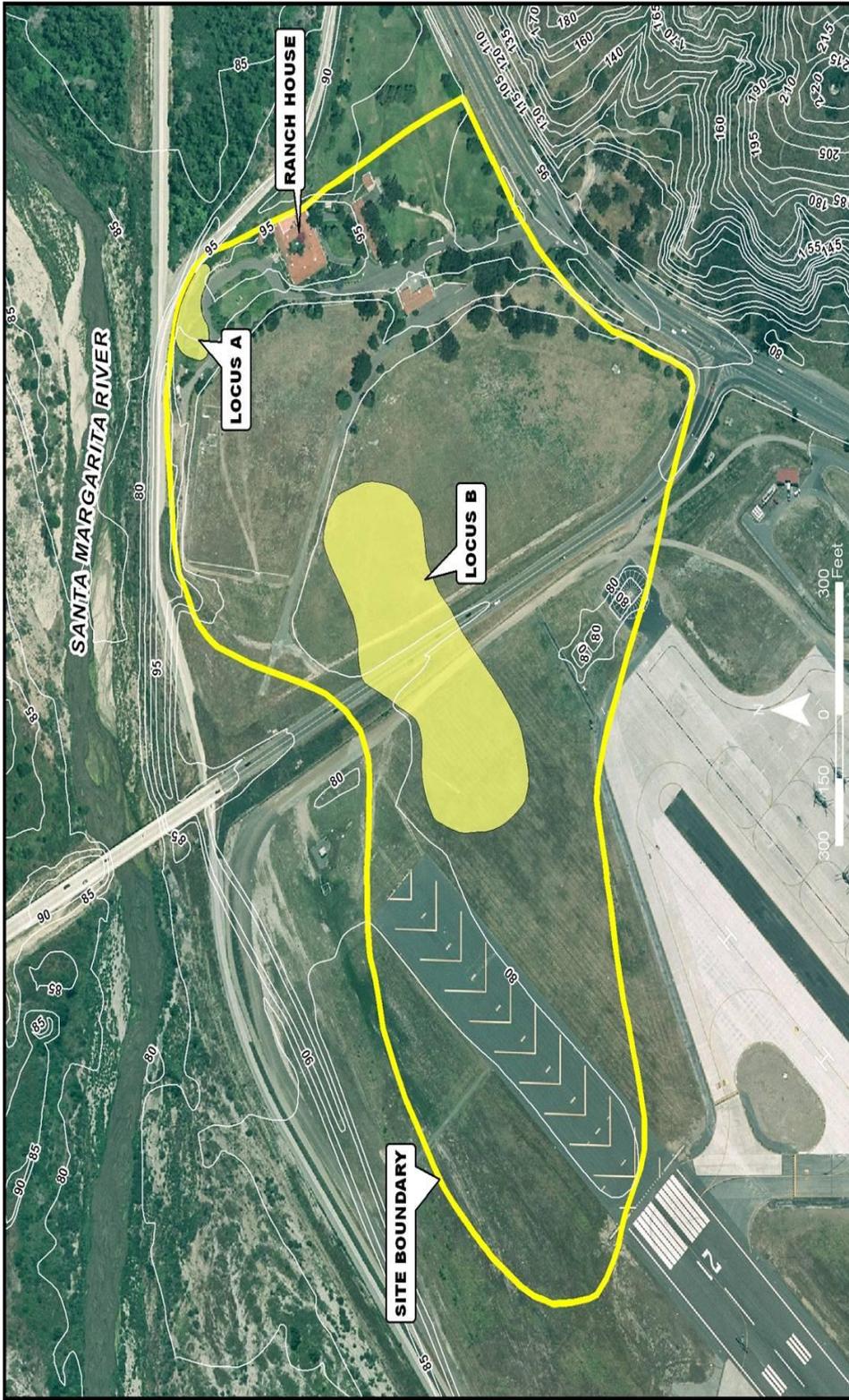


Figure 3.34 Aerial View of CA-SDI 10156/12599/H. (Map prepared from Camp Pendleton CRM. database by Stan Berryman 2014)

pieces were too small for chemical sourcing. Faunal bone fragments included 13,617 items. The animals represented include black-tailed jack rabbit, California ground squirrel, desert cottontail, brush rabbit, coyote, mule deer, pocket gopher, pond turtle, and raven.

York *et al.* (2002) conducted a sample analysis of the two cultural components within Locus A. They found that 53% of the debitage, 66% of the flaked tools, 42% of the groundstone and 45% of the bone came from the Early Archaic component. Surprisingly the lithic material type was nearly evenly split between the two components in the sample analysis as is seen in the following table. Metavolcanic was the most used lithic material in both components followed by quartz then PDL Chert. It is interesting to note the PDL chert was 13.2 % of the lithic sample in the archaic, and 12.1 % of the recovered lithic items (Table 3.17) in the Late Holocene component. PDL Chert is not a common item in Archaic sites as shown in the previous section.

Shellfish remains show a slight variation between components with Venus clam dominate in both. The greatest variation is in *Donax gouldii* which comprises 0.3% of the Middle Holocene component and 18.8% of the Late Holocene. Based on the results of the York *et al.* study (2002) Locus A was used as a residential base at separate times in the Holocene. Locus B is just southwest of the knoll on which Locus A is located. The adjacent Santa Margarita River has deposited a thick layer of alluvium on top of the cultural deposit. Forty-three excavation units were excavated in this Locus exposing 51 flaked stone tools; 801 potsherds; 10 fragments of groundstone; six bone tools; three hammerstones; 4,260 pieces of lithic debitage; 858 g of bone and 202 g of marine shell (York *et al.* 2002:0-1). There are 32 projectile points including 15 Cottonwood Triangulate. The remainder of the points were too fragmentary to identify. The material of the identified points was 46.6% (n=7) quartz and 33% (n=5) PDL chert. Ten bifaces, six used flakes, three modified flakes and nine flake tools were recovered from Locus B, but 98.6% of the recovered lithics were debitage. The dominant material of the debitage is

quartz (44.4%), metavolcanics (26.1%), and PDL Chert 27.8% (York *et al.* 2002).

Material	Number		Percent	
	Early Component	Late Component	Early Component	Late Component
Chert	9	2	1.7	0.4
Granite	3	4	0.6	0.9
Obsidian	3	2	0.6	0.4
PDL chert	69	56	13.2	12.1
Quartz	99	91	19.0	19.7
Quartzite	7	3	1.4	0.6
Volcanic	331	305	63.5	65.9
Total	521	463	100%	100%

TABLE 3.17 Debitage Raw Materials, Early and Late Component Samples, Locus A (York *et al.* 2002:8-59).

Eighteen rim sherds were found among the Tizon brownware potsherds. They were identified by York *et al.* as coming from constricted pots (n=13) used for cooking, and a vertical-sided bowl. Over 1/3 of the recovered faunal remains exhibited evidence of burning. The species represented include cottontail rabbit, ground squirrel, blacktailed jackrabbit, western pond turtle, badger and coyote. Shellfish remains were dominated by *Donax gouldii* and *Chione sp.* The recovered materials from this locus are consistent with Late Holocene residential bases.

CA-SDI-13986 is a two component site sitting on two terraces 120m north of the Santa Margarita River. It measures 190 x 140m. It is primarily a Middle Holocene residential site with a Late Holocene component. This latter component is likely to be a limited resource area/lithic scatter. The site was excavated using standard one meter square pits and 27 backhoe trenches. The excavation units revealed a site that has Middle Holocene dates of 6913 B.P.–6611 B.P. and 5328 B.P.–4876 B.P. and a broad range of lithic artifacts including 2,636 pieces ofdebitage, eight biface fragments; four discoidals, one small stone bowl, 139 *manos* fragments; 17 pestles; three *metate*

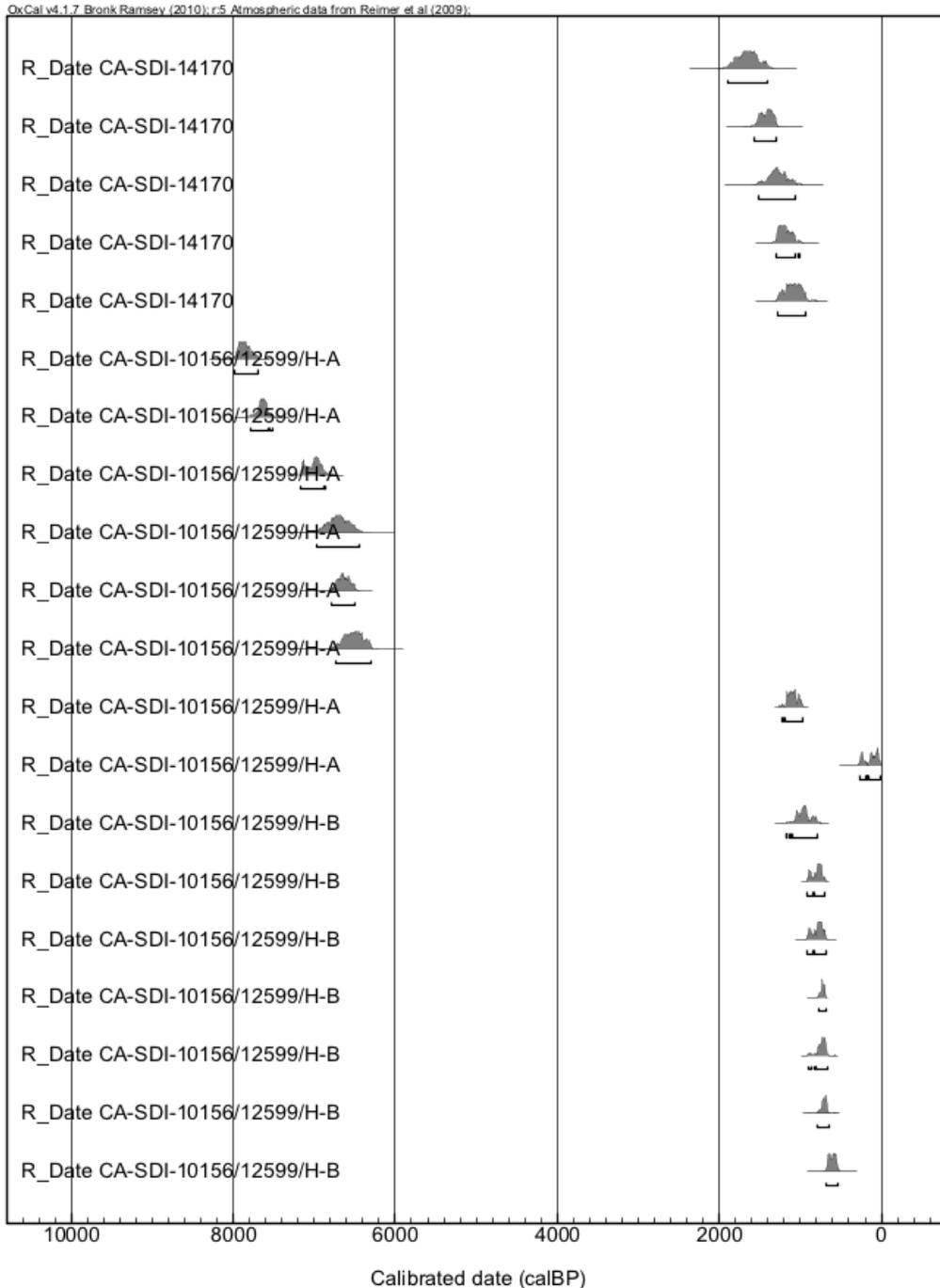


Figure 3.35 Santa Margarita River Residential Bases - These are shell and charcoal dates from unit levels. The dates are sequential except for one date in CA-SDI-10156/12599-A (York *et al.*) which at 90cm deep shows evidence of bioturbation dating to 270 B.P.-205 B.P. (See Appendix Table O).

fragments; two mortars; 62 flake stone tools; two crystals; two tarring pebbles; 30 cores; one steatite fragment; and one abrader. The debitage lithic material was primarily metamorphic (79%, n=2099) with quartz representing 9.9%

(n=261), quartzite was 2.3% (n=60) and PDL chert was 2.2% (n=58). Worked bone in the form of awl tips and a fish bone bead were found during the excavation.

The site has two Late Holocene date of 3700 B.P. – 3514 B.P. and 496 B.P. – 303 B.P. recovered from the layer above a buried rock pile feature. This and the few ceramic sherds (eight pieces of Tizon brown ware was recovered) point to a limited use of this area at a time possibly coeval with the Late Holocene use of CA-SDI-10156/12599/H.

3.6.1.4 Special Use Sites

CA-SDI-9824 is on the southern bank of the Santa Margarita River Bank. It is in a small grove of coastal live oak and *Engelmann sp.* oaks and measures approximately 90m northeast/southwest by 30m on the transverse. The site is composed of a cluster of granitic bedrock outcrops including a standing rock that are 18m above the Santa Margarita River. The site consists of bedrock milling features, a rock ring, rock wall, dark anthropogenic midden soil with a variety of artifact types (Table 3.18), and pictographs on a standing bedrock boulder. The site has undergone multiple evaluation excavations that have included excavation of shovel test pits, one meter square excavation units, mapping, and study of the pictographs. The milling features include seven mortars, 21 slicks,

Site number	Debitage	Ground stone	Flake tools	Percussion tool	Ceramic	Milling feature	Vertebrate Fauna	Invertebrate fauna	<i>Donax gouldii</i>	Macrobotanical
CA-SDI-9824	Y	Y	Y	Y	Y	Y	Y	Y	Y	N

Table 3.18 Material Recovery Santa Margarita River Study Unit Special Use Sites.

and two basin *metates* (Reddy 2000:81, York 2005). A total of 1,114 artifacts have been recovered from CA-SDI-9824, including 92.5% (n=1,031) debitage, two cores (0.2%) 22 bifacially retouched tools (2%), two percussing tools (0.2%), three groundstone pieces (0.3%), one shell bead (0.1%), and 53 potsherds (4.7%). One hundred and seventy grams of small to large mammal bones were found and only 5 g of marine shell fish remains including 2.4 g of *Donax gouldii* and 0.9 g of *Protothaca staminea* and 1.6 g unidentifiable shell fish remains. According to Reddy (2000) PDL chert was the most common lithic material, followed by quartz, metavolcanic, quartzite, and obsidian. Ten projectile points were recovered including one Desert Side Notched-base, three Cottonwood Triangulate fragments, three tip fragments, and two finished Cottonwood Triangulate (one PDL Chert and one clear quartz). A single radiocarbon date of 305 B.P. - 0 B.P. has been recovered. This date is entirely consistent with the Tizon Brownware potsherds and Cottonwood projectile points. The rock art is on a large upright boulder and consists of diamond chains (Figure 3.36) and other non-anthropomorphic figures (Hedges and Hamnan 2000). All of the features are on a single panel and within a declivity on the boulder. According to American Indian elders the site was a woman's rock and the designs and area have special meaning to women (Calac and Cauldell, personal communication 2005). Hedges interpreted the rock art as used in female puberty rights (Hedges 2002).

CA-SDI-9824 has all the characteristics of a Late Holocene Dinner Camp; however, the rock art gives the site a greater meaning. A consideration could be that the site was ritually used for ceremonies directly related to the rock art and is therefore different than other Dinner Camps on Camp Pendleton, or the site was used as a camp at times different from its uses related to the pictographs. Due to this site's isolated setting and the ritual uses of the site, Tilley's approach of experiencing of place might be a tool useful in its analysis (1994).



Figure 3.36 Rock Art Pictograph CA-SDI-9824 (Photograph taken by S. Berryman 2000).

3.6.2 Discussion

3.6.2.1 Radiocarbon Discussion

The radiocarbon dates from the Santa Margarita River study unit as with the rest of Camp Pendleton comes primarily from levels within excavation units and column samples from units. They demonstrate consistency except for the date 270 B.P.-205 B.P. from CA-SDI-10156 Locus A. This date is found in the 90 to 100 cm level which is inconsistent with the Middle Holocene dates found similar deep levels in other units. Another date of 480 B.P.-290 B.P. from CA-SDI-4417 was recovered at the same level as a Middle Holocene date. The unit containing the Locus A date is in a modern rose garden the other sample is also likely the result of mixing due to modern disturbances. The other dates in this Locus are consistent. Sixty of the 76 dates are derived from marine shell, four are from fresh water *Anodonta sp.* shell, 11 from charred organic material or charcoal, and one from bone. They show use extending from the Early Holocene to the Late Holocene. One site (CA-SDI-13936) had dates at the terminal end of the Early Holocene of 8330 B.P.-8050 B.P. to 8400 B.P.-8180

B.P. This site also shows occupation in the Middle Holocene 6930 B.P.-6620 B.P. Use of the Santa Margarita River continues intermittently in the Middle Holocene until approximately 5328 B.P.- 876 B.P. Evidence of short term use at the end of the Middle Holocene is seen at CA-SDI-12632 with a date of 4830 B.P.-4560 B.P. There is over a 2800 year gap before occupation occurs during the Late Holocene. Unlike CA-SDI-811 no site either in the coastal/lagoon aspect of this unit or inland aspect shows consistent reuse from the Middle Holocene through to the Late Holocene. The occupations occur intermittently in the Middle Holocene except at CA-SDI-10156/12599/H where there is evidence of recurring use from 7705 B.P.–7235 B.P. to 6165 B.P.–5885 B.P. The majority of the dated sites fall well within the Late Holocene, accounting for 49 of the dates, and of those most dates fall after 700 B.P.

3.6.2.2 General Discussion

Twenty-five of the Late Holocene determinations post-date 640 B.P. including 16 very late in the Late Holocene sequence, pointing to an expansion taking place in the Late Holocene. This expansion is present in each of the study units discussed. Finding PDL Chert in a Middle Holocene component of CA-SDI-10156/12599 (village of Topomai) is unusual in the relatively high density (exceeding 13%) of the recovered items. The overall size of Topomai demonstrates a congregating of late, Late Holocene people into a more controlled area. It is likely the rock art site CA-SDI-9824 is a ceremonial site associated with Topomai (Hedges 2002).

The river basin and other creeks and streams in the Santa Margarita River Study Unit exhibit evidence of intense use by prehistoric people during the Late Holocene. It is interesting to see that use shows a general pattern of recurring use of the sites within this study unit. Figures 3.38 and 3.37 show the patterns of dated sites within the Santa Margarita River Study Unit. With the exception of CA-SDI-10688 all of the dated Middle and Late Holocene sites are directly adjacent to the Santa Margarita River or Pilgrim Creek. This pattern holds true for all sites within this study unit.

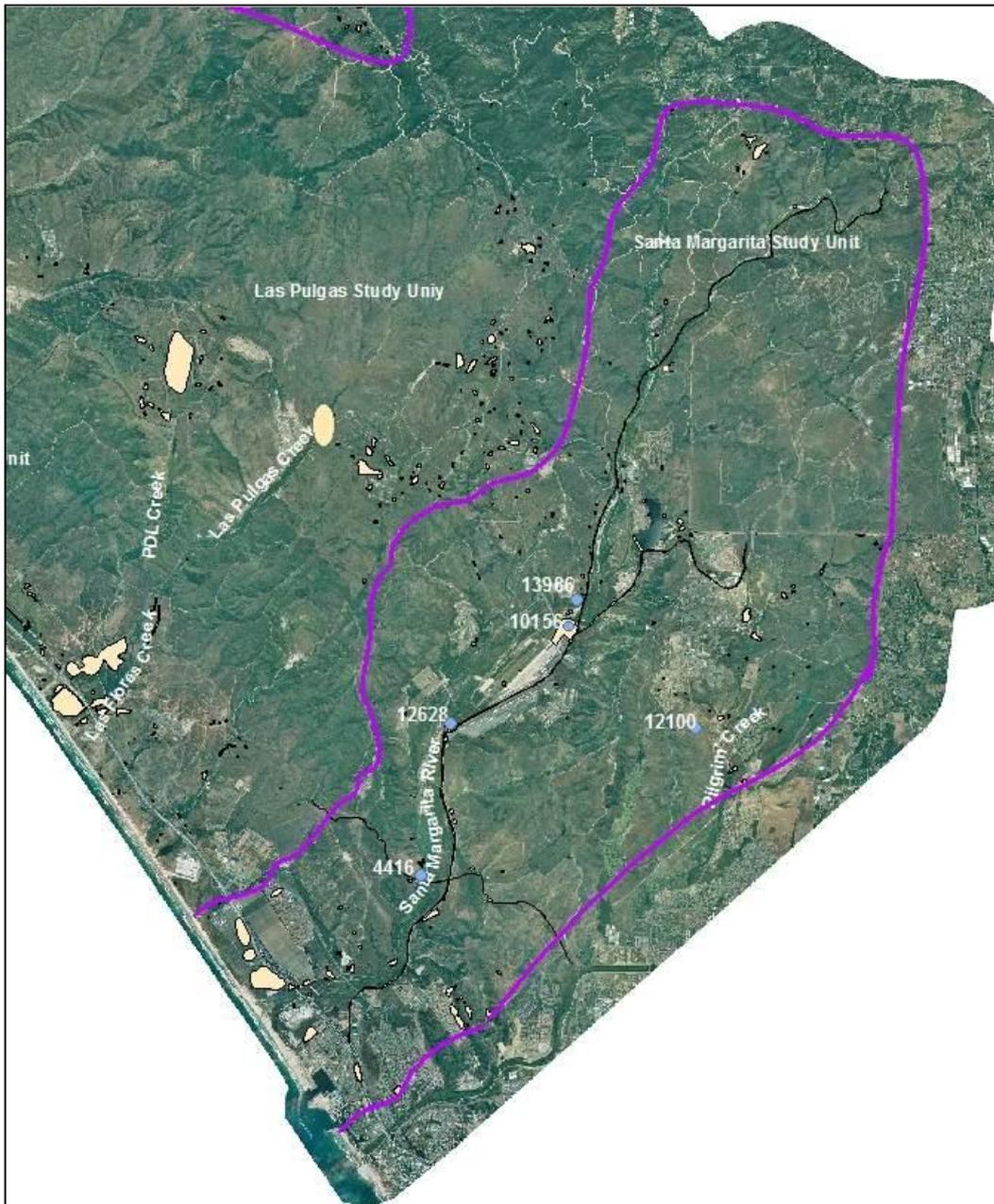


Figure 3.37 Dated Middle Holocene Sites – Santa Margarita Study Unit (Map prepared from Camp Pendleton CRM database by Stan Berryman 2014).

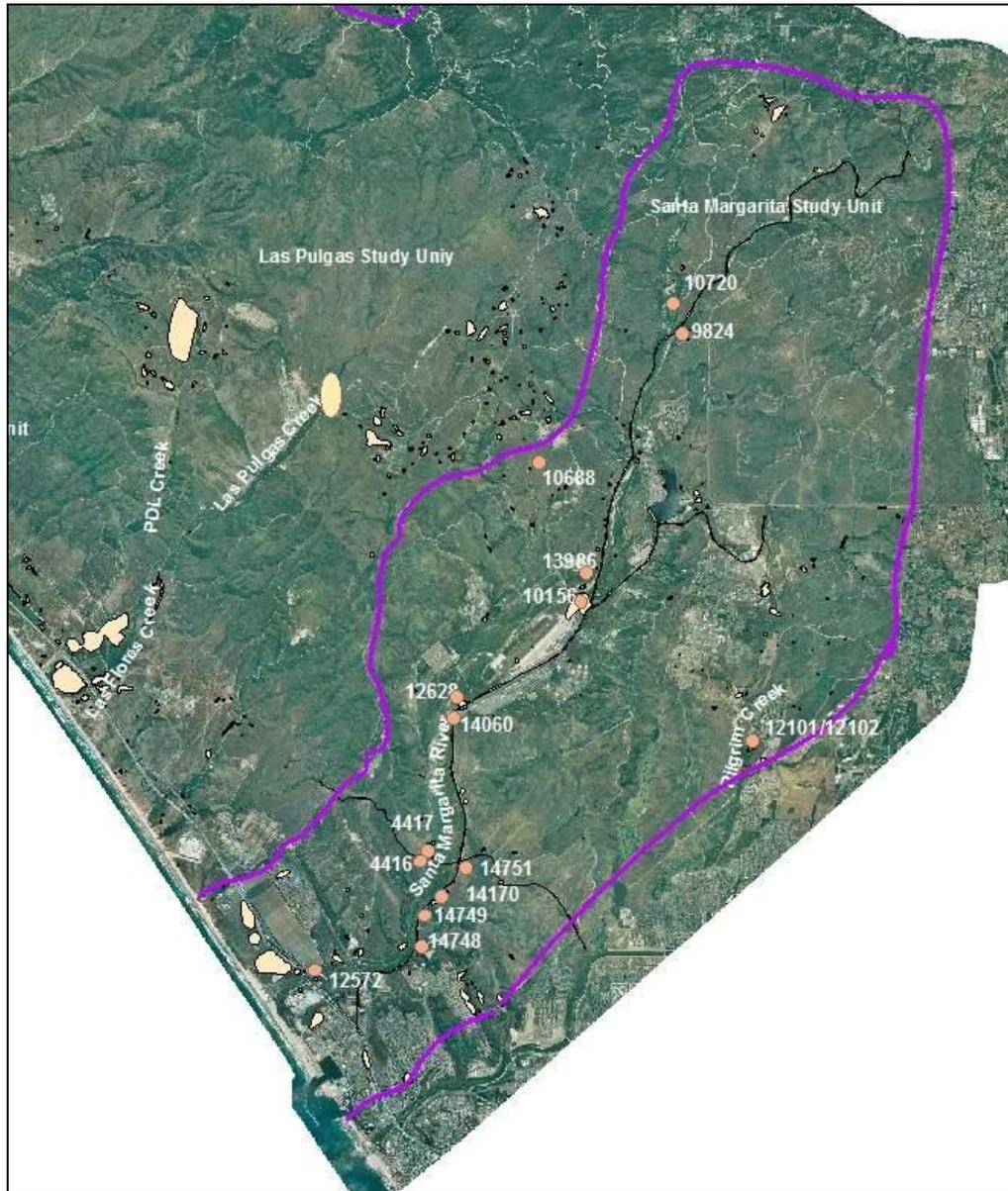


Figure 3.38 Dated Late Holocene Sites – Santa Margarita Study Unit Late Holocene. (Map prepared from Camp Pendleton CRM database by Stan Berryman 2014).

3.7 San Mateo Study Unit

Of the 29 kilometers of coastline on Camp Pendleton three km are within the San Mateo Study Unit (Figure 3.39). The coastal area under consideration is focused around the San Mateo Creek, estuary and uplands, located in the north coastal portion of the Base. This area of the creek on Camp Pendleton consists of a complex of beach, estuary, slough, creeks and cliffs extending

10.6 km inland totaling 24.9 square kilometers. Overall, San Mateo Creek is 35 km long and has a watershed of approximately 360 km². The modern channel of San Mateo Creek is on the western edge of the river valley. As with many rivers on southern California, the San Mateo Creek is dry much of the year. San Mateo Creek is joined by Cristianitos Creek approximately 4.4 km from the Pacific Ocean.

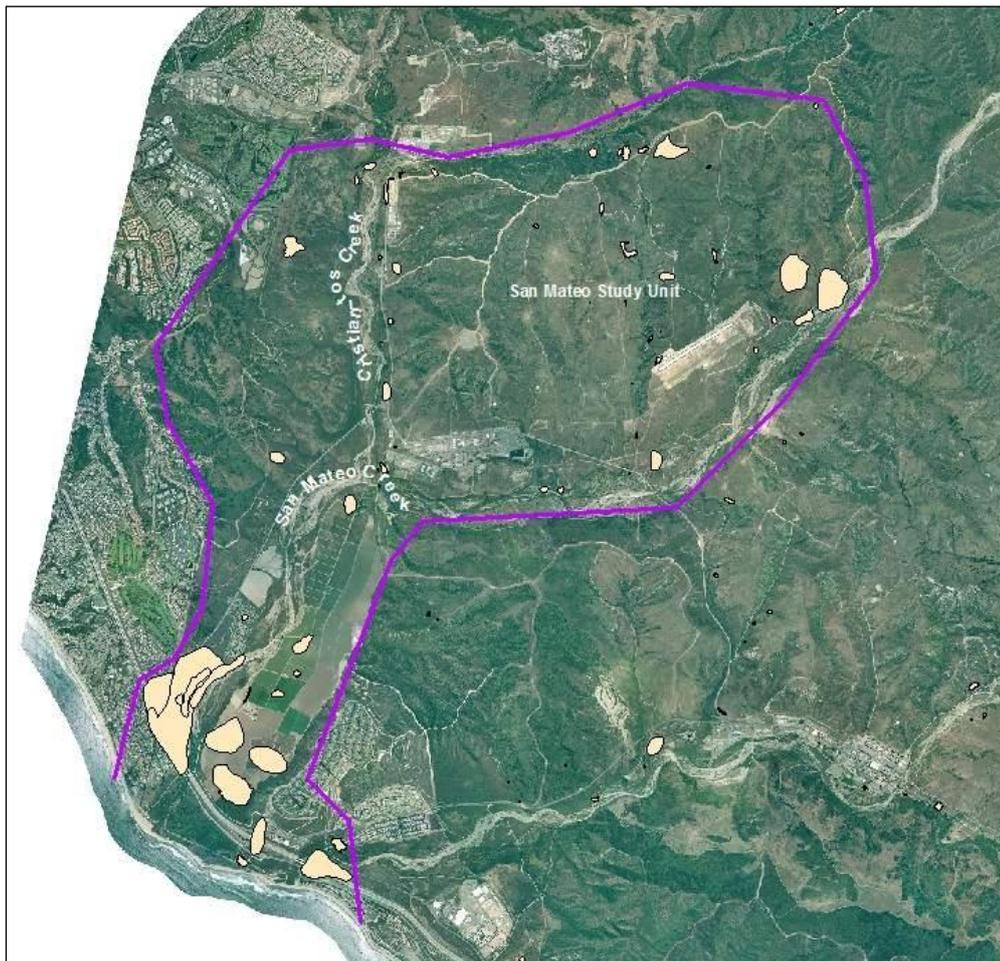


Figure 3.39 San Mateo Study Unit. (Map prepared from Camp Pendleton CRM database by Stan Berryman 2014).

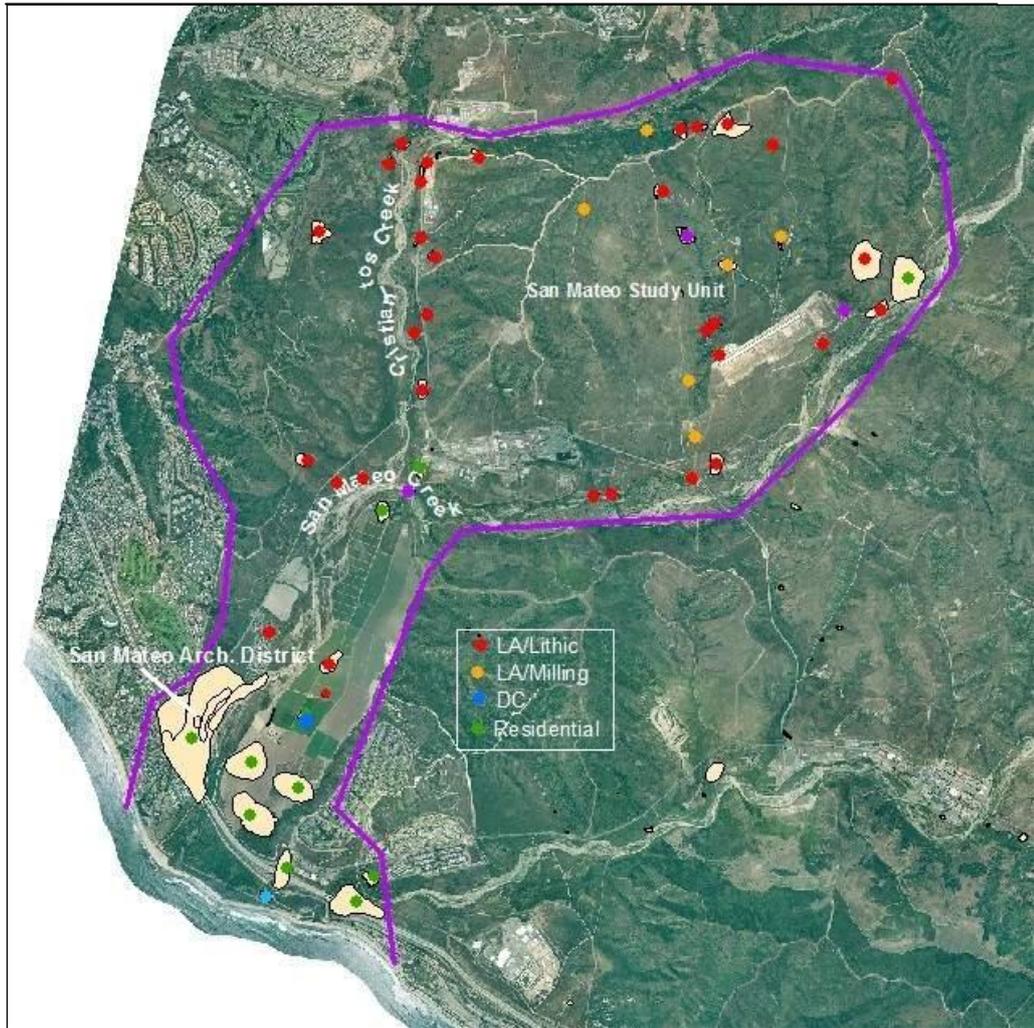


Figure 3.40 San Mateo Study Unit Site Type Distributions. (Map prepared from Camp Pendleton CRM database by Stan Berryman 2014).

3.7.1 Archaeological Sites

As shown in Figure 3.45 the archaeological sites around the San Mateo study unit comprised of the San Mateo Creek and the Cristianitos Creek drainages range from Early to Late Holocene in age. There is a cluster of residential base sites approximately at the southwest end of San Mateo Creek (Figure 3.40). The Dinner Camps and Limited Activity Areas are spread throughout the study unit. Few of the sites have been test excavated resulting in a limited number of dated archaeological deposits (Figures 3.41, 3.40, Figure 3.39, 3.41 and 4.424).

3.7.1.1 Limited Activity Area

The majority of sites within the study unit are Limited Activity Areas. Few of these types of sites have been test excavated in this study unit and only one has been radiocarbon dated (Figure 3.41).

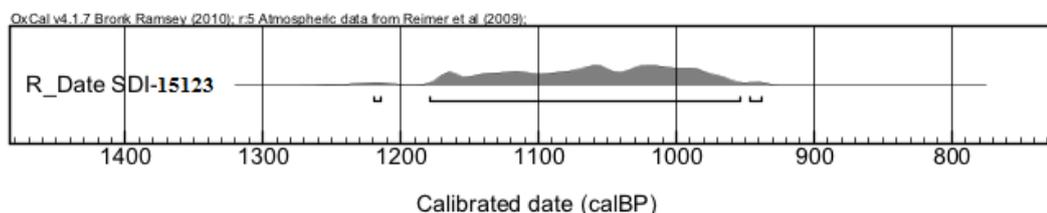


Figure 3.41 San Mateo Study Unit Limited Activity Areas – Date from unit level (See Appendix Table P).

Site CA-SDI-15123 is a shell scatter situated on the alluvial terrace overlooking San Mateo Creek. It is a small site measuring approximately 60 by 65 meters. The site consists of three species of shellfish consisting of *Donax sp.*, *Protothaca sp.*, and *Chione sp.* Lithic artifacts were primarily debitage flakes (Table 3.19). CA-SDI-15123 would have been used on a very limited basis, probably not more than one or two times.

Site number	Debitage	Ground store	Flake tool	Percussion tool	Ceramic	Milling feature	Vertebrate fauna	Donax	Pecten	Chione	Macrobotanical
CA-SDI-15123	Y	N	N	N	N	N	N	Y	N	Y	N

Table 3.19 Material Recovery San Mateo Study Unit Limited Activity Area.

3.7.1.2 Dinner Camp

There are four Dinner Camp sites in San Mateo Creek Study Unit. As shown in Figure 3.40 they are along San Mateo Creek. Only one of the Dinner Camp sites has been dated (Figure 3.43) falling within the Late Holocene at 1280

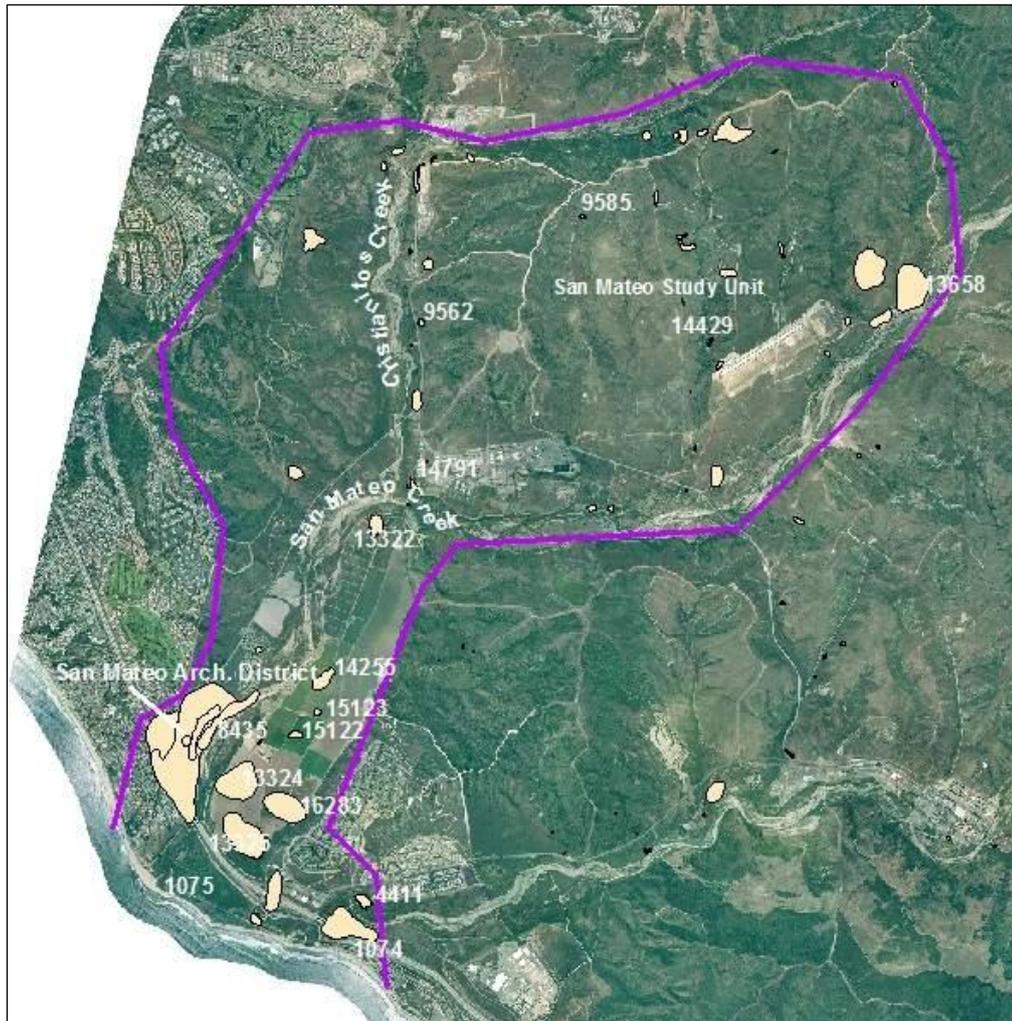


Figure 3.42 San Mateo Study Unit Dated Sites. (Map prepared from Camp Pendleton CRM database by Stan Berryman 2014).

B.P.-1070 B.P. CA-SDI-15122 is on the terrace east of San Mateo Creek within deeply plowed agricultural fields. The soil is a fine sandy loam. Cultural evidence is a scatter of *Donax sp.*, *Chione sp.*, and *Protothaca sp.* Lithic debitage (Table 3.20) is present as are fire hearths in the form of fire-affected rock. One piece of PDL chert was noted among the debitage. The site dates during a wet period in San Diego County.

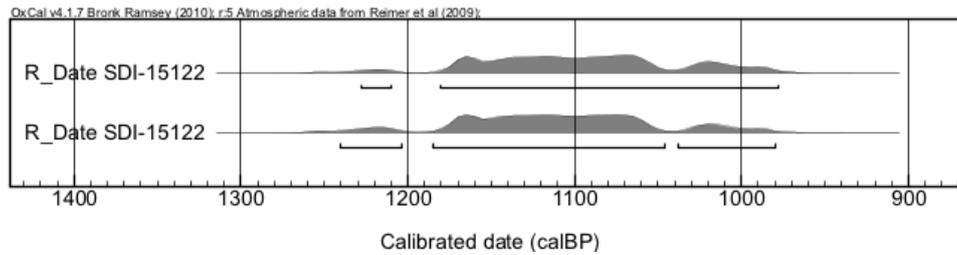


Figure 3.43 San Mateo Study Unit Dinner Camp – Dates are from unit level (See Appendix Table Q).

Site number	Debitage	Ground stone	Flake tool	Percussion tool	Ceramic	Milling feature	Milling element	Vertebrate fauna	<i>Donax gouldii</i>	<i>Pecten sp.</i>	<i>Chione sp.</i>	Macrobotanical
CA-SDI-15122	Y	N	N	N	N	N	N	N	Y	N	Y	N

Table 3.20 Material Recovery San Mateo Study Unit Dinner Camp.

3.7.1.3 Residential Bases

There are eight Residential Base sites within the San Mateo Study Unit. As is shown in Figure 3.40 the sites are distributed within the unit from the coast to the upper reaches of San Mateo Creek. The majority of the sites are within the San Mateo Creek Terraces. The 40 dates come from six of the sites with only two not having multiple dates (Figure 3.44).

Four contiguous sites (Figure 3.40) comprise a large residential base within the San Mateo study Unit; CA-ORA-22, CA-SDI-4282, CA-SDI-4535, and CA-SDI0-8435. Ethnohistorically these sites are the named Luiseno/Juaneno village of Panhe (Johnson *et al.* 1998:32). These four sites make up the San Mateo National Register District and as such, will be discussed under the designation CA-ORA-22. The site is on two Pleistocene marine terraces. It has been test-excavated multiple times beginning in 1973 (ARI), again in 1975 (Welch), 1977 (Cook and White), Romani and White (1980), Hines and Rivers (1991), Strudwick and Gallegos (1994), Byrd (1998), and Romani (1997). The site dates from the Early Holocene (6911 to 6549 B.P.) and the

Middle Holocene (4233 - 3940 B.P.) but with the majority of the occupation in the Late Holocene (1350 B.P.–1000 B.P. to 470B.P.-280 B.P.).

Site number	Debitage	Ground stone	Flake tool	Percussion tool	Ceramic	Milling feature	Vertebrate fauna	<i>Donax gouldii</i>	<i>Protothaca sp.</i>	<i>Chione sp.</i>	Macrobotanical
CA-ORA-22	Y	Y	N	Y	Y	N	Y	Y	Y	Y	N
CA_SDI-1074	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y
CA-SDI-4411	Y	N	Y	Y	N	N	Y	Y	Y	N	Y
CA-SDI-13324	Y	Y	Y	Y	N	N	Y	N	Y	N	Y
CA-SDI-13325	Y	Y	Y	Y	Y	N	Y	N	Y	N	Y
CA-SDI-13658	Y	Y	Y	N	N	N	N	N	N	N	N
CA-SDI-14791	Y	Y	Y	N	N	Y	Y	N	Y	N	Y
CA-SDI-16283	Y	Y	Y	Y	N	N	N	N	N	N	N

Table 3.21 Material Recovery San Mateo Study Unit Residential Base.

The CA-SDI-4282 component rests on the Parry Grove Pleistocene marine terrace north and adjacent to the San Mateo Creek. It consists of a scatter of lithic debitage, groundstone, shellfish remains, and pottery shards (Romani and White 1980 and Hines and Rivers 1991).

The CA-SDI-8435 component of the sites is situated along the San Mateo Creek bank (Figure 3.40). A rock-lined pit, possibly an earth oven or hearth consisting of fire-affected rock, cobbles, ash, and charcoal was noted by Romani and White (1980). Shellfish remains are found throughout the cultural strata dominated by *Protothaca sp.*, with lesser amounts of *Tegula sp.* and *Mytilus sp.* It is made up of shell middens composed primarily of *Protothaca sp.* which are noted in numerous areas of the site. The Late Holocene component comprises shellfish, fish, and terrestrial mammal remains. Ceramics, stone flakes, and groundstone are identified in quantity. According to May (1997) ceramic water canteens and fire carriers identified as Colorado River Buff ware pottery type points to this site having been visited by desert

traders. Evidence of historic occupation comes from an *Olivella sp.* shell saucer bead and two green glass trade beads. This adds some weight to CA-ORA-22 being the site of Panhe village as reported by Kroeber (1925). Two radiocarbon dates using mixed sea shell resulted in dates of 17498 B.P.-5923 B.P.(this spread is too wide to be of use) and 2768 B.P.- 2005 B.P. Radiocarbon dates were obtained during a geomorphological investigation of the terrace on which CA-SDI-8435 rests (Byrd 1983). One dated from a charcoal sample from a hearth at the site resulted in a date of 1291 B.P. - 962 B.P. Three human burials have been exposed by erosion within the site.

CA-SDI-4411 is a small residential base just east of CA-SDI-1074, approximately 0.37 km east of the Pacific Ocean (Figure 3.40). The site is of moderate depth (40cm) and size (60 by 100m). Test excavation (Byrd, Pallett, and Serr 1995) revealed a tool assemblage made up of cores, debitage flakes, used flakes, and percussing tools (Table 3.21). The debitage lithic material type included 70% volcanic rock, 19% quartz and 5% PDL chert. The invertebrate fauna recovered was extensive in the numbers of specie recovered, however *Protothaca staminea* (67%) dominated the recovery by weight followed by *Tegula sp.* (14%) and *Donax gouldii* (7.8%).

CA-SDI-1074 is a residential base just west of CA-SDI-4411 (Figure 3.40) less than 0.04 km from the ocean (Figure 3.40). The site is moderately deep (80 cm) and covers an area of approximately 113,000 square meters. Test excavation by Singer *et al.* (1993) and Byrd *et al.* (1995) revealed a site with limited artifact variability. The artifact assemblage lithic material based on debitage types are predominately volcanic (70%), followed by quartz (20%), chert (3%) and PDL chert (3%). Tools included used flakes, cores, percussing tools, groundstone, and a Cottonwood triangulate projectile point fragment. The invertebrate fauna recovery was dominated by *Protothaca staminea* (8%), and the next most frequent invertebrate specie was *Donax gouldii* (3%). Early extensive excavation of this site in 1964, prior to construction of Interstate Highway 5 which crosses the site, is reported (Hines and Rivers 1991) to have unearthed an extensive artifact assemblage including 135 shell

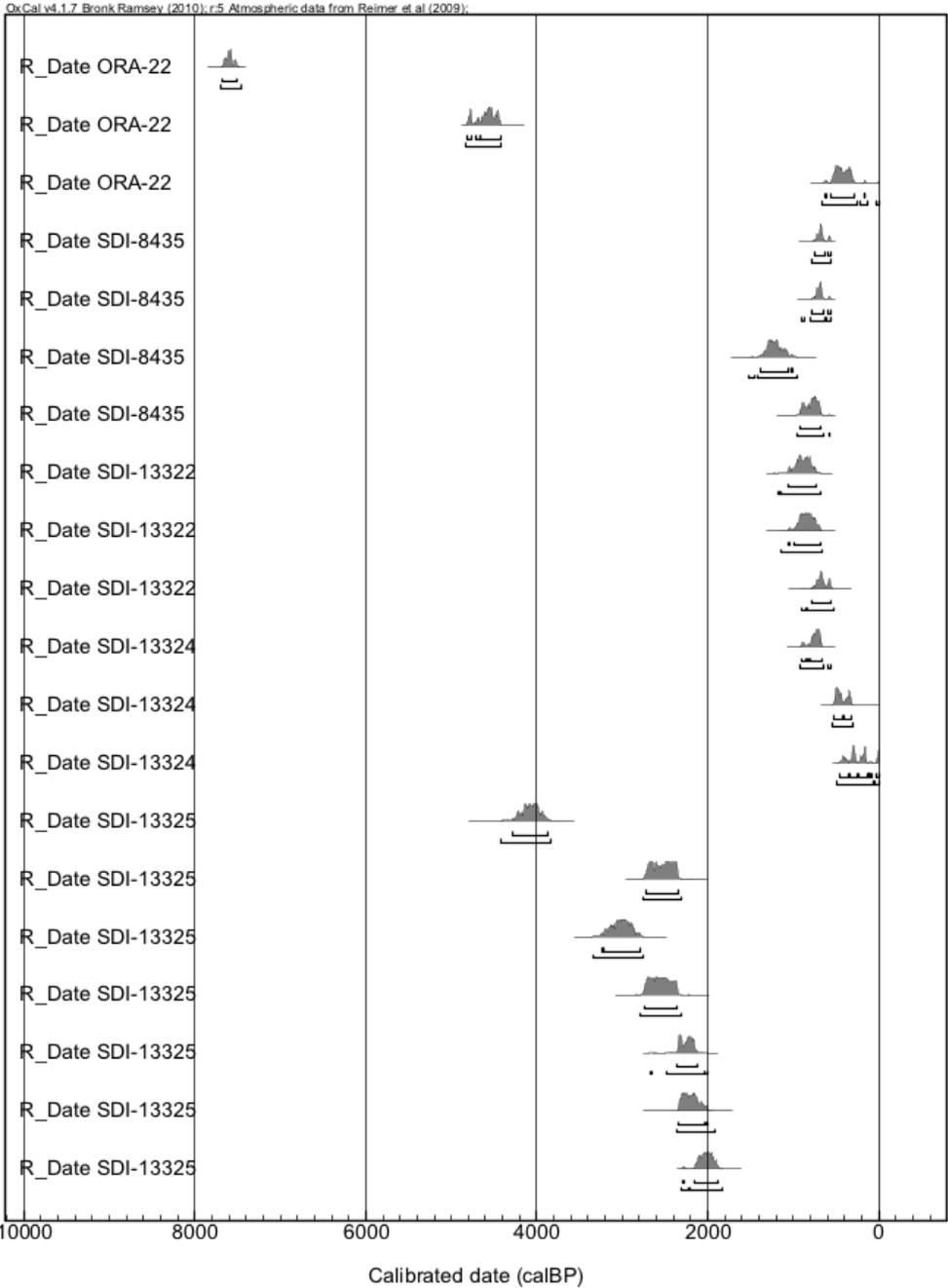


Figure 3.44 San Mateo Study Unit Residential Bases - Dates are from unit levels and from column samples. Radiocarbon evidence points to a lack of consistency internally in CA-SDI-13325. Unit1 (Byrd *et al.* 1995) shows two dates 2750 B.P.-2350 B.P. at 60 to 70 cm and 1440 B.P.-1150 B.P. at 80 to 90 cm. Unit 2 shows a similar date inversion that is likely due to extensive farming over this site. Other residential bases show internal consistency (See Appendix Table R).

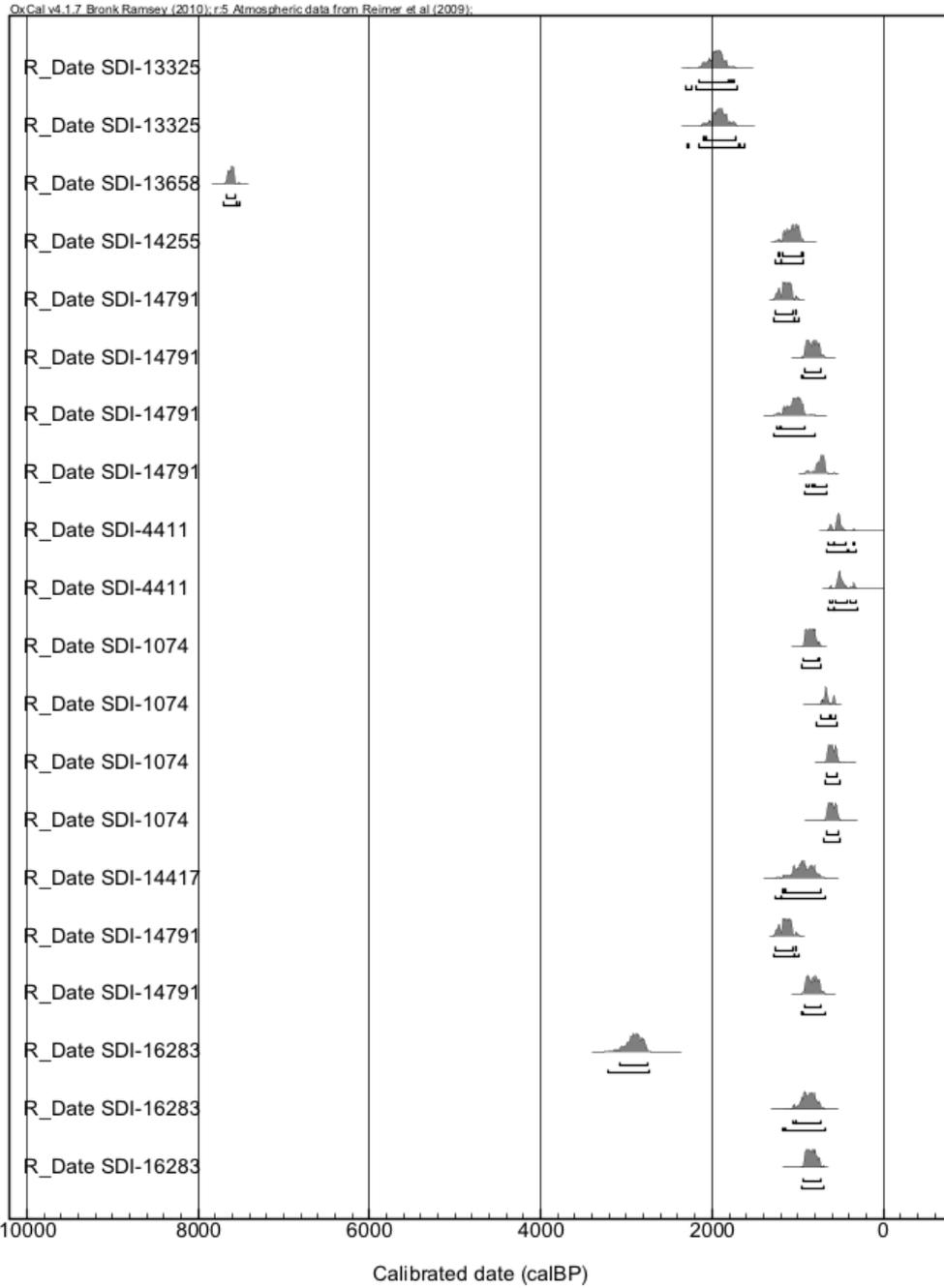


Figure 3.44 (continued). San Mateo Study Unit Residential Bases (2).

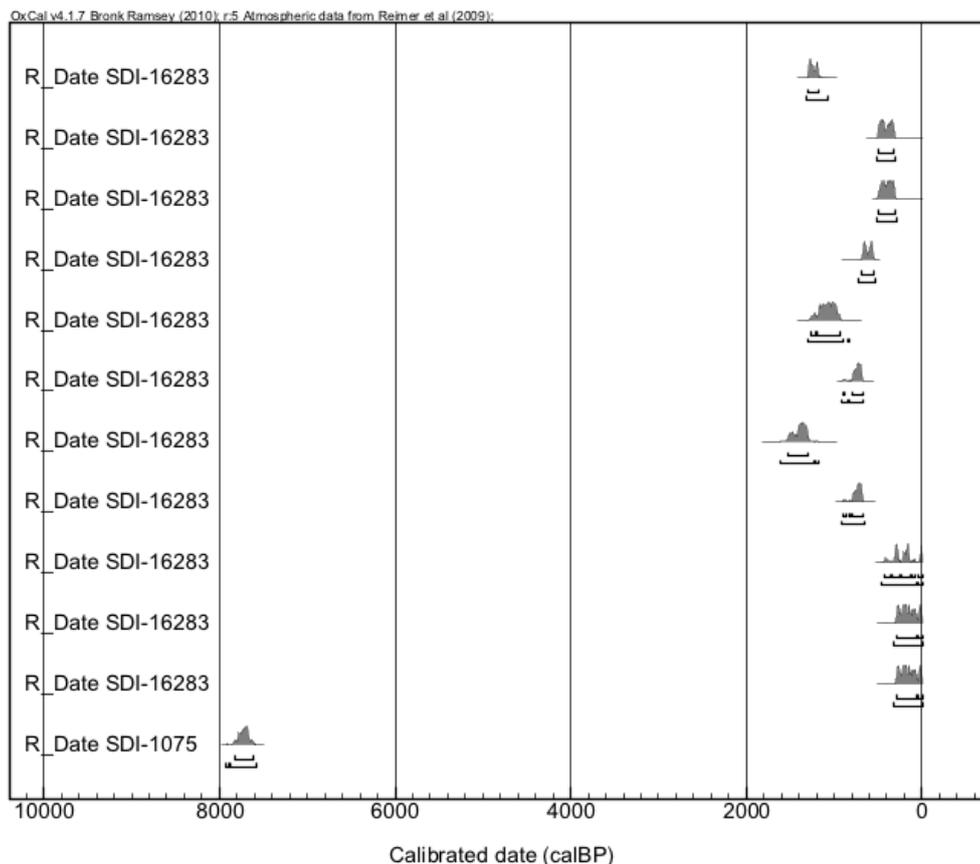


Figure 3.44 (continued). San Mateo Study Unit Residential Bases (3).

beads, 57 shell fish hooks, 81 projectile points, 240 flaked tools and potsherd ceramic fragments. Based on ethnohistoric information from Kroeber (1925) and Johnson and O'Neill (1998) CA-SDI-1074 is the most likely location of the ethnohistoric village of Hechmai. The radiocarbon dates of 460 B.P.- 70 B.P. and 420 B.P.-270 B.P. support this idea.

CA-SDI-14791 is a Residential Base located southern terrace overlooking San Mateo creek. Radiocarbon dates place the site in the Late Holocene. Results from four samples show a range of site occupation 620-530 B.P. to 490-420 B.P. Artifact recovery from test excavations (York *et al.* 2004 and Huntley 2002) included lithic debitage of which 89% is metavolcanic and volcanic material. Other lithic material recovered included cryptocrystalline material, granitic fragments, quartz, quartzite and siltstone (11%). Two cobble-based stone tools were recovered. Fire-affected rock was recorded

from five locations within the site. Interestingly the dominate shell fish remains were from *Protothaca sp.* and not *Donax sp.* As has been shown in the previous research units, *Donax sp.* is the predominate shellfish species on Camp Pendleton. Another anomaly is the seeming lack of PDL chert. Only five pieces were found among the debitage. No projectile points were discovered during the excavations by York *et al.* (2004) and Huntley *et al.* (2002).

CA-SDI-13658 is a Residential Base site on the north terrace overlooking the middle reach of San Mateo Creek. Approximately 1,945 debitage fragments were recovered during test excavation of one meter square units (Shaver and York 2005:33). Volcanic material accounted for 80% of the recovered material followed by metavolcanic (16 %), PDL chert (<3 %), with lesser amounts of quartz, cryptocrystalline, and quartzite (Shaver and York 2005). Twenty-one cores were recovered, along with 60 flaked stone tools, 13 battered stones, 37 groundstone and one stone ball. Over 2,000 grams of fire-affected rock was recovered. A single radiocarbon date of 718 B.P. to 6910 B.P. places this site firmly in the Early Holocene/Archaic time frame. This site's location, along a major creek, date and material remains are similar to CA-SDI-12,100 located along Pilgrim Creek in the Santa Margarita study unit.

CA-SDI-13324 is within the San Mateo Creek watershed sitting on Holocene Terrace 1 (Waters in Reddy 1994). This terrace is 2.5 meters above the San Mateo Creek Channel and is made up of coarse grained channel deposits and fine grained alluvial deposits. According to Strudwick *et al.* (1994) the site has two loci that are distinguished from the rest of the site by dense concentrations of artifacts. CA-SDI-13324 is a late, Late Holocene residential base and exhibits a wide variety of artifacts including Cotton triangulate arrow projectile points. Other artifacts include milling implements (manos and *metates*), used flakes, retouched tools, cores, shell fish hook fragments, and shell beads. The most common lithic material type was metavolcanic, then quartz and quartzite. PDL Chert accounted for less than 4% of the recovered material. Large quantities of shellfish are present at the site with *Protothaca*

staminea accounting for over 80% with *Tegula sp.* being the next most prevalent species. The site dates are from 775 B.P.-645 B.P., 520 B.P.-305 B.P. and 420-0 B.P.

CA-SDI-13325 is within the San Mateo Creek water shed sitting on Holocene Terrace 2 (Waters in Reddy 1994) about five meters above the creek channel. The site has two high density concentrations of cultural objects (Byrd, Palette, and Serr 1995). Lithic debitage makes up over 90% of the artifacts recovered during test excavation (Byrd *et al.* 1995:94). Other objects recovered include cores, used flakes, retouched tools, milling implements, modified shell ornaments, modified shell and bone, steatite and one fragment of ceramic. The primary stone type used in tool manufacture was volcanic material followed by quartz and then PDL chert which accounted for 0.02% of the lithic material at CA-SDI-13325. Large quantities of *Protothaca staminea* were found during excavation amounting in over 15,000 grams and 54% of the shellfish remains. *Mytilus sp.* accounted for 8% and the second largest recovered shellfish species. *Donax gouldii* was found to be nearly non-existent accounting for less than 0.01%. The site has been extensively radiocarbon dated with the earliest date from the earliest part of the Late Holocene (4260 B.P.-3060 B.P.). There is a suite of dates that show nearly unbroken intermittent use from 2750 B.P.-2350 B.P. to 1380 B.P.-1250 B.P. however Unit 1 (Byrd *et al.* 1995) shows an inversion of two dates 2750 B.P.-2350 B.P. at 60 to 70 cm and 1440 B.P.-1150 B.P. at 80 to 90 cm. Unit 2 shows a similar date inversion. This is likely due to extensive farming over this site making internal consistency of this site suspect.

CA-SDI-16283 is also within the San Mateo Creek water shed sitting on Terrace 2. It is a relatively large site measuring 410 by 220 meters. This site was discovered during monitoring of a grading during construction of sewage treatment ponds. It appears to be a prehistoric residential base and cemetery consisting of 12 flexed inhumations. There are 23 stone features that, while not investigated by the archaeologists monitoring construction of water treatment ponds, appear to have been stone hearths as reported by Byrd and

Huntley (2002). There is the density and range of artifacts that would be associated with a residential base including 244 flaked stone tools and debitage (Byrd and Huntley 2002:174). Debitage accounted for 60% of the artifacts, bifacial and unifacial retouched tools (8.7%), used flakes (0.3%), cores (6.8%), milling equipment (5.9%) and percussing tools (8.8%). In

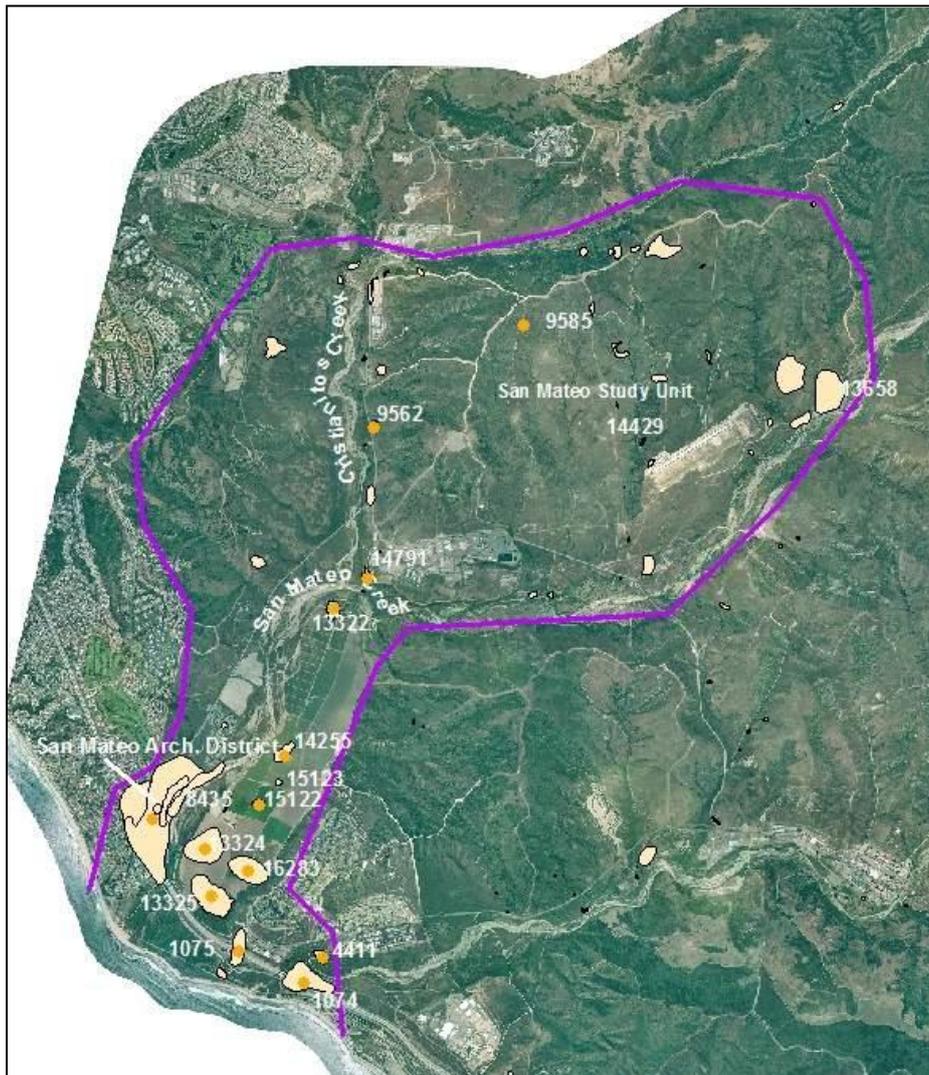


Figure 3.45. Late Holocene sites San Mateo Study Unit (Map prepared from Camp Pendleton CRM database by Stan Berryman 2014).

addition a steatite bowl, four ceramic fragments, a shell bead and shell fish hook fragment were recovered. The lithic material types were dominated by metavolcanics (39%) and quartz (35%). PDL chert accounted for only 4.4% of the recovered artifacts. The most common shellfish remains were *Protothaca*

staminae and *Tegula* sp. accounting for 1136 grams and over 50% of the recovered invertebrate remains. *Donax gouldii* accounted for 0.03% of the shellfish remains. This site has one date from 3070 B.P.-2760 B.P. and then a break until 715 B.P.-545 B.P., 510 B.P.-240 B.P. and 455B.P.-240 B.P.

3.7.2 Discussion

3.7.2.1 Radiocarbon Discussion

Thirty-seven radiocarbon dates were noted in this section 21 were derived from marine shell, 14 were from charred material or charcoal, and one was from bone. The sites with multiple dates generally show with the exception of CA-SDI-13325 overall internal consistency. Four dates were recovered from the side wall of the San Mateo Creek by Waters (1996) at CA-SDI-8435 (CA-ORA-22) during a geomorphologic study. The rest were recovered from unit excavations either directly from the unit or from a column sample within the excavation unit.

The majority of the residential base sites date well within the Late Holocene. Site CA-SDI-13324, 13325, and 16283 are located nearly contiguously on the San Mateo Terrace 2 (Figure 3.45). Only one of the sites, CA-SDI-13325 shows occupation fairly consistently from the early part of the Late Holocene (4260 B.P.-3860 B.P.) through the middle part of the Late Holocene (1440 B.P.-1150 B.P.) although the site does demonstrate date inversion in at least four of eight radiocarbon samples.

CA-SDI-16283 demonstrates occupation or use in the earlier part of the Late Holocene (3070 B.P. – 2760 B.P.) but consistent use in the late portion of the Late Holocene and post-droughts (715 B.P. – 545 B.P. to 455 B.P. - 240 B.P.). Only one date falls squarely in the Middle Holocene, the other dates are all from the Late Holocene. Site CA-SDI-13324 shows use during nearly the same time period (775 B.P. - 645 B.P. to 472 B.P. - 0 B.P.). Because CA-SDI-16283 was used as a cemetery it is feasible that it is related to CA-SDI-13324. Although it dates from the early part of the Late Holocene the Late Holocene dates for CA-SDI-16283 are consistent with the Late Holocene dates from

CA-SDI-13324 (Figure 3.45). Site CA-SDI-13322, 13324, 14791, 4411, 8435 (San Mateo Archaeological District) all date post 700 B.P. The residential bases show a pattern of occupation that is not unlike that of the Red Beach Unit. CA-SDI-13658 and CA-ORA-22 (Figure 3.46) both have dates within the Middle Holocene and CA-ORA-22 also dates to the Late Holocene. The majority of the residential bases radiocarbon date after the end of the major drought cycle and the expansion into the inland areas post 700 B.P.

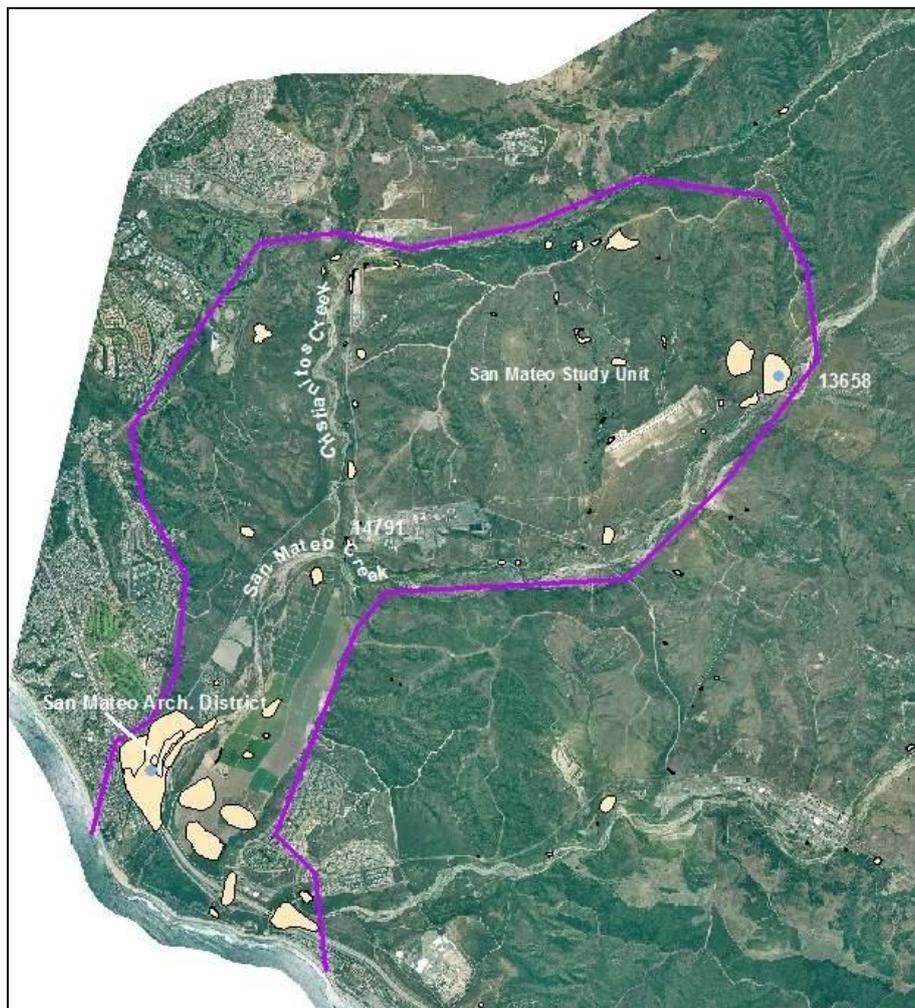


Figure 3.46 Middle Holocene Sites San Mateo Study Unit (Map prepared from Camp Pendleton CRM database by Stan Berryman 2014).

3.7.2.2 General Discussion

As is shown in Figure 3.40 the residential base sites are not distributed evenly across the unit from the coast to the upper reaches of San Mateo Creek and

Cristianitos Creek. The largest and most complex all post-date 700 B.P. and cluster at the southern end of the unit. All of the sites are within the San Mateo and Cristianitos Creek Terraces and the majority are residential bases. The earliest Late Holocene date of the Residential Base sites is 7180 B.P.-6910 B.P. and the latest is 290 B.P. -0 B.P. Twenty-one dates post-date 700 B.P. which suggest residential use of this area fluoresced subsequent to 700 B.P. after the end of a period of severe drought in the American Southwest.

A major difference between sites within the San Mateo Creek Unit and the Las Pulgas, Santa Margarita River and Case Springs Units is the noticeable lack or near lack of PDL chert and *Donax gouldii*. The quantities of PDL chert stone material seen in the San Mateo Study Unit sites are more reminiscent of the Red Beach Unit. While some PDL chert is found, its general lack shows the primary flow of this material was to the east and north, into the interior of the ethnohistoric Luiseno territory and south and east into the territory controlled by the Kumeyaay Indians. It can be hypothesized that this material, because it changed color during heat treating was prized by the occupants of southern San Diego County which resulted in the flow in that direction. *Donax gouldii* may not have been present in any great numbers along this part of the Camp Pendleton coast during the Late Holocene although the conditions should have been present for their harvest. The quantities are smaller in general in the San Mateo Study Unit sites than in some of the inland/uplands Case Springs Study Unit sites.

3.8 Summary

This chapter has presented the data from 88 dated sites located within the Camp Pendleton study area. The discussion started at Red Beach, went up the Las Flores/Las Pulgas Creek continuing to the uplands of Case Spring. The discussion next focused on sites along the Santa Margarita River and ending in the northwest part of the base at the San Mateo Creek. In general terms we can see from this data a pattern of sites that, for most of the history of this area are positioned close to the sources of water and not moving into the inland and upland until very late in the Holocene post 700 to 650 B.P.

Some interesting patterns can already be recognized in the distribution of sites across the landscape, as well as in the occurrence of some of the archaeological elements of special interest to this thesis. For example, *Donax gouldii*, which is so prevalent in coastal sites of Red Beach study unit in the Late Holocene, is rarely encountered in the San Mateo Creek area. Also, there is a large amount of *Donax sp.* found in the inland sites in the Las Pulgas study unit and in the uplands at Case Springs. The distinctive PDL chert, while present in limited quantities in Middle Holocene sites, is much more abundant in the late, Late Holocene, most especially around the quarry at Piedras de Lumbre Hill and at site CA-SDI-19392. The distribution of this chert material has an interesting south and west trajectory of density away from the north and northwest. PDL chert in the San Mateo study unit is nearly absent.

The spread of large residential bases post 640 B.P. into the inland and uplands is clear. The dated late, Late Holocene residential bases in the Red Beach, Las Pulgas, Santa Margarita and San Mateo study units support the idea of a late spread of large, possibly sedentary, residential areas. Movement into the highlands represented by Case Springs study unit is also late in the Holocene. The presence of quantities of *Donax gouldii* and PDL chert demonstrate a connection between the uplands sites with the coastal sites and the Las Pulgas inland sites. Finally, changes in the landscapes that are noted in this chapter become more distinct and will be discussed in greater detail in the following chapters.

Chapter Four Analyses and Discussion

Archaeological sites are contained within cultural and physical landscapes. They are a construct of the archaeologist to aid understanding the cultures under review. Landscapes are the physical and cultural overlays in/on which the sites are found. Taskscapes are made up of tasks “defined as any practical operation carried out by a skilled agent in an environment, as part of his or her normal business of life ... tasks are the constitutive acts of dwelling. ... [T]he taskscape is an array of related activities.” (Ingold 1993:158). Thus there are elements or activities that are indicative of that site, landscape, or taskscape. These elements maybe equated to a biological “indicator” species which are “plants and animals that seem to be the most abundant. These are generally the most conspicuous and can be indicators of a type of ecosystem” (Department of Natural Resources, State of Michigan 2013). Biologists often look for indicator species when determining habitat types or associated soils. Abundant stands of some taller and deeply rooted grasses can indicate a sandy loam type of soil, whereas the presence of shorter grasses indicates sandy soil. Indicator “species” or elements/activities inform and bring attention to certain sites or landscapes. Archaeologically, the indicator elements inform about the landscape, site or taskscape. It depends at what intensity or numbers the indicator is found. These “indicator elements” are seemingly tied with the concept of time which is an indicator element and also a landscape. The radiocarbon dates are indicators of a landscape of time that when combined together with other elements I believe constitute landscapes of time, artifacts and material culture that relate to use activities.

For the purposes of this thesis, the “indicator elements” discussed in this chapter when taken together inform about the cultural changes that took place during the Late Holocene. These elements may be embedded in a physical or cultural landscape or may be indicative of a landscape such as time or climate. One of the elements is the shellfish *Donax gouldii* or bean clam. Piedra de Lumbre chert can be considered a major indicator. It is a multi-hued material found throughout the archaeological record of Camp Pendleton, but

one which exhibits an explosion of use very late in the Late Holocene. Climate as seen in the proxy data of tree-rings is also another indicator which provides information about the landscape in which other elements are located. In what follows below, I examine these three elements or indicators in more detail to show how they contribute more broadly towards the understanding of cultural change.

4.1 Shellfish

There are four primary shellfish that will be discussed in this section, these are *Chione sp.*, *Argopecten sp.*, *Protothaca staminea*, and *Donax gouldii* or bean clam. *Donax sp.* is a variety of clam most often found in archaeological sites in Camp Pendleton. It is also chronologically significant as an indicator of a Late Holocene site. The bean clam is a small kidney-bean shaped and sized clam that lives within sandy marine beaches buried about 4-5 cm deep. They are found in exposed sandy beaches from the middle intertidal zone to deep on the open coast (Polo 1967 and Morris *et. al.* 1980). These bivalves occupy a narrow band within the intertidal zone exposed at low tide with complete submergence at high tide. According to Morris *et. al.* (1980) they are found from southern California through Baja California and may occur in abundances of up to 20,000 individuals per square meter. *Donax gouldii* makes its appearance in the archaeological context in the study area at approximately 1420 B.P. (Byrd 1996a: 311). Prior to this time it is found in relatively small quantities elsewhere in coastal middens. *Chione sp.* is a marine bivalve mollusk, in the family Veneridae. It is often found between small rocks in the intertidal zone. *Argopecten sp.* is a scallop that usually swims a few feet off the bottom in rocky areas from five to seventy-five fathoms beneath the surface (Fitch 2011) and *Protothaca sp.* or Pacific Littleneck clam occurs in the intertidal zone of estuaries, bays, sloughs and open coastlines within muddy and clean sand environments (Brooks 2001: 3). According to Brooks (2003) *Protothaca sp.* in its northern extension to Alaska is found in gravel, clay and rocky substrates.

Donax sp. as seen in Chapter 3 eases out (Byrd 1996, Reddy 2005, Rosenthal *et. al.* 2001) *Chione sp.* and *Argopecten sp.* as the dominant shellfish in the Red Beach coastal middens, becoming a significant element in the middens and the nearly sole species present in the shellfish camps and Limited Activity areas during the late, Late Holocene. Of further interest is that it is found inland in significant quantities, as seen in the discussion on Las Pulgas and Case Springs study units.

Donax gouldii is found in abundance in Camp Pendleton Late Holocene coastal sites (Becker *et. al.*, Byrd and Reddy 2002, Reddy 1999, 2004 and 2005). It is often the only species found in the small coastal Limited Activity areas and shellfish camps. The coastal Dinner Camps exhibit use starting approximately 1075-925 B.P. As was shown in Chapter 3 there are 23 shell scatters within the Red Beach unit that are limited in size and content. If the three dates of 0 B.P. are thrown out, site dates range from 720-540 to 475-210 B.P. (or A.D. 1230-1410 to A.D. 1475-1746). These sites appear to be intermittently used for a period of 400 years.

One of the shellfish Dinner Camps, CA-SDI-15254 has a Middle Holocene period of occupation solidly documented with six radiocarbon dates ranging from 7890-7320 to 7385-7050 B.P. These dates were derived from charred material and non-*Donax sp.* shellfish. This site was split from site CA-SDI-10726 for management considerations and was designated in 2000 as CA-SDI-15254 (Byrd 2003). It has an upper layer made up of *Donax sp.* with ceramics which overlaid an Early Holocene occupation that was dominated by *Chione sp.* and *Argopecten sp.* The early component of this site also known as the Red Beach Ridge Top Site fits the pattern of residential bases. The Red Beach Study Unit residential sites are often multi-component. As shown in Figure 3.7, sites CA-SDI-811, 10728, 15254, 10723 date from the Early Holocene.

CA-SDI-10728 is a multi-component site. The Early Holocene component dated from 8015-7950 B.P. to 7795-7460 B.P. These Early Holocene dates

were from *Chione sp.* which was the dominate species accounting for 68.7% by weight (Byrd 1997). *Donax sp.* accounted for only 7.6% of all the shell recovered from this early component of the site but 83.7% of the Late Holocene component. The Late Holocene component (Figure 4.1) dates from 720-515 B.P. to 515-275 B.P. (A.D. 1230-1435 to A.D. 1435-1675). These late period dates were all from *Donax sp.*

The Horno Canyon site or CA-SDI-4538 is a Late Holocene site with extensive midden soil covering an area 875 meters by 480 meters. *Donax sp.* is the dominate and nearly exclusive shellfish species found in the Late Holocene midden (Byrd 1996).

Only CA-SDI-811 shows occupation from the Early Holocene, Middle Holocene and ends with the Late Holocene. Site CA-SDI-15254 has a break of about 6,000 years within its occupational history (Rasmussen 1998, Reddy 2004). CA-SDI-10728 has a 3,600 year break, and CA-SDI-10723 shows a 7,000 year break in occupation between the Early and Late Holocene. The reoccurrence of occupation at these sites and the initiation of occupation at CA-SDI-14494 begin at approximately 1100 B.P. to 600 B.P. These dates demonstrate a brief reuse of the sites followed by another hiatus interrupted with clusters of dates at 700-300 B.P. CA-SDI-812 and CA-SDI-10006 are the only residential sites that date solely within the recent Late Holocene. Of interest in this discussion are sites CA-SDI-811 and 812. Occupation at CA-SDI-811 ended around 1385-1135 B.P. and began at CA-SDI-812 beginning around 1182-942 B.P. The only separation between these sites is the modern Interstate 5 highway and the railroad tracks. These two appear to be the same archaeological site with occupation shifting more inland during the Late Holocene. CA-SDI-812 is a large irregularly shaped site of 227,003 square meters (Cagle *et.al.* 1996:38) and consists of five separate loci. This site has been extensively tested for five different undertakings. As was shown in Table 3.6 it consistently dates within the Late Holocene with the cultural periods being the Late Prehistoric to the early ethnohistoric period.

Donax sp. is found in some sites as far inland as Case Springs, 15 km from the coast. The quantities of *Donax sp.* are greater in sites along the middle reaches of the Las Pulgas and Aliso Creeks than at Case Springs. At site CA-SDI-19392 (4665/14566/18990/18990/18991/18992/19392) the shell is nearly exclusively *Donax sp.* amounting to 97% of the shell recovered from the site. It dates within the Late Holocene with the dates ranging from 640-305 B.P. to 540-405 B.P. to 320-0 B.P. If the dates of 0 B.P. 2sigma are excluded the most recent range is 270-50 B.P. Moving up the Las Pulgas Creek to CA-SDI-

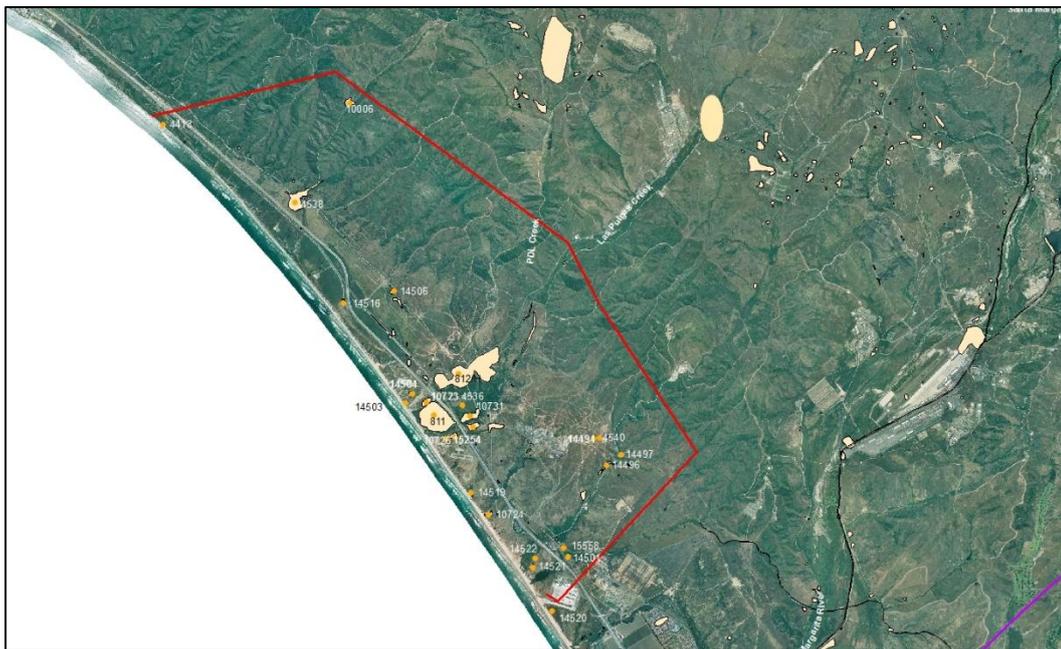


Figure 4.1 Red Beach Dated Late Holocene Sites (Map prepared from Camp Pendleton CRM database by Stan Berryman 2014).

10714 and 14631 (Figure 4.2), *Donax sp.* is found in large quantities. Site CA-SDI-14631, nearly 12 km from the coast, (described above in Chapter 3) has a cupule rock art feature. It dates from 530-420 B.P to 430-110 B.P. SDI-10700 is a Dinner Camp with milling situated in the middle reach of Aliso Creek approximately 12.5 km from the coast. It dates from 490 B.P. to 250 B.P. and 370 B.P. to 0 B.P. CA-SDI-10714 is in the upper reaches of Las Pulgas Creek about 14 km from the coast. CA-SDI-14571 is a Dinner Camp with milling evidence located in the upper reach of Aliso Creek, 14.2 km from the ocean. It dates from 510 B.P. to 310 B.P.

At Case Springs (Figure 4.3) two sites have *Donax sp.* in the midden deposit, CA-SDI-5138 and 5139. At CA-SDI-5138 *Donax sp.* was not the dominate

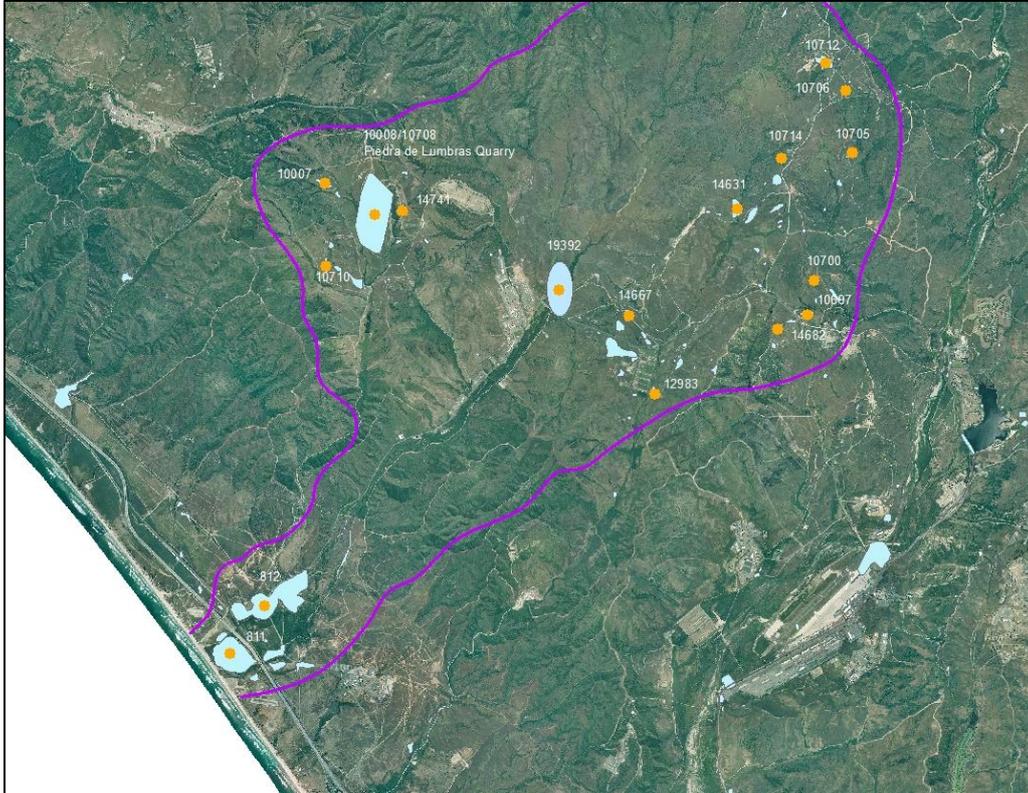


Figure 4.2 Dated Las Pulgas Slate Holocene Sites (Map prepared from Camp Pendleton CRM database by Stan Berryman 2014).

shellfish remains found, only representing 0.2% of the recovered shellfish, *Protothaca sp.* was by far the dominate specie. *Protothaca sp.* is the dominant specie found in the San Mateo Study Unit site CA-SDI-1479. With *Protothaca sp.* found in quantity in Case Springs, a relation between the use of CA-SDI-5138 and the San Mateo area is considered feasible. However at CA-SDI-5139 *Donax sp.* was the dominate specie, although it was found only in one part of the site. The sites range in date from 691 B.P.-520 B.P. to 525 B.P.-310 B.P.

The presence of *Donax sp.* in large quantities at Case Springs during the Late Holocene points to a tie between those parts of the coastline where *Donax sp.* is found in quantity. Based on the dates it seem likely there is a relationship between the Red Beach Study Unit Limited Activity sites and Case Springs.

Donax sp. is present to some extent in all the sites along the Santa Margarita River, though as York (2004:53) points out it is “most abundant in upstream contexts.” This is generally true with some exceptions. CA-SDI-4417 (Figure 4.4) is on the north bank and terrace overlooking the river and 5km from the coast dating from 1440-1260 B.P. to 300-90 B.P. (A.D. 510-690 to 1650-1860). One Early Holocene date from a non-*Donax gouldii* source was derived from this site. *Donax sp.* accounts for 52.7% of the recovered shellfish sample by weight. *Chione sp.* and *Argopecten sp.* are also present but account for less than 18% each of the sample.

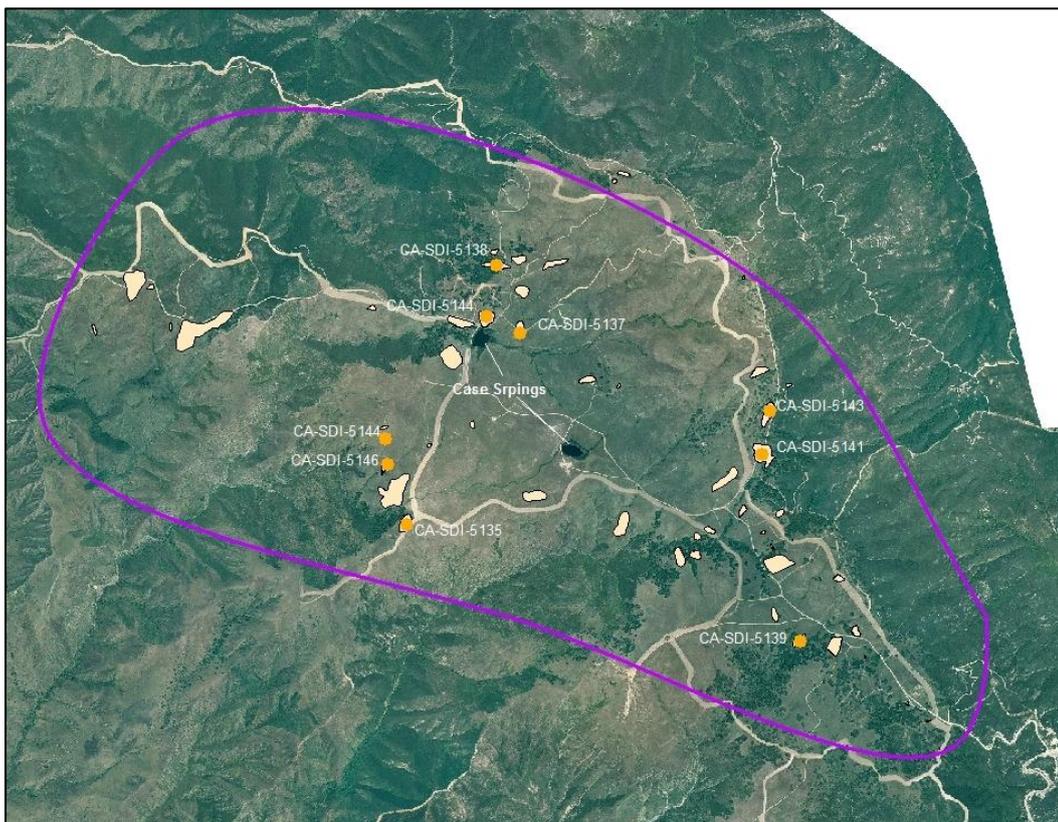


Figure 4.3 Dated Case Springs Sites (Map prepared from Camp Pendleton CRM database by Stan Berryman 2014).

Other sites with significant amounts of *Donax sp.* include CA-SDI-4426 with 52% of over 16,000gm of shellfish, although 24% was *Chione sp.* CA- SDI-10156/12599/H *Donax sp.* comprised 84.5% of 6,000 gm of shell fish and at CA-SDI-10,700 100% of 600gm of shellfish remains. The rock art/habitation

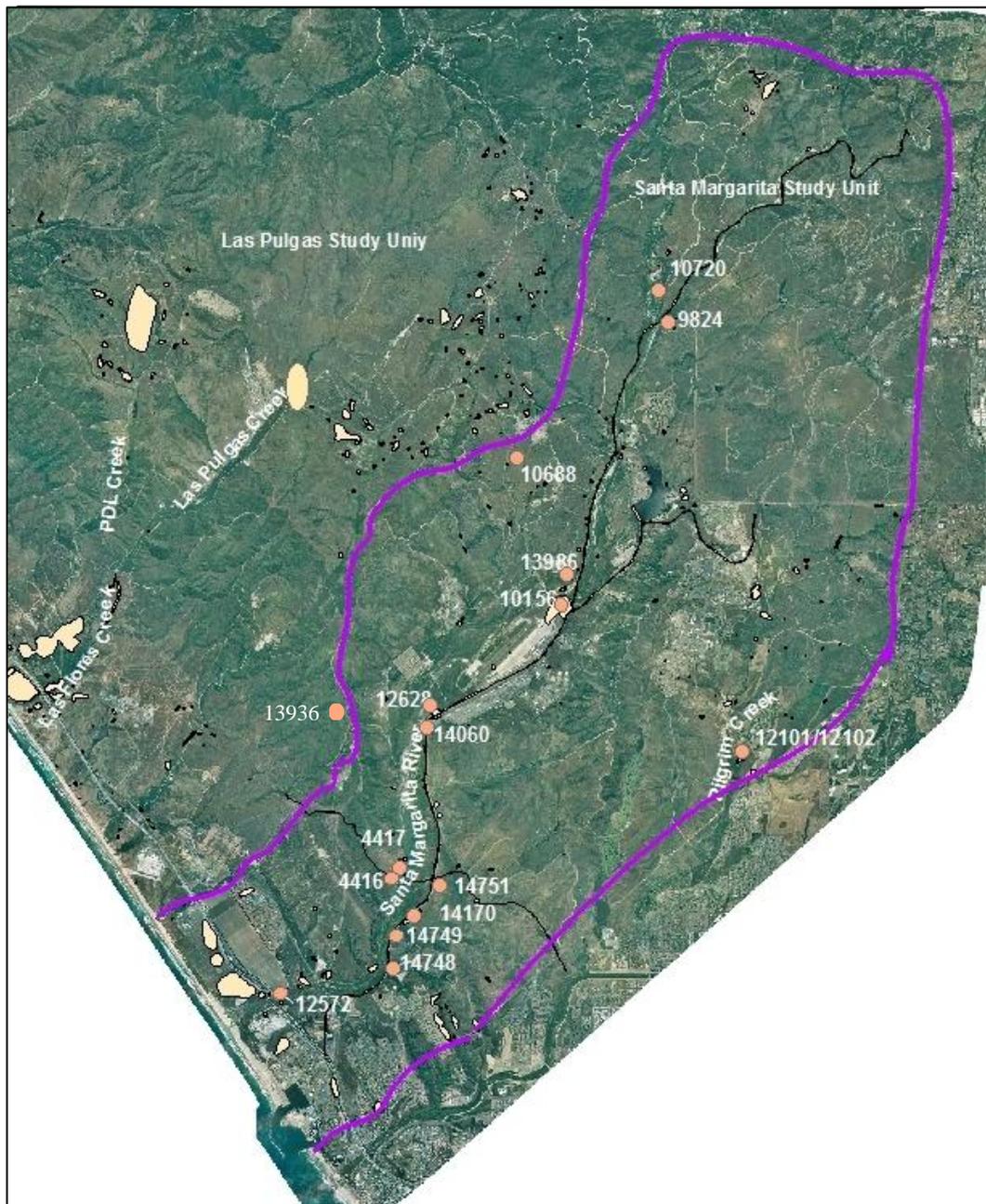


Figure 4.4 Santa Margarita River Dated Late Holocene Sites (Map prepared from Camp Pendleton CRM database by Stan Berryman 2014).

site CA-SDI-9824 is located on the south side of the Santa Margarita River. Test excavation shows evidence of multiple, long term use with concentrated midden, bedrock milling, a rock circle, and rock art panels. This site is 12.5 km from the coast and has only limited invertebrate remains consisting of small amounts of *Protothaca staminea*. Sites including CA-SDI-4416, 12568, 12572, 12577, 14060, 14170, 14751 had shellfish recovered that suggests exploitation of tidal mud flats. *Argopecten sp.*, and *Ostrea sp.* recovered from CA-SDI-14748 and 14749 indicate an open lagoon was exploited (York 2004:53). Both of these sites date from the Late Holocene although they are separated by about 500 years (Figure 3.31).

CA-SDI-4416 exhibits use in the Middle Holocene. Its dates indicate a site from which its inhabitants initially exploited both mud flats and open shore line. Later inhabitants exploited open shoreline. Interestingly, CA-SDI-4426 dates within the Late Holocene from 1990 B.P. - 1690 B.P. to 520 B.P. - 290 B.P. The four radiocarbon dates from this site were recovered from *Chione sp.* shell. As stated above the Late Holocene radiocarbon dates from CA-SDI-14749 were recovered from *Argopecten sp.* shell. Thus the presence of *Chione sp.*, *Argopecten sp.* and *Donax sp.* shell from Late Holocene sites shows that the people from this period, particularly in the Santa Margarita River area were exploiting a number of coastal marine environments and that neither or both were not present or necessary for exploitation during the Early and Middle Holocene period.

Within the San Mateo Study Unit sites *Donax gouldii* is found with far less frequency than in the other sites on Camp Pendleton which may point to differences in ocean front topography. It may also indicate a preference for different shellfish by the late, Late Holocene inhabitants. The earliest evidence of *Donax sp.* is found at CA-SDI-15122, which dates at 1280 -1070 B.P. The evidence for the shellfish is limited at this site. At CA-SDI-8435 small quantities of *Donax sp.*, less than 4% of the total invertebrate shellfish found within the Late Holocene context (1350-1000 B.P. to 470-280 B.P.). At site CA-SDI-10774 approximately 3% of the shellfish remains were *Donax sp.* and

at CA-SDI-4411 the recovery was 7.8%. At CA-SDI-14791 no *Donax sp.* was recovered while *Protothaca staminea* accounted for well over 50% of the recovered invertebrate remains. Within the San Mateo Study Unit Late Holocene context *Protothaca sp.* is the primary shellfish recovered archaeologically. However, when *Donax sp.* is recovered, it is in a Late Holocene context, generally post-dating 700 B.P., and is present in limited quantities. The small numbers of *Donax sp.* may be due to the coastal setting of the San Mateo Study Unit which has estuaries, slough and clean sand environments, ideal for *Protothaca sp.* However, although the proportions are lower for *Donax sp.* in this study unit, this does not change the presence of it as an indicator of change in the late, Late Holocene.

Although it is readily apparent that while there is evidence for use of *Donax gouldii* as early as 1420 B.P. it comes into general, wide spread use in the Camp Pendleton area around 750 B.P. It is interesting that Late Holocene Limited Activity sites in the Red Beach Study Unit are all *Donax sp.* shell scatter sites and are all late within the Late Holocene sequence. These sites are included in the topographic landscape of the ocean terraces, and the radiocarbon landscape. The presence of *Donax sp.* becomes prevalent in the Late Holocene which corresponds to the rising sea stands, flooding of the bays and estuaries resulting in broad exposed sandy beaches from the middle intertidal zone to further out on the open coast. As described above this is ideal habitat for the small mollusk and as described in Chapter 2 would not have been available in the Middle Holocene. It is also apparent that it became a favorite of people living along the coast in the Late Holocene particularly the more recent past.

4.2 Piedra de Lumbre Chert

Another indicator of Late Holocene use is the Piedra de Lumbre chert (PDL). PDL chert comes from a single source found only on Camp Pendleton at the head of the Piedra de Lumbre Creek. It is distinctive fine-grained cryptocrystalline silica. Various impurities give PDL chert its distinctive and variable colors. PDL chert ranges in color from a whitish gray, to a red or

yellow/red. When fire treated it will often turn red. The PDL quarry is a large site (nearly 120 hectares) located primarily on a north/south trending ridge with elevations ranging from 189 meters amsl to 42.5 meters amsl. The chert material is found in large boulders, outcrops and small nodules (personal observation). The latter are spread over the sides and top of the ridge. Flakes and other artifacts are visible on the surface of the ridge. According to Pigniolo,

... several features of the outcrop suggest its origin is sedimentary. Most notably the silicified portions of the outcrop contain occasional inclusion of well rounded black volcanic grains...Careful examination of the outcrop in general, indicates that there is no discontinuity or major difference in lithology between the silicified portions of the outcrop and the underlying softer mud to sandstones....The flattened cap of the formation, present on a portion of the ridge, generally corresponds to the west and southwesterly dip described for the formation in this area (Pigniolo 1992:56).

Due to fracture characteristics, the chert is used in small to medium flakes, bifaces, and projectile points. Pigniolo (1992:276) indicates that 60% of all tools made from PDL chert are projectile points and bifaces. Retouched flakes, used flakes and flake scrapers constitute 25% of PDL chert tools. "The artifact assemblage made from PDL chert suggests that the use of the stone was limited to the production of small tools with a preferential use in the production of biface tools" (Pigniolo 1992:278).

Distribution of PDL chert among the Camp Pendleton area archaeological sites is interesting. There is evidence that points to the material being used throughout much of the prehistory of the area. Generally, metavolcanic materials such as basalt, rhyolite, felsite and andesite are the most prevalently used on prehistoric sites throughout the area. PDL chert is often found in sites but its frequency is limited in sites beyond Camp Pendleton. This is particularly true in Archaic period Early and Middle Holocene sites. For example, CA-SDI-12100 is solely an early Archaic/Middle Holocene site, with only 2.2% PDL chert but 39% quartz and the rest metavolcanics (Gallegos 1994). Another Middle Holocene period site (CA-SDI-12100) is located just

south of Camp Pendleton’s southern boundary in the Pilgrim Creek area. This site dates 7,400 B.P. to 6,500 B.P. (Vanderpot *et al.* 1993:88) and demonstrates 4.1% PDL chert and 9.4% quartz. It seems then that PDL chert has been known for 8,000 years but it was not highly prized for its tool-making or other capabilities. York (pers. comm. 2011) says that perhaps the fracture characteristic made it impractical for the larger Archaic dart points. That is a valid conjecture and its limited quantities may point to a use other than tool making. The color may have played a role in its being selected, thus limiting its use and collection.

However, frequencies of PDL chert begin to change in Late Prehistoric/Late Holocene sites. Based on debitage frequencies PDL chert use begins to expand in the Late Prehistoric. That is most readily seen in the Las Pulgas study area and to a lesser extent at Case Springs. As shown in Chapter 3 archaeological sites in both areas exhibit use limited almost exclusively to the late, Late Holocene with the exception of one date 1160-950 B.P. at CA-SDI-

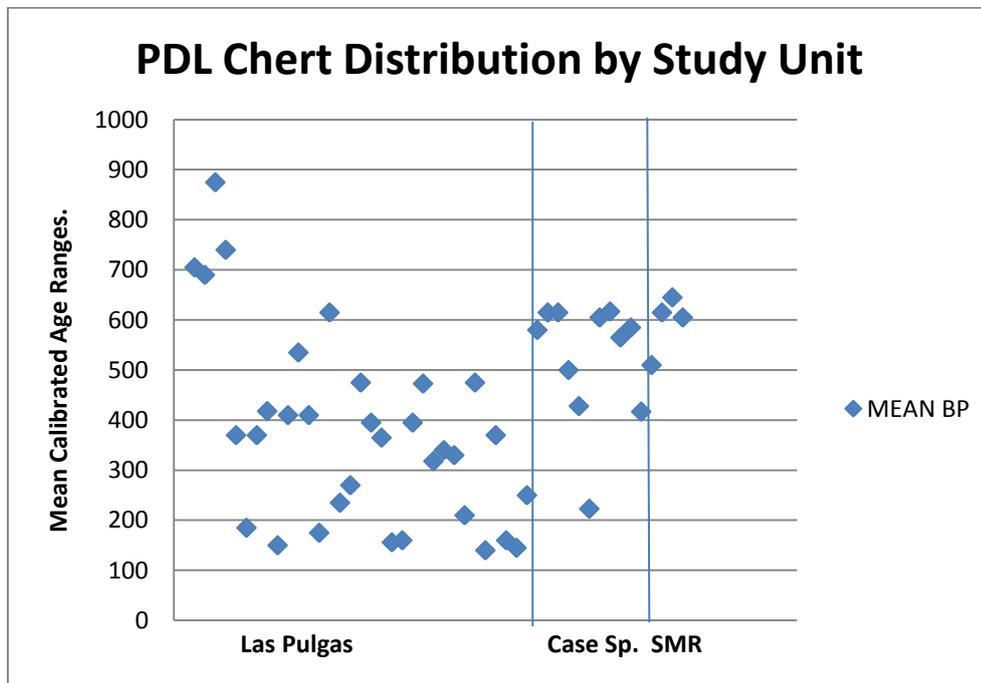


Figure 4.5 Chronological distribution of sites containing PDL chert. Data points are mean calculations of calibrated radiocarbon ages.

5135. Looking at the other dated sites with PDL chert the earliest dates are from approximately 640-305 B.P. Taking the average of the 2 Sigma dates from the PDL chert sites in Las Pulgas, Case Springs and the Santa Margarita River area there is distinct clustering at this time period. Plotting an average of the dates reduces the accuracy of the dates, but in this case will allow a better visual representation of the date range. There appears to be a growth in the number of sites with PDL chert in the Late Holocene post 780 B.P. (A.D. 1170) well after the beginning of the Late Prehistoric Period and after the introduction of the bow and arrow. There appears to be a growth in the number of sites with PDL chert in the Late Holocene post 780 B.P. (A.D. 1170) well after the beginning of the Late Prehistoric Period and after the introduction of the bow and arrow to southern California. Table 4.2 also indicates an explosion of the presence of PDL chert with large numbers of dates clustering around 550 B.P. - 450 B.P. (A.D. 1400-1500), again around 400 B.P (A.D. 1550), and finally around 150 B.P. (A.D. 1800).

As discussed earlier, sites CA-SDI-10700 and 10710 are both located in close proximity to the Piedra de Lumbre chert quarry. They show a preponderance of PDL chert in their midden deposits. PDL chert was 90% of all lithic material from CA-SDI-10700 and nearly 80% at CA-SDI-10710. It seems likely that a primary reason for the two sites is to facilitate extraction of the raw chert material. Evidence for core reduction followed by thinning flakes and bifacial thinning is present. York indicates that the sites were otherwise not used extensively (York 2004:29). It seems plausible these sites were used occasionally with focus on PDL chert extraction and reduction. Table 3.10 shows CA-SDI-10700 dated between 690 B.P. to 550 B.P. and 49 B.P.-290 B.P. CA-SDI-10714 is a milling Dinner Camp with two cupule petroglyphs (Hale and Becker 2006). Dating from 510 B.P.-310 B.P. 30% of all recovered artifacts were made from PDL chert. The complex of sites (CA-SDI-14665/14666, 18990, 18991, 18992, and 19392) now referred to here by its most recent accession number CA-SDI-19392 has up to 78% concentration of PDL chert. Because this site has been expanded as the result of test excavations of its individual components over the past ten years it is possible

to determine that the density of PDL chert is not uniform across the site. Indeed, in one locus formerly site CA-SDI-10728; it is only 28% of the total lithic recovery. This points to a variety of tasks within the site, as well as densities that show a difference in the importance of PDL chert across the site. In other words locus CA-SDI-19392 with a concentration of 78% PDL chert debitage demonstrates this site was a focus of preparation of PDL chert tools and blanks. The radiocarbon dates for this site complex range from 640 B.P. to 140/15 B.P. This site is the location of the ethnohistoric village of Chacape and is 2.8 kilometers from the PDL quarry. It is proposed here that this residential site controlled the extraction, or at least the distribution of PDL chert in the late, Late Holocene.

CA-SDI-14631 is, as described previously, a residential site at the northern reach of Aliso Creek. Forty-two percent of all lithic artifacts here were made from PDL chert. This is a large, complex site that exhibits both residential and religious/ceremonial elements. It dates from 530-420 to 270-200 B.P.

At Case Springs Late Holocene sites PDL chert makes up a large percentage of the material accounting for 11% at CA-SDI-5142, over 14% at CA-SDI-5138 and 5139 and at CA-SDI-5141 nearly 20% of the entire lithic assemblage. PDL chert is thus a significant portion of the lithic materials found at the Case Springs sites. Its movement is northeast away from the quarry site and in quantities to suggest a major use or control of this stone material.

When moving on south and west to the Santa Margarita River area York (2005:45) states that "PDL material is also common accounting for about 16% of the total debitage from the study area". This points to an interesting phenomenon that while the overall occurrence of PDL chert is 16%, it is found in a spotty fashion with only a limited number of sites having any appreciable amount of the material. CA-SDI-10156/12599/H (village of Topomai) is divided into multiple loci (Figure 3.7). Locus A shows 47% of the debitage being PDL chert, while at Locus B it is only 12% (York *et al.* 2002). In site CA-SDI-14751,

which is located on a terrace along the edge of the river and at the head of Ysidora Flats (Figure 4.4), the PDL chert is found in two varying densities separated by Vandegrift Boulevard. Piedra de Lumbre chert accounts for 84% of the lithics on the east side of the road (680 B.P.-530 B. P.), while on the west side (770 B.P.-520 B.P.), closest to the Santa Margarita River, it is less than 20% with quartz being nearly 81%. At site CA-SDI-14170 (670 B.P. to 385 B.P), a Dinner Camp also on the east side of the river, PDL chert amounts to 75% of the recovered debitage lithic. CA-SDI-9824 is an extensive rock art site associated with a Dinner Camp. It appears to have functioned as a ceremonial center, and PDL chert accounts for 65% of all recovered lithics. The single reliable date is 305 B.P. - 0 B.P. These few sites account for the majority of the PDL chert recovered from archaeological sites along the Santa Margarita River. If PDL chert is present at other sites in the area it is in very small quantities such as CA-SDI-4417, in which PDL chert accounted for 0.8% of all lithics recovered. When traveling north to the San Mateo River Area the frequencies of PDL chert drop off dramatically as a total percentage of the recovered lithics. Late Holocene sites such as Residential Bases CA-SDI-13324, 13325 and special use sites such as the cemetery at CA-SDI-16283 show PDL chert in amounts less than 4%. This shift in frequency along the modern landscape is seen in Figure 4.6, which shows representative PDL chert frequencies by percent of entire lithic assemblage beginning at the source at the quarry, then to Las Pulgas, Case Springs, Santa Margarita River and then the San Mateo study units. So questions surrounding the utilization of this chert include: why is there an increase in the frequency in use of PDL chert around 780 B.P? Why is there a drop in the frequency of PDL chert in the sites along the San Mateo/Cristianitos Creeks and the Santa Margarita River? Why does the occurrence of PDL chert move east up the Las Pulgas and Aliso drainages, while it is found in the rugged uplands at Case Springs?

Additional questions to be asked are; do sites near the quarry such as CA-SDI-19392 represent controlling entities over the physical landscape around the PDL chert quarry. Does the presence of PDL chert in large quantities at a limited number of sites along the Santa Margarita River mean only people

with access to these sites were responsible for gathering and processing the chert or in some way controlling the flow of PDL chert? An answer may be found in the religion of the late, Late Holocene people as exemplified by the Luiseno. White (1957) (see Chapter One) described the concept of knowledge or *ayelkwi*, or the mastery over the natural and social environment. Control over what appears to be a key element by controlling its production and distribution would give a degree of knowledge to the practitioners of the Luiseno religion. As can be seen in Figure 4.7 the frequency of PDL chert is greatest around the quarry site and generally lessens the further away from the source, as in classic economic labor minimizing models of behavior (Hale 2009: 292). However CA-SDI-19392 is over 2km from the source. This site complex was first occupied at approximately 640 B.P. - 305 B.P. a time when PDL chert use was rapidly expanding throughout northern San Diego County. To gain control over a material that is unique in its color and characteristics would imbue the religious leaders with great knowledge/power.

This may point to possible kinship ties or other relationships between those sites/individuals controlling the source of the colorful chert and those receiving it. The selection of CA-SDI-19392, 10700 and 10710 as a place to process the PDL chert may also be based on factors of physical landscape characteristics such as proximity to the quarry close but not on the quarry, and an area suitable for processing and residential activities.

Perhaps the most significant question is regarding what is special about PDL chert. It fractures well, but best along pre-existing fracture planes within the parent material. Its characteristics insure that only small bifaces, projectile points, and other small tools can be made. Being a cryptocrystalline rock it produces a fine, sharp edge, but in contrast to metavolcanics, large blades, points, scrapers, push planes cannot be made from it. There must be some reason that in sites such as CA-SDI-19392 and 14751 there are very dense concentrations. This thesis is postulating the key factor for the importance of

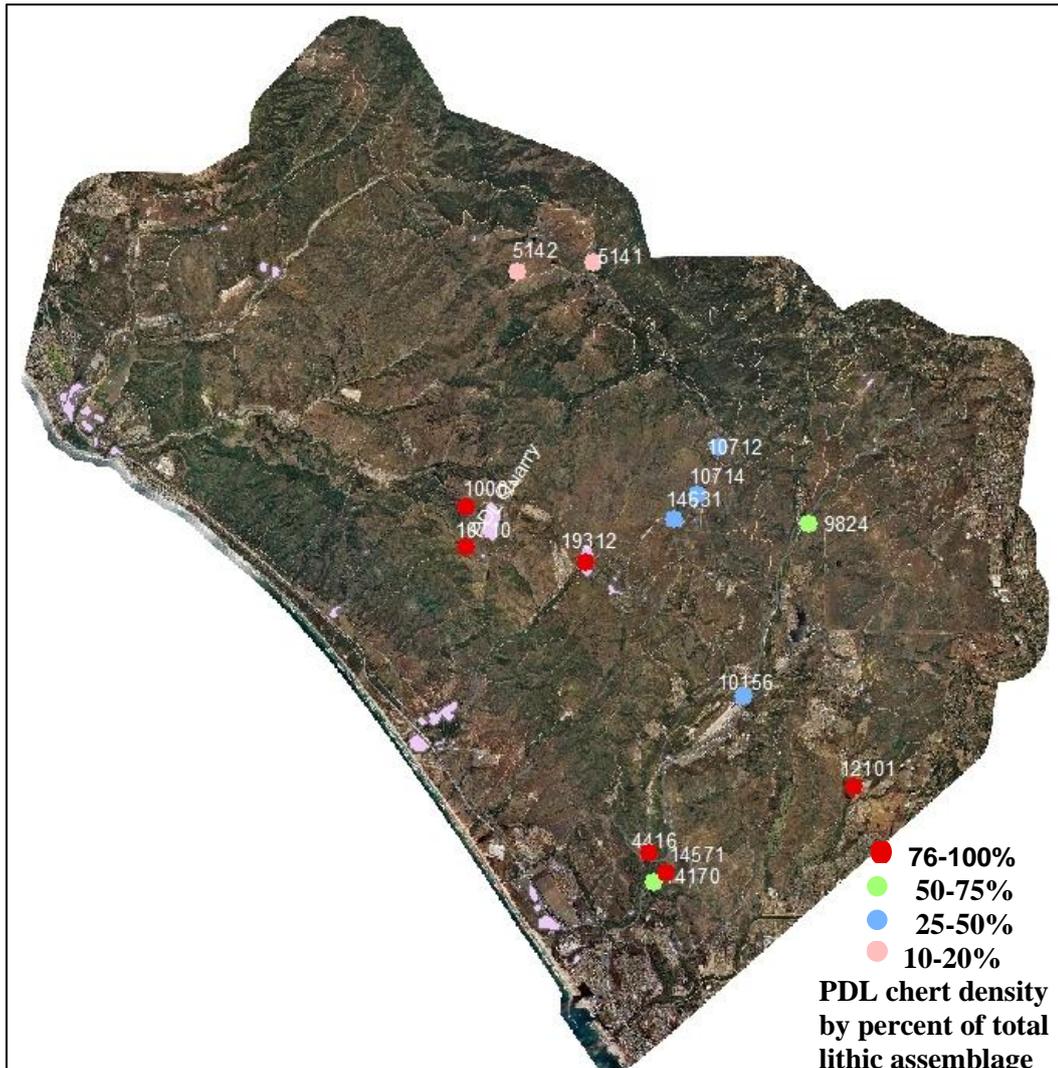


Figure 4.6 PDL Chert Densities Across Camp Pendleton (Map prepared from Camp Pendleton CRM database by Stan Berryman 2014).

PDL chert is color. This material has colors that range from whitish grey, yellow, and red. Perhaps the most important aspect of color is the fact that when heat treated the material turns red.

There is some ethnographic evidence that the descendants of the prehistoric people, the Luiseno and Juaneno, had significant color elements in their cosmology. In sand paintings red was one of the significant colors used to represent the Milky Way.

According to one authority the three circles for the circumference mean, the white outer one the Milky Way; the red central one, *tukmit*, the sky; the black inner one, chum *kwinamul*, our spirit. According to another,

the outer circle of white is the Milky Way; the middle of red, *chum towi* our spirit; the inner of black, *kwinamish*, the spirit.” (Dubois 1908:88).

Piedra de Lumbre chert has two aspects represented in the sand painting the colors red and white. Piedra de Lumbre chert also has the aspect of color shifting to red through fire treatment. Also, the topographic landscape means that the PDL chert quarry is a prominent hill, so not only does the material change color from that of the Milky Way to that of the spirit, it is found in a prominent, visible hill top location. If the PDL chert is used for its ritual properties, a reason for its apparently sudden increase in frequency can be suggested. The appearance of large quantities of PDL chert may directly relate to the end of climatic stress discussed in the following section. The color aspects of the stone and its fracture characteristics make it a candidate for use as arrowheads in the new bow and arrow technology. Here is a stone that combines possible ritual characteristics and high quality projectile points. One may thus argue that the quest for knowledge (*awelki*) played a role with the color aspect making the PDL chert a significant element in a ritual landscape and a significant material to control. That is to say control of the PDL chert allowed for the gain in *awelki*. It is important since red along with black in body paint symbolized Luiseno moieties (Strong 1929), thus controlling a source of red rock would lead to gaining more *awelki*. The appearance of PDL chert along with *Donax gouldii* and the end of climatic stress do not appear to be coincidental. Another possibility in controlling the PDL chert is that the Kumeyaay had a ritual and belief involving color and direction. In fact the Kumeyaay were one of the few southern California Indian tribes to have a highly developed association of color and direction (Cohen 1987:5). “North is associated with red, east with white, south with blue or green” (Waterman 1910:333). Color plays a role in the story about the culture hero Chaup. According to Waterman (1910) *Chaup* was not the original creator of the world but the *maker* of many plants and animals. Within the Chaup legend Waterman states “...there is a corresponding feeling for color connected with the north and south. ‘The elder sister, who was a witch-doctor and knew everything, stood up and held her hand to the north and brought

down a red stone” (1910:333). The PDL chert is located north of the Kumeyaay territory, and controlling the source of the red stone significant in the Chaup legend may well have granted knowledge or *awelki* to the people who controlled the source of the red stone. The aspect that is color may well represent a knowledge that the holders of the stone would gain. As seen in Figure 4.7, the direction of PDL chert movement is to the south and east. The Kumeyaay territory begins just a few kilometers south of Camp Pendleton. The abundance of PDL chert at CA-SDI-14170 along the Santa Margarita River lends credence that there is movement of PDL chert to the south as a trade item.

The sites near the PDL chert quarry may be considered to be placed there at least in part to take advantage of the source of the stone and to gain *awelki* for the religious practitioners. The more knowledge or *awelki* an individual has, the more they are able to control events. The landscapes and taskscapes at this time can thus be argued to also demonstrate spiritual component.

The uses of PDL chert were discussed in Chapter 2. In summary it was used as small projectile points, scrapers, and small bifaces. The limitation of artifact size is due to the fracture characteristics. The key to the massive amounts of PDL chert debitage, and other artifacts is due to the color range and that during heat treating this magical rock turns red. As discussed above the ethnohistoric Luiseno did not apparently place great significance on color other than in their description of the Milky Way and in their sand paintings. Ethnohistorically, Luiseno shamans made wands that were tipped with either small crystals or arrowheads. It may be that PDL chert was highly prized for its fracture characteristics for use in making small arrowheads, but it is also equally likely that it was prized for its color. The distribution of the material shows that the site, CA-SDI-19392 or the ethnohistoric village of Chacape, may have been controlling either the production of PDL chert or the access to the PDL chert quarry. The distribution of the chert to the northeast and

southwest may represent it as a trade item to the Kumeyaay, who did place special significance on color.

4.3 Late Holocene Climate Landscape

Climate is a factor within and for landscape that is often shifting and, within the Late Holocene, not overly stable. This was a period of significant stress resulting from prolonged period of drought, interspersed with wetter and cooler periods. Reconstruction of past climates is accomplished through the use of “proxy data” such as tree rings that can preserve evidence of changes in lake salinity, vegetation, or evidence of blowing sand. Proxy data are also found in buried sediments of sand dunes and lakes, or found in historical documents, and preserved in archaeological remains (Stine 1990, Scuderi 1987, Miller and Wigand 1994, Mayewski *et al.* 2004, and Larson, no date). In order to reconstruct climate from environmental proxy data, the data are calibrated with the instrumental record to determine how well the natural record estimates the climate record. A model is developed using the mathematical relationship between the proxy data and the climate record (Grissino-Mayer *et al.* 1997).

The climate during the first two thousand years of the Middle Holocene shows considerable warming and aridity (Carbone 1991). A long warm and dry period followed that lasted from about 5,000 years B.P. to approximately 2,500 B.P. This was followed by a cooler and wetter period from 2500 B.P. to 0 B.P.(Jessen and Iverson 1941). All of these general sequences would be interspersed with periods that vary from the norm.

4.3.1 Late Holocene

According to Larson (no date) rainfall totals in the Late Holocene were highly variable. Based on his tree ring data there was a 50 year period from 1450 B.P. to 1300 B.P. when rainfall was moderate, followed by a 150 year period of low amounts of precipitation ending approximately 1250 BP. This was followed by a 20 year period of drought to 1230 B.P. From circa 1200 to 1000 B.P the Archaic period experienced high rainfall.

Stine (1994), using tree data derived from relic tree stumps found in four sites close to and within the central Sierra Nevada Mountains in central California, determined that a period of climate known as the Medieval Climatic Anomaly was a world-wide phenomenon. “The mediaeval [*sic*] period in California was thus marked not only by severe and prolonged drought, but by abrupt and extreme hydroclimatic shifts – from inordinate dryness, to inordinate wetness, and back again” (Stine 1994:549).

According to Stine (1994) the first medieval drought lasted for over 220 years (1058 B.P. to 838 B.P.), the second lasted for a period of approximately 140 years (741 B.P. to 600 B.P). A period of wetness separated the droughts for a period of less than 100 years, from approximately 838 B.P. to approximately 741 B.P. This period of wet weather was marked by precipitation that exceeds modern levels.

Larson (1994) studied variations in rainfall and surface sea temperatures (SST) for central coastal California covering the period of time 1550 B.P. to 150 B.P. He coupled these with tree-ring samples from big cone spruce found in the Transverse Range of central Santa Barbara County. Additional samples were derived from San Geronio Peak. Both sample areas are north of San Diego County. The tree ring record began at 1500 B.P. and ended at the present. Larson identified four episodes of extreme dry (Table 4.1) conditions interspersed with favorable wetter conditions along the coast of southern California.

The first episode, A.D. 620 to A.D. 650, was a 30-year interval when mean precipitation rates fell well below the reconstructed mean and SST (surface sea temperature) was very warm. The second notable event, A.D. 700 to 750, was also severe when mean precipitation rates dropped dramatically and SST increased significantly. The third event, A.D. 980 to 1000, followed a very favorable 200-year interval and included abrupt shifts in environmental conditions. During this 20-year interval mean precipitation rates fell rapidly and SST increased as well. The fourth event, which began at A.D. 1120 and ended at 1200, marks

the most significant sustained period of extreme conditions for both marine and terrestrial environments” (Larson no date:28).

Recent studies have highlighted Holocene climate change within southern California (Mayewski *et al.* 2004). Studies of sediment cores at Lake Elsinore east of Camp Pendleton (Kirbey *et al.* 2005, 2006) have demonstrated that the Early Holocene was generally wet, followed by long-term drying through the Middle and Late Holocene. Kirby *et al.* (2004, 2006) have suggested that there was limited variability in the Holocene climate from 3800 to 2000 B.P., followed by a wetter, more variable climate up to the present (Kirby *et al.* 2004, 2006). This conclusion is somewhat different than what has been derived by recent tree ring studies.

Looking to another area of the American Southwest, Grissino-Mayer (1997) reconstructed annual precipitation for the Southern Rio Grande Basin, within southern New Mexico. The climatic data were derived from proxy data using tree-rings derived from Colorado pinion pine, ponderosa pine, and Douglas fir. The results of this study showed a pattern not greatly different from that developed by Stine (1994). Drought occurred during the first drought interval defined by Stine and during a drought pattern described by Larson *et al.* (1994) for A.D. 940-1040 (Table 4.1). During this period of drought Grissino-Mayer identified a wet interval during the A.D. 980's (970 B.P.). He also describes a very wet period during A.D. 1040-1125 (910 B.P. - 830 B.P.) which corresponds with Larson's wet period of A.D. 1030-1100 (920 B.P. - 850 B.P.). This was followed by a drought beginning in A.D. 1125 (830 B.P.) and ending A.D. 1140 (810 B.P.). Both Stine and Grissino-Mayer saw a wet cycle occurring during the early to middle A.D. 1100's (800 B.P.) and ending in the early A.D. 1200s (750 B.P.). Grissino-Mayer has a nearly 100 year drought that corresponds to the 140 year mega-drought defined by Stine (1994). After A.D 1300 (650 B.P.) the severity of wet/dry cycles becomes less severe and the climate generally becomes more benign interspersed with several short-term drought or wet periods. “The MCA [Medieval Climatic Anomaly] period stands out clearly this way as an extended period of elevated

aridity over the West that has not been matched since A.D. 1300” (Cook *et al.* 2009:38). The long-term variations diminished in frequency and severity post 650 B.P.

Stine (1994)	Larson (unpublished)	Grissino-Mayer (1997)	CLIMATIC CONDITION
	A.D. 500-650 (1450-1300 B.P.)		Drought
	A.D. 650-800 (1300-1100 B.P.)		Low rainfall
	A.D. 700-750 (1250-1200 B.P.)		Extreme Drought
	A.D. 800-1000 (1100-950 B.P.)		Wet
A.D. 892-1112 (1058-838 B.P.)	A.D. 980- 1015 (970-935 B.P.)	A.D. 940-1040 (1010-910 B.P.)	Severe Drought
		A.D. 980's (970 B.P.)	Short wet interval in drought
	A.D. 1015-1030 (935-920 B.P.)		Moderately Dry
	A.D. 1030-1100 (920-850 B.P.)	A.D. 1040-1125 (910-825 B.P.)	Very Wet
	A.D. 1100-1250 (850- 700 B.P.)	A.D.1125-1140 (825-810 B.P.)	Drought
	A.D. 1120-1150 (830-800 B.P.)		Extremely Harsh
A.D. 1112-1209 (838-741 B.P.)		A.D. 1140-1210 (810-740 B.P.)	Very Wet
	A.D. 1250-1300 (700-650 B.P.)		Improving
A.D. 1209 to 1350 (741-600 B.P.)		A.D. 1210-1305 (740-645 B.P.)	Drought

Table 4.1 Climatic Conditions American Southwest.

A decrease in long-term variance over time has also been observed in other tree-ring chronologies and reconstructions in the southern portion of the Southwest... suggesting that the decrease in precipitation variability over time is a real feature of Southwestern climate, (Grissino-Mayer 1997:21).

When comparing Grissino-Mayer (1997) with Larson *et al.* (1994, and no date) and Stine (1994) it becomes readily apparent there are broad, regional patterns of climate tempered with local variations. There are droughts in central California and southern New Mexico that correspond to two time periods. While the Larson *et al.* data do not show a drought that corresponds with Stine's megadrought A.D. 1209-1350, there is a corresponding drought in southern New Mexico during the same time period.

Two other phenomena affected climate and perhaps helped the late, Late Holocene remain a period of cool wet environment. The Little Ice Age (Matthes 1939) was a cool/wet period that followed the MCA from 600 B.P. to 100 B.P. (A.D. 1350 to 1850). Another phenomenon (Eddy 1976) known as the Maunder Minimum (prolonged sunspot minimum) occurred from 315 B.P. to 245 B.P. (A.D. 1645 to A.D. 1715). This period of limited sunspot activity corresponded to the coldest phase of the Little Ice Age. This is a period noted in the Camp Pendleton data of expansion and aggregation of the residential base sites.

What does this mean for the Camp Pendleton area? This area has a somewhat different climate from that of central coastal California. The modern rainfall is on average 8 inches less in San Diego County with the storm track often to the north, resulting in less precipitation (Camp Pendleton INRMP 2007). So it is possible that southern coastal California experienced less moisture than to the north, perhaps was not as dry as that indicated by Stine (1994) and Grissino-Mayer (1997), but certainly dry enough to constitute a drought. Reviewing Table 4.1 (Larson, no date) and Larson, *et al.* (1996:230) there is a dry period within the time span of 650 B.P. to approximately 600 B.P. followed by fluctuating periods of wet and dry conditions. Based on this and the generally lower amounts of rainfall historically in San Diego county it is very feasible there was a period of dry weather in the period of A.D. 1200 to A.D. 1600 (750B.P. - 350 B.P.).

The periods of stress confirm the drought periods identified by Stine (1994). The southern California climatic landscape was changeable, but accounted for long, extended periods of either dry or wet weather. While some archaeologists look at climate being a significant driver or determinate of human settlement, there is more to the human response to climatic shifts than just changing resource exploitation and changing settlement patterns. A prolonged drought as described by Stine, Larson or Grissino-Mayer will be viewed differently by individuals depending on when in time they experience the event. If a person is born during a long drought, they will see the dry as the norm, if the event is experienced at its beginning that experience will result in a different perception. Equally important to the dry, drought periods are the wet phases. In either case whether the climate has turned wet or dry, humans individually and communally will develop different senses of both the physical and ideational landscapes that constitute normal.

Humans will also develop a response to a significant climatic event. A prominent feature along Camp Pendleton's eastern boundary is Katuktu or Morro Hill (DuBois 1908). This promontory is visible from many places on and off the Base. It is a location of a significant event within Luiseno religion, where the Luiseno ancestors are gathered to protect them from a flood.

There is a wonderful little knoll, near Bonsall, the Spanish name of it Mora, the Indian name Katuta; and when there was a flood that killed all the people, some stayed on this hill and were not drowned. All the high mountains were covered, but this little hill remained above the water. One can see heaps of seashells and seaweed upon it, and ashes where those people cooked their food, and stones set together, left as they used them for cooking; and the shells were those of shell-fish they caught to eat (Dubois 1908:157).

If modern history can provide a clue to the past climatic events, climate is one. In the recent past flooding has occurred on both the Santa Margarita River and San Luis Rey River (south of Camp Pendleton within Luiseno territory). In one case the waters of the Santa Margarita River backed up into much of the low-lying ground adjacent to the river including Ysidora Flats

(personal observation 1998). With the increase in precipitation post 645 B.P. flooding along the rivers would be expected. A severe storm event could well have forced the Luiseno ancestors onto higher ground, such as Katuktu. Later generations would incorporate that event into their religious stories giving us a snapshot of the response to changing climate or to real events that have been incorporated into their religion's stories.

4.4 Radiocarbon Dated Landscape

Radiocarbon dates like climate can be an element of landscape. This following section explores the chronological development of the landscape drawing on the radiocarbon dates for the sites.

4.4.1 Early/Middle Holocene Sites

Of the 191 radiocarbon dates from archaeological sites on Camp Pendleton there are Early and Middle Holocene dates from three sites in Red Beach, six sites in the Santa Margarita River Study Unit and two in the San Mateo Study Unit. There are 24 Early and Middle Holocene dates from the Red Beach Unit, 16 radiocarbon dates from the Santa Margarita River area, and four dates from the San Mateo Unit. (Figures 3.5, 3.7, 3.32, 3.33, and 3.42)

It is the gaps in the dates at these sites that are most informative. There is no Middle Holocene in evidence at CA-SDI-10723 and 12100. There is a 2,000 year separation between the end of the Early Holocene and the beginning of the Middle Holocene at CA-SDI-811; 600 years at CA-SDI-10726; 2,000 year gap at CA-SDI-12568, and nearly 2,000 years at CA-ORA-22. Within the Middle Holocene sites that also exhibit Late Holocene components, gaps between Middle Holocene and Late Holocene are also noted. The gaps can be very large: at CA-SDI-15254 the gap is 6000 years, 5000 years at CA-SDI-10156, 4000 years at CA-SDI-10728 and 12628, and 3000 years at CA-SDI-13986. As has been noted earlier in this thesis, only CA-SDI-811 exhibits no gap in the dates from the Middle Holocene to the Late Holocene, suggestive of a more continuous, if intermittent, occupation. CA-SDI-13325 also exhibits few gaps between the Early to Late Holocene. Like CA-SDI-811 it does not

extend into the later Late Holocene with occupation ending post 1100 B.P. CA-SDI-13325 is in the San Mateo Study Unit and CA-SDI-811 is in the Red Beach Study Unit. Both sites demonstrate that within the Camp Pendleton area during the Middle to Late Holocene there were at least two sites that were occupied in a relatively continuous basis. Other Early and Middle Holocene sites were occupied, and then abandoned until the Late Holocene. These gaps are important because they relate to the intensive nature or lack of intensive resource exploitation and settlement occurring during the earlier periods of the Holocene at Camp Pendleton. The fact that both sites show use into the Late Holocene and then abandonment with occupation picking up at other sites in close proximity may indicate a change in use of the physical landscape or a change in the spiritual landscape.

Based on the radiocarbon dating and occupation data that we have seen, Early and Middle Holocene prehistoric people used Camp Pendleton in a very limited manner focusing on the high ground overlooking Las Flores Creek at the Red Beach Ridge Top Site along the inland portion of an ancient Las Flores lagoon, and occupying a small hilltop overlooking the Pilgrim Creek. However, the archaeological record of Early Holocene use of Camp Pendleton is limited to that which can be seen today. Stepping back 7,500 to nearly 10,000 years ago today's coastal zone was then inland by a distance of 2km to 3km. As was discussed in Section 1 a saline bay at the mouth Las Flores Creek was connected to an inland freshwater lagoon by a slough. By this period the shoreline was two km further west. By the beginning of the Middle Holocene the shoreline had advanced another one km inland and the freshwater lagoon changed to a saltwater lagoon. The coastal and lagoon landscapes that could have been exploited at that time for resource procurement and residency are underwater, and there is no evidence of significant marine adaptations. All that remains of Early and Middle Holocene occupations along the northern San Diego County coast are inland expressions of what may have been extensive use of the marine setting.

At first look CA-SDI-811 seems to be well located to exploit the freshwater lagoon of the Early Holocene, but that is not in evidence. According to Pope (2002) this area was likely covered by the lagoon. The best areas to set up residency would be on the ridges and terraces overlooking the lagoon. It was not until 7740 B.P. - 7300 B.P. that the area around the lagoon could be exploited. Subsequent to this time, as the shore line retreated and the bay, slough, and freshwater lagoon had shrunk to a much smaller saltwater lagoon, the area became more habitable. As the creek went through cycles of aggrading or abrading to no deposition people would move over the site area making use of first its proximity to a lagoon and then to the shoreline.

The Santa Margarita River valley went through a similar geomorphological history. As described previously in Chapter 2, a brackish lagoon formed along the river floodplain to the Ysidora Basin by 9400 B.P. (Byrd 2005:101). The Ysidora Lagoon formed again two more times around 8800 B.P. for a short period and again between 7000 B.P. to 5400 B.P. Within Locus A, CA-SDI-10156 the Middle Holocene levels, the dominate invertebrate shellfish species were *Chione sp.* and *Argopecten sp.*, two species typically found in lagoon or bay/estuary habitats. These types of shellfish remains from CA-SDI-10156, 12568, and 12628 and the fact that the Early Holocene dates from these sites were all recovered from *Chione* shellfish suggest the lagoon was exploited by the prehistoric inhabitants during the Middle Holocene period from 7705 B.P. - 7235 B.P. to 6165 B.P. - 5885 B.P. Without knowing the submerged prehistory of the northern San Diego County coast, it appears there was a general abandonment of the coastal area between the mid to late Middle Holocene (approximately 4800 B.P.). Again as described in the foregoing and previous sections, the exception to this is CA-SDI-811. It demonstrates a consistent, if not permanent use of the area around the mouth of the Las Flores Creek. The same pattern of general abandonment also holds true for the Santa Margarita River Study Unit, with the exception that there is no equivalent to CA-SDI-811 and the San Mateo unit, where there is evidence of a more stable occupation at CA-SDI-13325.

It is important to note that while both *Donax gouldii* and Piedra de Lumbre chert are represented in many Camp Pendleton sites in the Early and Middle Holocene (Byrd 2003), it is not until late in the Late Holocene that there is a florescence in their use, both coming into general use post 700 B.P. a time when according to Larson (no date) the climate was stabilizing to a wetter regime along the central California coast.

4.4.2 Late Holocene Sites

There are currently 68 archaeological sites on Camp Pendleton with Late Holocene dates represented by a total of 191 radiocarbon dates. These dates range from 3070 B.P.-2760 B.P. (CA-SDI-13325) to 290 B.P.-0 B.P. (CA-SDI-14519). Within this date range there are 10 sites that demonstrate relatively early, Late Holocene dates (Figure 4.7). As shown in Figure 4.7 the pattern is one focused on the creeks with only one CA-SDI-5135 inland dating to 1160 B.P.-950 B.P. The largest site during this period is Red Beach site CA-SDI-811 (Figure 4.8). It has been previously described as showing a fairly consistent occupation from the Middle Holocene/Archaic through to the middle part of the Late Holocene with the dated end of the occupation being 1220-980 B.P. Interestingly, site CA-SDI-812, which is separated from CA-SDI-811 by only the interstate highway and railroad tracks earliest date is 1182 B.P.-942 B.P. There is continuity of the dates as the focus of occupation as this site complex moves inland from the beach to the broader coastal terrace along Las Flores Creek. The pattern of early period Late Holocene sites focusing on the coast and creeks does not change as CA-SDI-811 is abandoned and CA-SDI-812 is occupied. As was shown in Chapter 3 other coastal sites demonstrating these earlier dates are CA-SDI-15254, 14494, and 13325. CA-SDI-15524 has a Middle Holocene component but does not show use in the Early Holocene, and it is not until 1075 B.P.-925 B.P. that the site exhibits use in the Late Holocene. CA-SDI-14494 is a Late Holocene site whose use ends before 700 B.P. Site CA-SDI-13325 has a range of Late Holocene reflecting use primarily at the beginning of this sequence.

The majority of Late Holocene dates shown in Figure 4.7 are post 700 B.P. and of these sites the major portion are post 645 B.P. In the Red Beach Study Unit all Limited Activity shell scatter sites are post 740 B.P., as are all Limited Activity milling sites. With the exception CA-SDI-15254, Dinner Camps in the Red Beach area all post date 640 B.P. Of the dated Limited Activity lithic scatters, milling and Dinner Camps in Las Pulgas Study Unit only two sites do not post-date 645 B.P. These two include CA-SDI-12983, a Dinner Camp that dates 730 B.P.-650 B.P. and CA-SDI-14682, a Limited Activity lithic scatter that dates 900 B.P. - 850 B.P. At Case Springs seven of the nine dated sites are post 645 B.P. Within the Santa Margarita River unit eight of the Late Holocene sites either completely date post 645 B.P. or demonstrate components dating to that time period.

Site Number	Metavolcanic	PDL Chert	Quartz	Obsidian	Cryptocrystalline	Other
5142	82	12	5	0	0	0.03
5141	75	19	5	0	0	1
9824	15	65	18	0.7	0	0.9
10007	13	82	4	0	0.6	0
10156*	26	28	44	0.4	0	1
10710	3	92	3	0	2	0
10712	31	50	18	0.1	0	0.2
10714	51	30	18	0.5	0	1
14170	14	75	9	0	0	1
14631	38	42	17	0.1	0	42
14571	34	46	20	0	0	0
19392	24	62	10	2	0	2

Table 4.2 Lithic Material Based on Percentage of Total Collection *Locus B CA-SDI-10156.

As can be seen in Figure 4.8, there are few (n=10) of what can be described as earlier sequence Late Holocene dated sites from the 245 Late Holocene dates. None of these earlier dates was obtained from *Donax gouldii* but are

rather from non-*Donax gouldii* shellfish species including *Chione sp.*, *Anodonta sp.* (freshwater mussel), mixed shell samples, and charcoal. These earlier Late Holocene sites are CA-SDI-12628, 10156, and 4417 from the Santa Margarita River Study Unit and CA-SDI- 811, 14522, 12576 and 8866 from the Red Beach Study Unit. CA-SDI-13325 is from the San Mateo Study Unit, CA-SDI-12575 is just east of the San Mateo unit and CA-SDI-5135 is in the Case Springs unit. None is inland in the Las Pulgas Study Unit. However, these dates point to a minor use of the inland/upland landscapes. Dates from *Donax gouldii* come from throughout Camp Pendleton and generally begin around 960 B.P. - 600 B.P. As was noted in previous discussion the Limited Activity shell scatters and Dinner Camps are nearly all post 645 B.P. *Donax gouldii* within these Dinner Camps and Limited Activity areas is the primary shellfish type. There is ample evidence of some residential use in the “middle period” Late Holocene at sites such as CA-SDI-10156, 12572, 12628, 14748, 4417, 14494, 15254, 10726 and 812. One thing these sites have in common is they are in close proximity to a source of water, and the time these sites were occupied was a time of changing climate as explicated by Larson (no date). The dates show occupation during times of primarily drought interspersed with limited wet cycles. So while occupation did occur during the earlier to middle of the Late Holocene period, it was focused on the river and creeks that flow to the ocean. Only one inland/upland site CA-SDI-5135 in Case Springs is dated from this period of climatic stress. It should be noted this site is in close proximity to the spring at Case Springs.

It is worth pointing out that there are what could be considered “new” Residential Bases and existing Residential Bases. The “new” residential sites are formed, as indicated above, very late in areas not previously occupied, while the existing residential bases developed in locations that had been used either relatively consistently for hundreds, if not thousands of years, or at least are sites that exhibit intermittent use until the development of Late Holocene Residential Base sites.

The aggregation of sites during the Late Holocene into residential sites that were present at the time of Spanish incursion into San Diego appears to have occurred very late, at a time after 645 B.P. To take this to the next step, there are one more concentration of late Holocene sites and that is post 500 B.P.

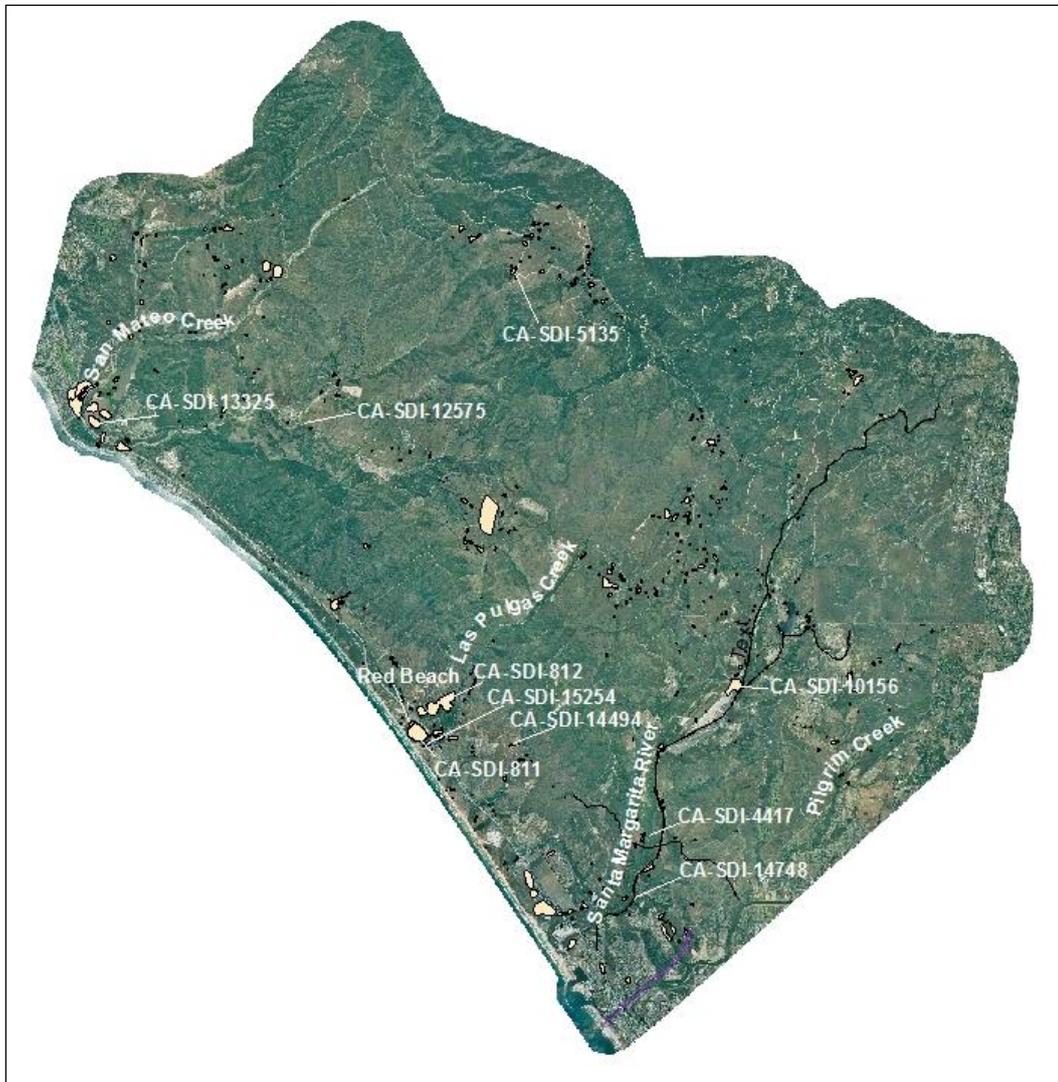


Figure 4.7 Late Holocene Sites that occur Early in the Sequence (Map prepared from Camp Pendleton CRM database by Stan Berryman 2014).

In fact this concentration of very late Holocene dates occurs between 500 and 400 B.P. In the Las Pulgas Study Unit Residential Bases all have a mean date after 475 B.P. The majority of sites in Case Springs date to this time period. Prior to 645 B.P. the Late Holocene in northern San Diego County as represented by Camp Pendleton sites were focused around sources of water

and there is limited evidence of use of the uplands. Comparing figures 4.7 and 4.8 it is possible to see an expansion from the coast and major river valleys to inland and upland areas such as Las Pulgas site CA-SDI-19392 and Case Springs. The numbers of sites in the San Mateo unit dramatically increase during this later period: in fact the number of sites in all of the study units dramatically increases across all categories of Limited Activity, Dinner Camps and Residential Bases. The climate landscape is changing during this latter period to a more stable, milder time. The response, as Grissino-Mayer (1997) has argued, is that during



Figure 4.8 Late Holocene Sites that occur Late in the Sequence (Map prepared from Camp Pendleton CRM database by Stan Berryman 2014).

times of climatic stress as in a drought, human populations contract and when the climate stabilized or became wetter, human populations respond by increasing in number. Thus the majority of Late Holocene dates on Camp Pendleton are post 700 B.P. to 645 B.P. It is within this date range that we see also the sharp increase in the dated sites with PDL chert, inland and coastal sites with *Donax gouldii* shell fish, and the end of significant environmental stress caused by long, harsh droughts. The increase of both major residential bases and Limited Activity and Dinner Camp areas points to increasing populations within the Camp Pendleton portions of northern San Diego County. Population increase places new stress on people, and their responses to this stress can result in new ways to organize and utilize the various landscapes (Grissino-Mayer 1997). I would argue that it is also likely that the times of environmental stress are remembered in songs and stories. These new stressors can result in new uses for old resources. PDL chert is found in Middle Holocene sites but in very limited quantities and there is no evidence of camps used to exploit the resource. As Figure 4.6 shows the number of dated sites with PDL chert in the Late Holocene dramatically increase between 700 B.P and 645 B.P.

4.5 The Late Holocene Responses - Coming Together

In order to develop an understanding of what is considered the Late Prehistoric in Northern San Diego County during the Late Holocene it is necessary to understand and determine what represents the Late Prehistoric. Many archaeologists in San Diego point to the introduction of the bow and arrow technology to the area as marking the beginning of the Late Prehistoric. (Hale 2009). This would place the beginning at around 1500 B.P. (Glassow 1996; Koerper *et al.* 1996). If there is a transition from the Archaic to the Late Prehistoric surely there must be some key cultural components that distinguish it, other than the introduction of new hunting technology. Is there a change in the technology used to make stone tools? The simple answer is 'no'. Could it be the introduction of the cremation of human remains as has been suggested (Warren *et al.* 1998)? This is doubtful since full inhumations continue through the Late Holocene (Byrd 2001, Ezell Las Flores 1973). Is it

the introduction of ceramics or proto-agriculture? The short answer is 'possibly': these represent changes that are reflected in the archaeological record as the overall use of the physical landscape changes through the Late Holocene, and shown in Chapters 4 and 5. So what is the difference between the Middle and early Late Holocene and the late, Late Holocene? If the general timeline for the bow and arrow introduction is correct, it occurred at the beginning of a time of environmental stress. It is apparent that the introduction of this technology did not immediately result in a change in how the prehistoric inhabitants were either using or modifying the physical landscape. However, the above discussion pointing to residentially re-organizing around sources of water is, I believe, essential to understanding the response to the climatic stress of the period extending from 1450 B.P. to 700 B.P. There is limited evidence showing focused use of the inland/upland area of Camp Pendleton during this time. Rather, it is likely the focus was on using resources around the residential areas at such sites as CA-812, 10156, 4417, etc. There is little evidence that smaller Limited Activity and Dinner Camps were used during the early part of the Late Holocene sequence. The Limited Activity and Dinner Camps in the inland areas away from both Red Beach and the Santa Margarita River simply did not exist during this long stress period nor did they exist during the Middle Holocene. There is no evidence for a change in the pattern of land use and lithic technology exhibited during the Early Holocene and ending with the late period of the Late Holocene.

It is my contention here that the late, Late Holocene or what is called the 'Late Prehistoric' in the archaeological literature began post-700 B.P., and is better understood as change in how the people were using and modifying their landscapes. The evidence points to a major shift in not only the uses of the physical landscape, but also in how spaces were being conceptualized. It is in this shift where we see the coming together of the divergent elements of site location and aggregation, PDL chert, *Donax gouldii*, ceremonial rock art sites, and climate. It is here we see a major shift in the taskscapes of this region.

It is apparent that around 700 B.P. to 645 B.P. something significant is beginning to happen in northern San Diego County archaeology. We begin seeing the use of areas not directly associated with sources of water. *Donax Gouldii* becomes prevalent if not dominate in nearly every shell midden and is present in significant quantities in upland sites 14 km from the coast. Movement from beach to uplands is clearly very significant and represents an altered taskscape and movement patterns away from just coastal and riverine landscapes but encompassing the broader physical landscape of the region.

The upland areas such as Case Springs are being used for temporary settlement and food stuff procurement and processing. PDL chert is being exploited in what could only be termed massive quantities. Beginning at 530–420 B.P. large residential sites are being formed in the Las Pulgas Study Unit, and approximately at this time the Residential Bases form into large settlements that by the time of the Spanish conquest would be fully functioning permanent villages. It is this coalescence into a structure of villages with outlier Limited Activity and Dinner Camp areas that is the hallmark of the late, Late Holocene in this part of San Diego County.

4.6 The Beginnings of a New Stage 645 B.P. to 200 B.P.

This section is titled beginnings because the coming of Europeans to San Diego County effectively ended the transformation of native cultures as they developed and evolved in relationship to the landscape, but instead after the coming of Europeans, native cultures evolved in response to the new dominate culture. The prehistory of southern California (and elsewhere) was often seen as a delayed and then interrupted version of progress towards agriculture as seen in the Near East or Mesoamerica. In 1955 Willey and Phillips proposed a cultural stage where agriculture was a food resource but not necessarily the primary one. Hunting and collecting were still significant roles, in fact, “it is even theoretically possible that collecting, rather than agriculture, was the effective stabilizer; sedentary life may have been a prerequisite for agriculture rather than the other way around” (Willey and

Phillips 1955:775). They go on to point out that early agricultural practices did not result in new techniques or tools that are readily recognizable (Willey and Phillips 1955). This was in contrast to many later views such as those of North and Thomas (1977), who claimed that foraging was initially characterized by an open access property regime that failed to restrain overuse of wild resources. This problem was exacerbated by population growth, to the point where a transition to private property rights under agriculture became attractive.

Throughout the American Southwest cultures have been traditionally defined by a high degree of sedentism, “but archaeologists increasingly are inclined to feel that even post-Basketmaker settlements were less sedentary than traditionally has been assumed” (Will and Windes:1989:355).

Over the past few decades various general models have been presented to explain the beginnings of agriculture. One such model explains why agriculture did not begin during the Pleistocene. In 2001 Richerson *et al.* indicated that climatic instability of low temperatures, atmospheric CO₂ levels, extreme aridity, and high-amplitude fluctuations for a few years to a thousand years made agriculture not possible during the last major ice age. Using a global scale for the transition to agriculture they find that climatic change is a driving factor and that the relatively warm, wet stable post Ice Age conditions led to reliance on specialized plant resources which resulted in the development of agriculture. The empirical problem with this perspective, however, is that archaeologists have not yet found evidence for agriculture anywhere in the world during the initial warming phase following the last glacial, even though this interval lasted almost two millennia (Dow *et. al.* 2005).

In an overview of the European situation, Robb (2013) has indicated that around 9,000 B.P. foraging was the only form of subsistence in Europe, but by 6000 B.P. farming was practiced over most of the continent. This shift

covered 3,000 years and spread was directional from southeastern Europe northwest to the Baltic and Atlantic Oceans. He makes the point that farming was generally irreversible in that few farmers in Europe have ever reverted to foraging. However, Layton *et al.* (1991) had proposed instead an approach to the transition from foraging to agriculture that shows hunting, gathering, herding, and cultivation as alternative strategies of subsistence that may be taken up individually or in various, combinations, depending on the social and ecological circumstances. The transition between foraging and agriculture is not an irreversible direction. For example, there is in principle nothing to prevent food producers from evolving into foragers.

Initial investigations of agricultural history including north America such as those by Harlan (1971) proposed three centers of plant domestication including the Near East, north China, and Mesoamerica and three non-central plant domestication areas of Africa, southeast Asia, and South America. At the time of his article the status of North American plant domestication was not known. According to Smith (1989) a number of plants were brought under domestication in eastern North America including squash, sunflower, and marsh elder. Receipt of incipient domesticated plants in the eastern United States such as maize occurred between 8000 B.P. and 4000 B.P. *Cucurbita sp.* developed in the northeast United States between 4000 B.P. and 3000 B.P. (Smith 1989). Smith (1989) indicates the initial planting of these domesticated plants began about 7000 B.P. to 4000 B.P. This occurred over a span of two to three millennia, transformed stands of colonizing weeds first into inadvertent or incidental gardens and finally, by the second millennium B.C., to intentionally managed and maintained gardens of domesticated crop plants (Smith 1989: 1568). Domesticated crops became a substantial food source at approximately 2500 B.P. to 1750 B.P.

Within the American Southwest domesticated cultigens are dated at 4500 B.P. (Upham and MacNeish, 1993). Other early dated occurrences of maize came from the Tornillo shelter and are radiocarbon dated from 2030 B.P. to 830 B.P. (Upham *et al.* 1987). Similar dates are reported from the

Fresnal shelter site in southeast New Mexico (Tagg, 1996). As Riley *et al.* (1990) show there is no evidence to support a single early introduction of maize from the southwest.

Robb (2013) points out that there is little evidence for mass migrations of agriculturalists moving into Europe, but rather migrations of small enclaves seemed to bud off a larger group. There is a parallel between this kind of pathway in North America with a slow advent of agriculture into the continent. The trajectory is from the south (Mesoamerica) into the east and southwest part of North America (Harlan 1971, Smith 1998, Riley *et al.* 1990.). As shown below the transition continued until disrupted by the advent of Europeans. Also, these movements seem to stop when encountering different environments or dense forager settlements. To the extent that archaeologists have reached any consensus, it is that the Neolithic transition happened in a 'mosaic' way, with quite diverse pathways evident not only between regions but also within any moderate-size region' (Robb 2013: 659). Interestingly Robb indicates that where foragers have access to agriculturalist objects they "often adopt them slowly and piecemeal for their own social purposes" (Robb 2013: 659). For example he points to foragers in southern France maintaining many of their traditions but adopting agriculture. This European patterns as discussed here are an analog for the transition from foraging to farming in North America.

Addressing the transition from forager to agriculturalist is a complex and variable issue. The spread of farming can be looked as a demographic advance with persistent migration searching for new farm land. Another way to address the transition is to look at it as solely the result of pressure from growing population, climate or economic adaptation which is a top down transition. Robb (2013) has proposed there are bottom-up explanations for the transition to agriculture. These are the transition as a social strategy or as a way to have surplus food to use as capital to obtain introduced products or to support programs such as feasting. This results in a piecemeal adoption of

agricultural objects such as specific tools, pottery, etc. Another explanation of the transition is as a cultural repertory or as “a state of mind or repertory of material things rather than an economy. Combined with a propensity for local-adoptions explanation ... foragers formulated new relationships between themselves, land, and ancestry” (Robb 2013: 660). A third way of expanding cultural and economic transitions would be migration, as a means to escape increasing control of lands and production through budding off new communities to escape internal tensions and the growth of hierarchal controls (Zilhao 2000). Thus the transition from forager to agriculturalist would happen in different ways in different places. It could be one transition element or perhaps have elements of all three of the transitions.

Robb (2013: 662) has pointed out a wide range of alternative choices to be made by foragers when faced with the transition to agriculture when coming into direct or even in direct contact with agriculturalists. The foragers could reject the new alternatives; they could incorporate selected elements such as axes, pots, plants, animals or exchange rather than produce the items; maintain local forager identity while obtaining through exchange objects from the agriculturalists; mix with agriculturalists while remaining a forager possibly through intermarriage, kinship, or exchange networks; learn to produce the selected part of the repertory such as making pots or having small herds or gardens; or go completely agriculturalist by adopting the new lifestyle.

Cohen (1989) has indicated that increasing sedentism leads to a rise in population possibly due to less seasonal nutrition, changing values placed on children, shorter lactation periods and birth spacing.

Moreover, not only is the carrying capacity of the sedentary forager system rapidly attained, judging by the Natufian example, but also the system itself is unstable: it generates demographic growth that cannot sustain itself beyond the specific biogeographical local conditions. Its expansion capacity is almost nonexistent. This is not the case with the farming system, where both the expansion capacity and the potential carrying capacity per unit area are of considerable orders of

magnitude culminating in a farming system that is still the primary sector of the world economyll (Bocuet-Appel 2011: 504).

Bowles provides an expanded view on why foragers would change to farming. He has shown that population increased subsequent to the transition to farming, but that the first farmers were smaller and less healthy than foragers. The findings reported here—that the first farmers were probably no more productive than the foragers they replaced, and may have been considerably less productive — favors a social rather than technological explanation of the Holocene revolution, one based on the demographic, political, and other consequences of adopting farming as a livelihood” (Bowles 2011: 4760). He points out that many foragers did not fully transition into a reliance on farming and used a more low level food production which mirrors Willey and Phillips (1955) idea that foraging continued to be a driver. This would match also up with Robb’s forager transition discussed above, learning to produce the selected part of the repertory such gardens. How have these various overarching schemes been applied to the American southwest?

Within the American Southwest “the shift from the Late Archaic to the Formative Period is characterized by the development of ceramic technology and the shift from nomadism to semi-sedentism“ (Hokanson and Gray 2010:3-9). Whalen has indicated that;

The Greater southwest participated in a familiar evolutionary sequence in which, small mobile, preceramic hunter-gatherer groups were replaced by larger societies or ceramic-using farmers whose residential mobility was either absent or significantly diminished. Nevertheless, it is clear that this was not a simple, universal progression that affected all of the Southwest to the same degree or at the same time (Whalen 1994:622).

Among the Jornada Mogollon in southern New Mexico during the Mesilla Phase “it is clear that all Mesilla people remained heavily reliant on food collecting. Some of the characteristics of the old Archaic way of life thus persisted in Mesilla times, while other patterns were altered” (Whalen

1994:627). At the end of the Late Archaic intensified gathering took place. Intensified gathering can be supplemented by two other activities, as well: intensified hunting and supplemented horticulture. Looking at Camp Pendleton, post 645 B.P. existing villages such as CA-SDI-812 were undergoing aggregation through population expansion. New villages were being established in the inland areas such as in Las Pulgas unit including the extensive CA-SDI-19392. There is an expansion of the territory being used by an increasingly dense human population. By 400 B.P. there are at least 15 dated late, Late Holocene major residential sites on Camp Pendleton and by the time of European intrusion there are seven named villages. These are focused not just along the coast and on major rivers but are found inland along streams and springs.

Cultures within the American Southwest such as the Mesilla Phase of the Mogollon are represented by the development of residential complexes that are part of a culture that was still mobile, and used pottery, agriculture, hunting and collecting. Their residential bases were generally formed around *bajadas* or ponding water. The stability of their lifestyle was generally based on substantial collecting. In addition to the cultigens of maize, *Cucurbita* (squash/pumpkin/gourd), and *Marantaceae* (arrowroot), the Mesilla Phase people collected a significant variety of wild plants. As has been recently demonstrated at such sites on White Sands Missile Range (Renn and Church 2010) these plants included representatives of a variety of wild plants; *Amaranthus sp.* (pigweed), *Acnatherum sp.* (rice grass), *Allium sp.* (wild onion), *Thalia dealbata* (alligator flag), *Asteraceae sp.* (sunflower family), *Helianthus sp.* (sunflower), *Xanthium sp.* (cocklebur), *Nicotiana sp.* (tobacco), and *Quercus sp.* (oak-acorn), *Yucca sp.*, *Opuntia sp.* (prickly pear cactus), *Agave sp.*, *Chenopodium sp.* (goosefoot), and *Cylindropuntia sp.* (cholla cactus).

The beginning of the Mesilla phase has been tentatively established at approximately A.D. 200 with the production of plain, brownware pottery, the increased use of cultigens and the increased storage security provided by ceramic vessels contributed to the inception of a

semisedentary, village lifestyle during this phase” (Renn and Church 2010:19).

Within Northern San Diego County a Late Holocene culture was identified by Meighan in 1954. He postulated what he referred to as the San Luis Rey cultural complex made up of the aceramic San Luis Rey I phase occurring just prior to contact (550 B.P.- 200 B.P.), and the ceramic San Luis Rey II phase occurring at European contact (200 B.P.- 100 B.P.). D.L. True worked at further defining the San Luis Rey complex based on his research along the inland portion of the San Luis Rey River. The majority of True’s research has focused on the inland portions of the San Luis Rey River. True pushed the San Luis Rey I back to approximately (2000 B.P. to 1000 B.P.), and the subsequent San Luis Rey II period is dated to the Late Prehistoric. In 1982 True and Waugh postulated a San Luis Rey I settlement model using a foraging pattern characterized by residential shifts during the year. According to True (1993), San Luis Rey II shifted to a collector strategy while settlement developed a strong territorial focus. The settlement and collecting focus was related to particular drainages. A bipolar settlement strategy was employed with permanent winter villages in the foothills and permanent summer camps in the mountains.

There is little evidence for True’s San Luis Rey I pattern within the Camp Pendleton area. As discussed above there is limited evidence showing any focused use of the inland/upland area of Camp Pendleton pre 645 B.P. Rather, it is likely the focus was on using resources around the residential areas at such sites as CA-812, 10156, 4417, etc. and perhaps further inland along the river and stream courses (Hale and Becker 2006). The Limited Activity and Dinner Camps in the inland areas away from both Red Beach and the Santa Margarita River simply did not exist except in very limited fashion pre-700 B.P. True (1993:17) has also hypothesized that the lower portions of the San Luis Rey drainage had sedentary villages with limited use of marine resources.

Lightfoot and Parrish (2009) consider California Indian culture to be unique in North America in terms of food production and storage, fire management, populations and linguistic diversity: “Native California supported the greatest linguistic diversity and highest population density north of Mexico, with people dispersed across the landscape in a plethora of village communities - all without recourse to agriculture (except in the Southern Deserts Province)” (Lightfoot and Parrish 2009: ix). However, the late, Late Holocene people of northern San Diego County may have some commonality with the early proto-agriculturalists in the Southwest. This included residential bases generally formed around sources of water, and substantial collection of plant resources which aided in the stability of their lifestyle. Recent evidence from White Sands, New Mexico points to the early Formative people depending on hunting or at least harvesting large quantities of rabbits (Kurota, personal communication: 2013). It is not so much that the late, Late Holocene people in northern San Diego County followed the exact same developmental trajectory as the Jornada Mogollon in southern New Mexico (Renn and Church 2010, Whalen 1994), but that there are similarities that may aid in understanding the changes under investigation. The similarities are not so great when considering the differences in physical landscape and how the people organized their taskscape. Ceramic technology may sometimes be considered an element in the move from nomadism to semi-sedentism because it can provide a relatively secure form of storage that baskets cannot (Renn and Church 2010). But in the Camp Pendleton area ceramics did not come in until very late, post 400 B.P., so ceramics played a minor role in development of a sedentary life. As Lightfoot and Parrish (2009) have pointed out, California Indians developed basketry to a level not seen in other areas of North America. Baskets were able to perform the same roles that ceramics did in the Southwest. Baskets allowed the late, Late Holocene people to develop taskscape that allowed more sedentary lifestyles.

4.7 Resource Intensification

Two different models have been presented to explain the settlement system of Camp Pendleton: these are the Coastal Intensification and Coastal Decline

models (York 2007). Hale and Becker (2006) have presented a concise discussion of the sometime contentious debate over which of the models best explicates the economic and settlement trends during the late, Late Holocene. "One side of the debate posits a decline in coastal resource use during the Late Holocene in favor of inland resources, while the other asserts that coastal resources were more intensely utilized during this same period at the expense of inland resources" (Hale and Becker 2006).

These two very different models have been postulated to explain the archaeology of California's Pacific coast. One model proposes intensification of coastal resource exploitation and a move towards a sedentary lifeway towards the Late Prehistoric (York 2007). It is postulated that more intense use of coastal resources occurred during the Late Holocene than the Early and Middle Holocene (Iverson 2007). This intensification is exemplified by Late Holocene residential locations (Byrd 1998, Byrd and Reddy 2002, 1999). Using the intensification model several researchers have suggested that sedentism in coastal areas is only possible with heavy exploitation of littoral resources (Jones 1991). This is a movement that is purported to occur along the California coast, except for San Diego County/Camp Pendleton coastline where, according to this model and unlike most of the Pacific coastline, populations did not undergo a move towards sedentism. San Diego rather went through a decline in coastal population after 4,000 BP. The first model suggests that during the Early Holocene there were many lagoons along the San Diego Coast line, such as the one at Red Beach that created a stable source of shell fish and therefore a stable population living around the lagoons. However, after 4,000 BP sea stands continued to rise and lagoons silted in causing a disruption to the shellfish, the major source of protein for the human population. This drastic change resulted in people leaving the coast and moving inland along rivers and in river valleys and in turn intensifying use of terrestrial plants and animals. In this model the coast was either abandoned completely or used on short term basis.

Such a change would, archaeologically produce either no sites or small sites used intermittently. These types of sites would be similar to the Limited Activity areas or Dinner Camps previously described. Much of the evidence for any intense occupation during the Early Holocene and subsequent decline during the Middle and Later Holocene is beneath the ocean, a victim of the rising sea stands. As a result we are left with only the evidence inland from the modern coast line. However the coast at Camp Pendleton shows few Early and Middle Holocene residential sites and no small ancillary sites. There is a distinct break in occupation following the Middle Holocene, visible only at coastal sites SDI-10728 and 15254. Site CA-SDI-811 when looking at the radiocarbon samples date ranges shows persistent if not unbroken occupation from the Middle Holocene through into the Late Holocene. Sites CA-SDI-812, 4538, 10731, and 10726 shows the coast was occupied only during the Late Holocene. Most telling is that during both Early and Middle Holocene through to the early Late Holocene, residential or at least generally large midden sites are in found in a stream or estuary setting or are overlooking a stream (Figure 4.1, 4.2 and 4.4). In the case of Red Beach these areas are associated with the Las Flores Creek and Estuary and Horno Canyon Creek. Thus neither model seems to hold true for this portion of San Diego's coast line.

In sum, neither of the alternative scenarios of coastal intensification and coastal decline as laid out by Byrd (1998) are entirely supported by our review of regional component assemblages. A more satisfying explanation of late Holocene subsistence changes requires a more nuanced interpretation of the data (Rosenthal *et al.*2001:21).

If there was marked intensification of coastal resources during the Late Holocene then there should be numerous large sites, rather than a few large sites. If there was substantial coastal decline then there should be few or no large Late Holocene sites along the coast, with only Limited Activity and lithic scatter Dinner Camps present. The large databases from Camp Pendleton may provide a better view of both intensification scenarios. Looking at the spread of these sites across the landscape across time provides a better picture of the land use.

There does appear to be a significant change from the Early and Middle Holocene. However, it is the view presented here that there is no dramatic change that occurs with the introduction of the bow and arrow technology. The change takes place much more recently, certainly after 700 B.P. and likely as late as post 500 B.P. This change, I suggest is facilitated by reduction in resource stress resulting from the end of persistent droughts and by development of basketry storage containers. This provides the opportunity to use and manipulate a variety of different areas from the coast, to the rivers and streams, and to the uplands. The landscapes became the palette against which the Late Holocene people of northern San Diego County developed their particular cultural response to their physical and ideational landscapes. They took the opportunity to develop stable and at least semi-sedentary residential areas and would have used the areas between the sites for gathering and hunting. As the broad range of foodstuff stabilized, the population grew and eventually, as hypothesized by Cohen (1981), the area would become overcrowded so that a sedentary lifestyle may have actually been forced upon these people. Whether forced or not, the Late Holocene people used the entire physical landscape and brought it together with their spiritual landscapes and developed a plethora of taskscapes that we find evidence for today. Keeley (2002) has pointed out that the shrubland vegetation that dominates the coastal ranges of California are areas of high population density and that the natural landscapes are nearly impenetrable. "Natural fire frequencies are not high enough to maintain these landscapes with habitable mixtures of shrublands and grasslands but such landscape mosaics are readily produced with additional human subsidy of ignitions" (Keeley 2002:303). The use of fire allowed type conversions from shrublands to grasslands and to a greater productivity for managed food production.

4.8 Landscape Organization during the Late Holocene

One last element points to the late, Late Holocene people in the Camp Pendleton area of San Diego County manipulating and extensively using the physical landscape. One of the tools that allowed the people to organize their

landscape physically was the use of fire. There is evidence for the use of fire by the local inhabitants. Father Juan Crespi, during the Portola expedition of 1769 observed Indians burning grass during a rabbit drive. Pedro Fages provides a brief glimpse look into the types of food eaten by the inhabitants of the village of Husime. He indicated that the natives all along the coast were cordial and presented gifts of fish, nuts, pine nuts, acorns, and seeds (Priestly, 1937:7-8). Shipek (1977) pointed out that many southern California tribes had religions that rewarded knowledge on how to increase plant and animal supplies. She indicated that repeated burning of chaparral resulted in a type conversion to a more open grassland/chaparral mixture. Keeley states that:

Post-fire shrublands and site type converted to herbaceous association, would have been dominated by important seed resources, e.g. *Salvia*, *Madia*, *Calandrinia*, and vegetable resources such as foliage, e.g. *Trifolium*, *Lupinus*, and bulbs/corms, e.g. *Dichlostemma captata*, *Brodieae spp.*, *Calochortus spp.* Following fire, diversity increases from two dozen (mostly woody species) per tenth hectare pre-fire, to as many as eighty species, largely annuals arising from dormant soil-stored seed banks (Keeley 2002:310).

Keeley continues to indicate that repeated burning reduces many chaparral species that are of limited resource value to the native people and leaves those that are more important to prehistoric inhabitants.

Repeated burning by Indians would maintain these herbaceous elements on the site and diminish the capacity of the woody cover to close in, thus placing the vegetation on a trajectory that favored persistent of a strong herbaceous component.... As a consequence, once the stand was opened up, less frequent burning would have been needed to preclude shrub recolonization (Keeley 2002:310).

Dodge (1975) compared areas described in Spanish diaries with modern conditions and concluded that many grasslands described by the Spanish are now covered by shrublands. He has hypothesized that Indians maintained the vegetation landscape in southern California as a mix of shrub land and grassland by repeated burning. Keeley (2002) has concluded that grasslands

occupied at least 25% of the indigenous landscape and was the result of type conversion of the shrub lands through anthropogenic fire.

A wide variety of wild plants as described in previous sections were collected and processed by late, Late Holocene residents of Camp Pendleton. The various plants include *Asteraceae* (sunflower), *Chenopodium sp.* (herbaceous goosefoot), *Hemizonia sp.* (tarweed), *Heteromeles sp.* (toyon), Fabaceae (legumes), *Lepidium sp.* (peppergrass), *Marah macrocarpus* (manroot), *Cucurbita foetidissima*, *Rhus laurina*, (laurel sumac) and *Solanaceae sp.* (nightshade), *Arctostaphylos sp.* (Manzanita), *Madia sp.* (herb), *Proacea*,(grasses), *Quercus sp.* (oak), *Sambucus sp.*(elderberry), *Opuntia sp.* (prickly pear), *Malvaceae* (mallow), *Festuca sp.* (bunchgrass), *Hordeum pusillum* (little barley), *Erodium sp.* (filaree), *Bromus/Avena* (grasses): (Reddy 1997, 1998, Byrd 2003, Becker and Hale 2006, York, Kirkish, and Harvey 2002). The seasonality of these species includes all four seasons. Many of these plants do best in a more open environment such as a mixed grassland/shrubland. Interestingly *Zea mays* was found in an unambiguous Late Holocene setting of a hearth feature A-4 at CA-SDI- 10156/12559/H within the Santa Margarita River Study Unit (York, Kirkish, and Harvey 2002:8-53). This may indicate a use of that cultigen. According to Reddy (1997) grass seed begin to dominate the recovered paleobotanical remains during the late, Late Holocene. For example grasses vary from 17% to 52% of the carbonized plant remains at sites in Case Springs (790 B. P. to 315 B. P).

Overall, emerging patterns of plant exploitation reveal that early Archaic coastal settlements exploited a wide range of local resources with considerable emphasis on grasses followed by legumes. Although the late Archaic sample is much more restricted, it is indicative of a narrow range of resources. This trend is well-documented in the Late Prehistoric period as grasses become a larger component of assemblages, and the number of plant families decrease, indicating that overall diet breadth may be diminishing. Furthermore, coastal and inland patterns diverge during the Late Prehistoric period as local patterns of intensive exploitation appear to be crystallizing. (Byrd, Raab, Reddy, and Wake in Byrd 2004:44).

.According to the earliest chronicles of the Spanish explorer Portola; “we went over hills of moderate height, all grassy, and halted near the water, which is in the grass, we could not judge whether or not it was running. What we did see was a great deal of water, and the spot was full of grapevines and innumerable Castilian rosebushes and other flowers. ... Very near there we found a small village (CA-SDI-812). From which three men immediately came to visit us, with eleven women and some children.” (Gaspar de Portola on July 21, 1769 in Bolton 1926).

I am proposing here that within northern San Diego County there is evidence of a change during the late, Late Holocene (post 700 B.P.) that is comparable to what was seen in the Southwest, Jornada Mogollon in a broader use of their landscapes resulting in a more sedentary lifestyle (see Chapter Five). I am suggesting the term Late Prehistoric may better represent a late, Late Holocene culture whose people employed a change in use of the physical landscape at least by post 700 B.P. and left their mark with ceremonial or religious landscape features. This change is reflected in how the climatic landscape was changing from the times of stress during the Medieval Climatic Anomaly and droughts to a more stable wetter climate. The people in the study area were organizing and using the physical landscape through more intensive collecting and at the least horticulture based on the use of fire. Perhaps even what could be considered as fire-based swidden horticulture or garden plot farming.

As pointed out in the preceding discussions the change is one of how people were using and organizing the various landscapes and developing taskscapes structured in different ways. The PDL chert quarry was a significant resource for the study area. As would be expected, occurrence of PDL chert diminishes the farther from the source, but what is not expected is that movement of the material from the source is largely to the south and east. The site at CA-SDI-19392 is the nearest residential site. Within the Spanish records it is called Chacape, and large quantities of PDL chert have been identified by the various archaeological excavations at the site. It seems probable that the

people of this community had identified the quarry as a significant element in both the physical and likely spiritual landscapes. With the direction of the flow of the stone it seems probable that if this site did not “own” the material source, it certainly controlled access to it. The *ayelkwi* or knowledge gained by its control would have benefited the residents of the Chacape village bringing about power with the knowledge.

Donax gouldii follows a similar trajectory. We see during this time, post 700 B.P. to 645 B.P., the development and use of coastal shellfish Limited Activity areas and Dinner Camps within the Red Beach Study Unit. The range of dates for the Limited Activity area shell scatter sites range from 720 B.P.- 540 B.P. (CA-SDI-19501) to 300 B.P.- 0 B.P. (CA-SDI-14503) follow the same pattern. Limited Activity milling/shellfish sites date from 395 B.P. - 130 B.P. (CA-SDI-4540) to 270 B.P.-0 B.P. (CA-SDI-14495). The shellfish Dinner Camps, with the exceptions of CA-SDI-15254 which has Early Holocene components overlain by Late Holocene components which range in date from 833 B.P. - 520 B.P. and CA-SDI-4413 to 485 B.P.-250 B.P. (CA-SDI-15253). From Red Beach the *Donax sp.* is carried inland in large quantities to Las Pulgas and Case Springs pointing to an intensification of shellfish collecting. As with site CA-SDI-19392 which may have controlled the Piedra de Lumbre quarry, CA-SDI-812 may well have either controlled access to the collecting shoreline of *Donax gouldii* or possibly controlled the actual harvesting of the shellfish.

What has developed is a culture that is not Archaic in the traditional sense but rather a Late Prehistoric semi-sedentary culture that has some aspects seen in the greater Southwest American early Formative culture (Jornada Mogollon). This very late Holocene culture exhibits control of the physical landscape, changes the physical aspect of that landscape by the use of fire, and one which manipulates the landscape to achieve a more stable resource base. I suggest that the “Theory of Knowledge” (White 1957) or something very similar played a role in how the ancestors to the modern Luiseno developed their physical landscape. White (1957) indicated that the *ayelkwi* or

Theory of Knowledge was a set of concepts and principles that touched the people's lives prior to the arrival of Europeans. *Ayelkwi* exists everywhere, it is manifest in everything and "is responsible for all appearances and relationships among things" (White 1977:3).

4.9 Landscape of Movement

A landscape that is easy to ignore or not see, especially in areas with significant alteration of the physical landscape, is that of movement or getting to and from. "Traditionally archaeologists avoided this entirely by emphasizing route, logical topography for long-distance travel through which people must have ventured, if they ventured at all. Since the hypothesis could be confirmed by presence of similar artifacts at either end, there was little need to search for actual evidence of the process" (Snead 2006:1). He continues to say that archaeologists are interested about what happens at either end of a journey and that our study methods of transects and sites provide obstacles for the study of movement (Snead 2006). "There can be no places without paths, along which people arrive and depart; and no paths without places, that constitute their destinations and points of departure" (Ingold 1993:167; see also Ingold 2007). Trails are essential to taskscapes: without access there can be no tasks taking place. Trails have histories. People move across them, events take place and of course there are places associated with them (Bell and Locke 2000). Movement would be part of the knowledge as part of *ayelkwi* or the Luiseno "Theory of Knowledge". As pointed out in the section on ethnohistory, "...the acquisition of knowledge-power forms a measure of the degree to which the individual achieves mastery over his or her material and social environment" (White 1957:2). Understanding the movement along trails would provide *ayelkwi*.

Movement involving the coast is generally felt to have been linear from the coast inland up the various river and stream courses (Reddy 2006). This inherently seems logical since the major Late Holocene residential sites are situated along streams and rivers and movement would be along the drainage. However, this only works if the assumption is made that all

relationships are only between sites within the same water drainage. We know from ethnographic evidence (Johnson and O'Neill 1998) that there were relationships between villages, not all located along the same river or stream course. Also, not all inland sites fit nicely along stream courses. Additionally, resources in the form of recovered artifacts, features and refuse in middens may have a source that may or may not be located to a specific location. Plotting this can result in a general movement landscape.

4.10 A Taskscape Example

Looking at the pattern for Residential Base sites (Figure 3.7) within the Red Beach Area that falls within the last millennium covering a time span of 1000 B/P. to 100 B.P., we see a time when there may be people using four individual areas to carry out activities represented within multiple taskscapes. These activities would be bounded by the six neighboring and chronologically overlapping sites, potentially co-occupied between 1780 B.P and 107 B.P. (Figure 4.10). Over the hundreds of years of shifting tasks a boundary definable in archaeological terms was developed. It is useful to remember that site boundaries are based on a Western European construct of jurisdictional boundaries. In other words a site boundary carries the same weight as a legally defined property line, or community boundary. To the archaeologist a site boundary is fixed in space and often in time. SDI-10723 is a good example of a Residential Base site. It demonstrates internal spatial patterning within two distinct strata. Stratum 1 is a 50 cm thick late, Late Holocene component and Stratum 2 is a 10 cm intact Early Holocene concentration. Becker and Iverson (2007) identified four Late Prehistoric locales within SDI-10723 demonstrating diverse and high artifact concentrations. The 50 cm thick midden is vertically dispersed likely due to bioturbation and the effects of modern farming, however, "horizontal spatial patterning is still relatively intact within Stratum 1" (Becker and Iverson 2007:314).



Figure 4.9 Red Beach Residential Base Sites (Prepared by S. Berryman using Google Earth and Camp Pendleton archaeological site data).

Using the horizontal patterning it is possible to define these artifact concentrations as representative of taskscapes. Concentration 10 contains flakes and shatter with groundstone. Concentration 18 has a high artifact density and diversity including bone, flakes, exotic stone, shatter and tools, (Becker and Iverson 2007). It has a ground stone cluster and discrete locations of stone and flakes. Concentration 29 contains a feature described as a void of artifacts surrounded by concentrations of flakes, groundstone,



Photograph 4.1 Site CA-SDI-10723 Locus B, Looking West towards the Ocean (from Becker and Iverson 2007:66).

bone and exotic stone. Based on tools found including chisels, denticulates, and drills suitable for wood and thatch working, the void area was interpreted as a structure, likely a residence. Concentration 52 is a:

...high diversity locale that also contained discrete activity areas. Flakes appear to be dispersed throughout the cluster. Shatter is found predominately along the northeast periphery of concentration, with ground stone isolated in the northwest portion. The ground stone cluster would represent either a vegetal processing area or cooking stones since ground stone is frequently recycled for this purpose. Tools and exotic stone are located in the center of the concentration and along the southern periphery. Finally, bone is also found in the center of the concentration, and along the eastern periphery (Becker and Iverson 2007:216).

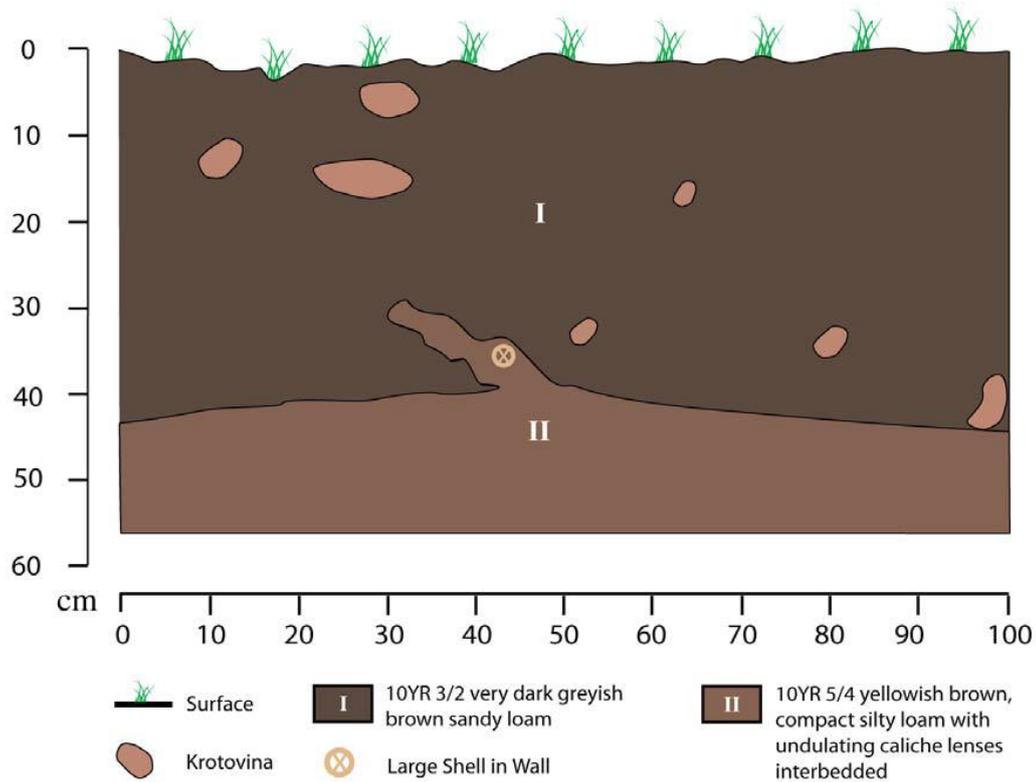


Figure 4.10 CA-SDI-10723 Strata I and II (from Becker and Iverson 2007:73).

Looking at these concentrations as tasks we can well imagine “clusters” of activities or tasks taking place over the area defined as SDI-10723. These clusters of activities would occur within landscapes of topography, material, religion, time, and climate that intersect at the taskscape that may well extend beyond the bounds of the site. Each taskscape can overlay multiple landscapes. Concentration 18 may actually represent multiple overlapping tasks that are reminiscent of Limited Activity areas where a number of individual tasks take place including making and sharpening stone tools, meal preparation, consuming the meal and finally disposing of the remnants of the meal. Becker and Iverson suggested that Concentration 18 was a communal work area. So by looking at the individual artifact concentrations as elements within the taskscapes the pattern of use within the site becomes more apparent. During the Late Prehistoric occupation of SDI-10723 (650 B.P.-435 B. P.) the taskscapes show a shifting use rather than a site with fixed areas of

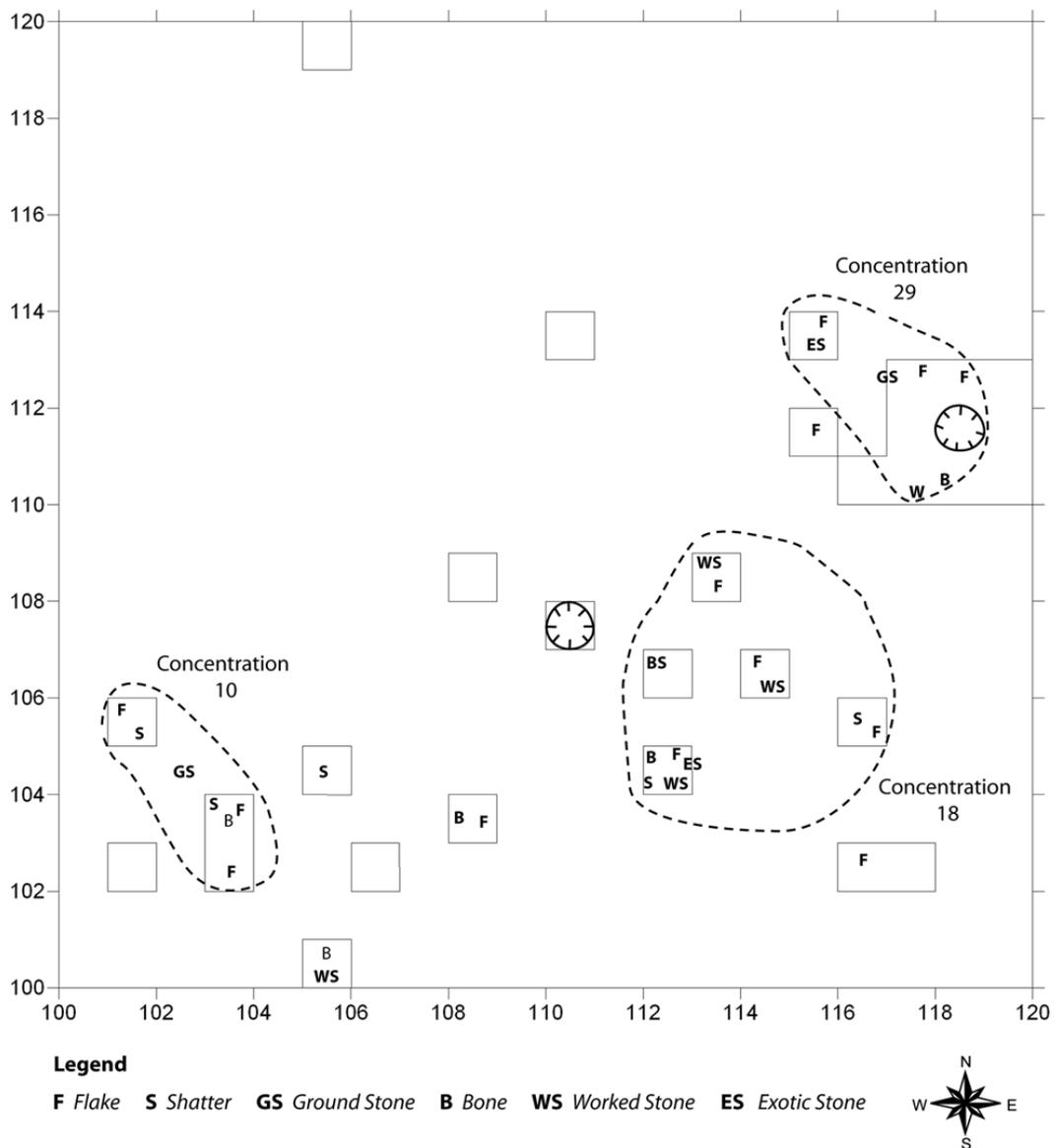


Figure 4.11 High density spatial distribution of material remains for Block A, Stratum I, with Concentrations, 10, 18, and 29. The artifact void in Concentration 29 is shown (from Becker and Iverson 2007:215).

use. They show taskscapes being used and then abandoned around the time the large residential base CA-SDI 19392 was beginning to be used in the Las Pulgas area.

4.11 Discussion

If an observer had been able to land on Red Beach during the Early Holocene the scene visible would be people interacting with an entirely different physical

landscape. At 8,000 B. P. to approximately 5,000 B. P. Red Beach in the contemporary sense would not exist. There would be a sandy beach two km further to the west. Transiting inland there would first be a saline bay followed by a slough finally ending in an inland freshwater lagoon. During this two km trip there should be residential and resource collecting areas all along the shore line. The Early and Middle Holocene prehistoric inhabitants would be carrying out their daily activities in a variety of taskscapes. It is unfortunate that these sites are now under many meters of sea water and sand so we have to infer past taskscapes from partial preservation. However, what is not supposition is that at the mouth of the Las Flores Creek emptying into Las Flores lagoon there would be people carrying out residential tasks. For a nearly 2,000 year time span (8,500 to 6,500 B. P.) there would be activities taking place at four sites within the Red Beach locale. Looking northeast at around 8,000 B. P. there would be another small aggregation of people. At what is now SDI-811, there would also be people working and living. The people living here would be 2 km from the sandy beach but near the slough and lagoon. Based on the types of marine shell present they were collecting shellfish in the mudflats along the shore line of the lagoon and slough. These now submerged collecting activity areas would have been parts of taskscapes. This lagoon/estuarine landscape would have provided excellent locations to carry out a variety of hunting and fishing tasks. In addition to the physical landscapes there would also be cultural or religious landscapes which would intersect with physical landscapes that would be conducive to cultural/religious taskscapes.

These residential bases would exhibit the focal points of multiple taskscapes including living and cooking areas, tool making, shell fish shucking, etc. It is probable that the populations at any one of these sites were small, not more than a few extended family groups. Based on radiocarbon dates, sites SDI-811, 10728, 10723, and 15254 all show use during the Early Holocene (Early Archaic). Use of CA-SDI-10723 preceded that of the other sites and was ending at the time CA-SDI-10728 was being used. Sites CA-SDI-10728, 15254 and 811 were all used for a nearly 600 year period from approximately

7,600 B. P. to 6,000 B.P. These sites would be an inland expression of a people that heavily used marine resources for their livelihood. The physical, climate and time landscapes would be conducive for a range of taskscape that are today seen as the archaeological sites. There is no evidence for Middle Holocene use further inland than these sites with the exception of a few sites located along rivers or major streams such as CA-SDI-12100 overlooking Pilgrim Creek in the Santa Margarita Study Unit. What might be present during this time would be inland taskscapes associated with the lagoon and coastal sites. These sites are close to the inland end of the ancient lagoon, they are generally small in extent, and even SDI-811 is small in that it appears that during the Early and Middle Holocene various tasks were shifting across the site over time. These taskscapes would be similar to those associated with the Limited Activity Areas and Scatter sites as commented upon above.

As the sea encroached inland during the Middle Holocene, evidence for use of the area diminishes. Only SDI-811 shows a consistent pattern of use, if not continuous use right into the Late Holocene. It is during the Late Holocene that the first uses of SDI-812 and SDI-10731 are apparent.

During the late, Late Holocene the observer at Red Beach would see an area whose primary use was the task of resource procurement. There would be some evidence of residences at CA-SDI-1072 and CA-SDI-812. From the beach houses would be visible and people would be present. There would be people spread along the beach digging for clams, out in canoes fishing or using nets in the surf line to catch fish. Further inland there would be people in areas between or possibly in front of the houses flaking stone, making tools, processing plant and animals for food, and likely cooking meals.

In late summer or early fall the observer would note people harvesting grasses and other plants they have been managing through the use of fire. The tasks taking place may be reminiscent of the example Ingold (1993) used on the painting of the harvesters. The plants harvested would be growing in

large patches over and between the archaeological sites. Acorns would be derived from the oak groves along the coastal foothills and terraces. The key is that in the Late Holocene activities would not only be occurring at SDI-10723, but also at SDI-812, SDI-10728 and 10726 as well as beyond the “formal” site boundaries in taskscapes that result from the intersection of landscapes such as topography, climate, soil, and time. On any given day there would be people using the spaces and paths beyond the sites. These would be taskscapes subsequently archaeologically defined by the presence of isolated artifacts and other evidence of activities. The Late Holocene physical landscape should be seen as an actively used landscape area where people pass between and into the taskscapes of harvesting, tool manufacture, marine shell fish shucking or smoking, or lithic resource procurement. The people could be carrying out activities that leave little or no trace other than the occasional isolated stone flake or tool.

Continuing inland and moving to the north, the landscape would change: there would be people present collecting shell fish, processing and gathering salt. These people away from Red Beach would collect the foodstuffs, have a brief meal, possibly camp and then move up the canyons to the inland residential bases. Not all taskscapes would be used at the same time; the radiocarbon dating points to large scale shifting spatial patterns of use that demonstrates preferences for specific locales. Taskscapes are the aggregate of various elements and can contain a variety of landscapes including topography, time, vegetation, religious, climate, etc. Taskscapes are the result of the inferred intersections of different landscapes and tasks, activities, and elements identified and constructed archaeologically.

At the Las Pulgas area there is a large residential site (CA-SDI-19392) exhibiting many of the same elements that make up the taskscapes along the coast at Red Beach. There is no coastal landscape made up of the shore line; however the Las Pulgas area contains a significant element from the coastal landscape, the shellfish, collected and processed within taskscapes at Red Beach. A major difference in the Las Pulgas area would be in the processing

of PDL chert quarried from the Piedra de Lumbre hill to the west. The PDL chert extraction would be done within taskscapes dedicated to that activity. The landscapes involved in this PDL chert taskscape would be the topographic point of Piedra de Lumbras and the locations where the stone was processed and then transported. The taskscape may actually tie together various landscapes such as the Piedra de Lumbras hill and the *ayelkwi* which represents the religious landscape of the PDL chert. The landscape of movement is visible at this site in the form of the elements mentioned above including the PDL chert, and *Donax sp.* and other shellfish. The items had to be transported from their point of origins to the site.

The late, Late Holocene people brought their physical landscapes together with their spiritual landscapes. The intersection of these landscapes can also be seen at sites such as CA-SDI-9824 and 14631 where rock art either in the form of pictographs or cupules is an integral part of the sites. At CA-SDI-9824 there is an intersection of the physical and the sacred. We see rock art, PDL chert, and *Donax gouldii*. The taskscape present at the intersection of the appropriate topographical and physical (proper stone for rock art), time, and climate landscapes coupled with the religious landscapes. The intersections of these landscapes would provide the opportunity for the religious practitioners to gain power/knowledge or *ayelkwi*.

These late period Late Holocene people are moving a variety of material from the coast to the inland, with little archaeological evidence of movement from the inland to the coast seen in the taskscape associated with them as implied by the data from the coastal and inland sites. There is a wide variety of elements or activities related to the taskscapes that range from simple collecting and harvesting areas, to processing and cooking, Limited Activity areas such quarrying PDL chert, PDL chert processing, and religious locations that bring together various components of the activities from across the landscapes and intersect to form taskscapes. Recognizing the changing taskscapes aids in understanding the changes occurring with the people of this late period. The taskscapes are reflective of the changes and it is these

changes that are marked and seen. The archaeological cultures in the traditional sense seen in the Late Holocene prior to 640 B.P. and to a greater extent 400 B.P. were not all that different from the Middle Holocene. The taskscapes were very focused around the topographical landscapes related to major rivers and streams, with only limited use of the broader uplands. Post 640 B.P. there began an expansion of the taskscapes seen through the intersection of the landscapes of topography, climate, chronologies, ocean shoreline and movement and the elements of PDL chert, *Donax sp.*, the prescribed or controlled use of fire, and the religious landscape exemplified ethnohistorically by *ayelkwi*. The taskscapes and archaeological sites point to a time when sedentism was developing with defined village boundaries (White 1963) reflecting that more sedentary life.

CHAPTER FIVE SUMMARY AND CONCLUSIONS

The intent of this thesis has been to present, use and interpret information originally collected during CRM studies on Camp Pendleton. Using this important and substantial body of data it was hoped to develop our understanding of the prehistory of Southern California from about 7500 B.P. to 100 B.P. The major chronological focus is on the occupation of 700 B.P. to about 150 B.P. or the latter period of the Late Holocene. The majority of the studies used in this thesis were prepared between 1996 and 2009 when I was the Camp Pendleton Cultural Resources Manager. The studies were carried out under my direction and this thesis reflects my compilation, synthesis, analysis and original interpretation of the data derived from the studies.

Camp Pendleton is within San Diego County, California and stretches from the San Diego and Orange County border south approximately 27 kilometers and 24 kilometers inland from the Pacific Ocean to the foothills (Figure 1.1, occupying an area of 50,586 hectares. Within the study area five study areas were defined, the Red Beach coastal area, Las Pulgas, Case Springs, Santa Margarita River and San Mateo Creek (Figure 3.1). The sites within these units were classified following the typology developed by Byrd *et al.* (2004) consisting of limited activity locales, camps and bases. This typology worked well for the analysis within this thesis. Refinement in definition of what constitutes a residential base may be needed when going from sites of Middle Holocene to Late Holocene age.

At the Red Beach Study Unit, 23 of the 65 recorded archaeological sites have been dated with a total of 120 radiocarbon samples. The densest concentration of sites is around Las Flores Creek (Figure 3.2). There are 35 limited activity sites of which 12 have been dated within the late, Late Holocene. Nine of the 21 dinner camp sites date within the same period. The 13 residential bases range in age from the early to late, Late Holocene. One of these sites is an ethnohistoric village called Huisme.

The Las Pulgas Study Unit is in the central part of Camp Pendleton (Figure 1,4). It is made up of Las Flores Creek, Las Pulgas Creek, Aliso Creek, and Piedra de Lumbre Creek. Eighty-four sites have been recorded in the area with 25 being dated with 43 radiocarbon samples. Seven limited activity areas, six dinner camps, and seven residential bases date to the late, Late Holocene. The earliest inland residential base dates between 540 B.P. to 405 B.P. One ethnohistoric village Chacape is located in this unit.

Case Springs is in the northern central uplands part of Camp Pendleton (Figure 3.22). This area of Camp Pendleton forms the head waters of the San Onofre Creek. Forty-five archaeological sites have been recorded within the Case Springs Study Unit (Figure 3.22), and seven of these have been dated. Six are limited activity areas dating within the late, Late Holocene. Only one site, CA-SDI-5135 dates prior to 700 B.P. All three of the dinner camps post-date 700 B.P.

The dominate feature in the Santa Margarita River Study Unit is the river channel. It passes through 27.6 km of Camp Pendleton. Its major tributaries on the base are De Luz/Roblar Creek and Wood Canyon. There are 129 archaeological sites recorded in the study unit covering the full range of sites types. Seventy-four radiocarbon dates were recovered from 19 sites with dates varying from Early to Late Holocene sites with Early Holocene dates found at two dinner camps and one residential base (see Chapter 3). Late Holocene dates have been recovered from two residential bases and five dinner camps. Two ethnohistoric villages are recorded within this unit, Zanche and Topomai, the largest village noted by the Spanish in the Luiseno territory (Figure 3.29).

The San Mateo Study Unit includes the San Mateo and Cristianitos Creeks, estuary, and uplands. There are 56 archaeological sites in the San Mateo Study Unit ranging from Early to Late Holocene in age. A dated limited activity area and a dated dinner camp are both Late Holocene in age, pre-dating 700 B.P. Of the eight residential bases that have been dated only two exhibit

Middle Holocene dates and only one of these CA-SDI-13658 is exclusively Middle Holocene in age. All the rest also exhibit Late and late, Late Holocene dates (see Chapter 3). Two ethnohistoric villages, Panhe and Zouche, are in this study unit.

This thesis asked if it is possible to use data derived from CRM studies on Camp Pendleton to address issues related to Holocene occupations. Within the late, Late Holocene significant movement into the uplands and away from the rivers and streams is apparent. Archaeologically there are landscapes and landscape elements that reflect this movement. These elements are *Donax sp.* shellfish, PDL chert, anthropogenic fires, and landscapes of climate and trails. The radiocarbon landscape ties it all together by giving a time depth to the changes occurring in the late, Late Holocene, post 700 B.P.

The transition to a settlement pattern that crosses the physical landscape is greater than just a switch from a primary residential focus along rivers and streams and coastal beaches, it is reflective of a change in how the physical landscape is both envisioned and used by the prehistoric inhabitants. This expansion is seen at such sites as CA-SDI-19392 or Chacape which developed post 500 B.P. At Chacape there is evidence in the form of large amounts of red PDL chert that is indicative of people developing control over the PDL chert quarry. The use of PDL chert at sites is shown in Figure 4.5. Directionality of movement of the PDL chert (as shown in Figure 4.6) from the quarry toward the Kumeyaay territory is striking. Late Holocene expansion in the upland sites such as Case Springs, which with the exception of CA-SDI-5135 (1160-950 B.P. and 790-680 B.P.), generally shows use post 640 B.P. Within these sites quantities of *Donax sp.* are found over 15 km from the ocean. While shellfish remains might not be unexpected at inland sites, the quantities are significant (Chapter 3) as are the dates at which the type of shellfish becomes prevalent, post 700 B.P.

Climate is shown to be a significant landscape that affects human populations. This thesis shows in Chapter 4, Table 4.1 that the climatic landscape and

histories are significant factors in the development of California prehistoric cultures and indeed throughout the greater Southwestern United States (Stine 1994, Larson and Michaelsen 1989, Larson unpublished, Larson, Neff, Graybill, Michaelsen, Ambos 1996, and Grissino-Mayer *et al.* 1997). A wetter and cooler climate in the late, Late Holocene allowed for an expansion into the uplands and inland areas away from the coast. This expansion is unique during the later Holocene in that there were changes from hot dry period to wetter cooler periods earlier in the Holocene that did not result in rapid expansion into new territories that are coupled with large residential bases and increased numbers of limited activity areas and dinner camps.

Anthropogenic fires as discussed in Chapters 2 and 4 played a significant role in the use of the physical landscape by the prehistoric people. Fires were used to clear vegetation, promote the growth of specific plants and to prepare areas for planting. From a purely comfort concept fires were used to reduce Coastal Sage Scrub and inland chaparral to allow for easier passage between residential bases, and activities areas (Keeley 2002). Without fire and burning of tall dense vegetation use of and access to many taskscapes would be nearly impossible. There is no evidence that controlled fires were a new phenomenon in the late, Late Holocene, but it seems that fire coupled with changed climate, exploitation of new areas and uses of materials and resources such as the PDL chert, and *Donax sp.* was new.

5.1 Conclusions

The Holocene archaeological sites are spread over the modern Camp Pendleton landscape in clusters. Post 700 B.P. these clusters of sites significantly change from elements of all three types (limited activity areas, dinner camps and residential bases) to primarily large residential bases, no longer clustering but appearing individually. These bases are inland as well as along the coast. By 400 B.P. these sites had developed into what the Spanish described as villages or *rancherías*. They represent a significant shift in use of the physical landscape. Early and Middle Holocene sites are found primarily along the coast at or near sources of water such as springs, creeks and rivers.

Inland sites from these two periods are in a few limited locations including CA-SDI-13658 (San Mateo Study Unit), 10156, 13986, 12628, 4416, 4417 (Santa Margarita River Study Unit and 12100 (Pilgrim Creek of the Santa Margarita Study Unit). These site locations can be seen in Figures 3.8 and 3.9. There is no evidence of sites from the Middle and Early Holocene periods inland from the major water sources but rather the sites follow the rivers and stream terraces. If other sites from these time periods are found along these features, those sites will likely be buried under alluvium (Figures 2.7.2, 2.7.3, 2.7.5 and 2.7.6) or will be submerged west of Red Beach as shown in Figure 2.7.4. These submerged Red Beach sites would be found along the edges of the ancient lagoon, bay or slough at the mouth of Las Flores Creek. Within the Late Holocene sequence there are ten sites that date before 700 B.P. All of these sites are along the major water sources (Figure 4.8) of the San Mateo Creek, Las Flores Creek and Santa Margarita River. Only one of these sites, CA-SDI-5135, is in the uplands at Case Springs. It dates to just before the end of the prolonged drought period. There are approximately 71 sites that are late in the Holocene sequence (Figure 4.9). These sites include all three types of sites discussed in Chapters 2 and 3. All of these sites have dates that are after the end of the prolonged drought.

As described in Chapters 2 and 3 the Middle Holocene climate was varied but generally mild, which should have provided a climate conducive for settlement and use of the inland and upland areas away from the major sources of water. However Middle Holocene sites were primarily located along lagoons and estuaries, therefore placing most within the Santa Margarita River Study Unit. Their location may well have been predicated on the presence of the shallow lagoon that extended into the Ysidora Basin (Figure 2.7.4). The Early and Middle Holocene sites recorded at Red Beach would have been the inland expression of a land-use that focused on the prehistoric lagoon, bay and slough shown in Figure 2.7.1. As the sea stands rose nearly 2 km inland during this period more use of what would have been the inland areas would be expected. However, there is no evidence from Camp Pendleton that as people moved ahead of the slowly rising water they moved into the modern

upland areas. Rather they continued with their traditional aggregation around sources of water, remaining focused on marine-based resources with the sites of CA-SDI-811, 10723, 10728, and 15254.

Sites that are post 700 B.P. reflect changes from a riverine and coastal focus to a broader base and more extensive use of the physical landscape. The change is not necessarily one of a technology that reflects another way of hunting and exploitation of the coast and riverine resources, but rather one that is significantly different in the ways the physical landscape was exploited. The change is reflective of how the late, Late Holocene people modified and used the physical landscape. There is ethnohistoric evidence that suggests management and manipulation of vegetation over a broad area through the use of fire. This was not through random fires but rather purposeful fires to control for specific plants. Fire was used to modify the physical landscape (Keeley 2002, Lightfoot and Parrish 2008). One of the purposes for these fires would be preparing the land for planting of desired plants such as grasses that produce seed heads (Shipek 1977). The changes to the landscape are reflected also in the paucity of limited activity and dinner camps within the Middle Holocene, and the appearance of these types of sites post 700 B.P. in not just the uplands but also along the coast. During this time there is also growth in the numbers of residential bases that are no longer just focused along the coast or the Santa Margarita River and San Mateo Creek but also inland. There is strong evidence of the continuing use of coastal resources, as shown in the Chapter 3 discussion on CA-SDI-812, 10723, 13325 and ORA 22. The clustering of dates at the coastal limited activity areas and dinner camps post 700 B.P. and often post 500 B.P. suggests that there is more intense use of coastal resources in the Late Holocene. However, it is difficult to postulate definitive uses of coastal resources during the Early and Middle Holocene since most sites from those periods are submerged. The quantities of shellfish found in the inland/upland areas such as Case Springs point to a continuing use of coastal resources into the Late Holocene. Resource intensification along the coast also appears to be a significant change from post 700 B.P., perhaps resulting from stress reduction due to the end of

persistent droughts discussed by Larson and Michelson (n.d). and Grissino-Mayer *et al.* (1997). The reduction in environmental stress may have facilitated an expansion in population, seen archaeologically in the rapid appearance and expansion of large inland residential bases and ancillary sites. The growth in the residential bases provided the opportunity to expand into and manipulate a variety of different areas from the coast, to the rivers and streams, to the uplands.

There are significant changes in the characteristics of sites from the Middle to the late, Late Holocene. These changes are in a number of areas that have been discussed within this thesis. The first is in the nature and quantities of the shellfish as described in Chapters 3 and 4. Post 700 B.P. and especially post 500 B.P. large quantities of *Donax sp.* are found in inland and upland sites, possibly supplementing the foodstuffs gathered in these locales. PDL chert debris is much more abundant in the late period of the late Holocene. Particularly at CA-SDI-19392, 14170, 4416 and 12101 large quantities of the lithic material are found in these sites that post date 700 B.P. and generally post date 500 B.P. It can be hypothesized that some of the sites, such as CA-SDI-19392 and 10700 and possibly 14170 are placed strategically to result in gains of *awelki* through control of the changeable red stone PDL chert. A possible reason for the extensive use of *Donax sp.* in the Red Beach area north to Case Springs is the availability of the shellfish coupled with the attraction of gaining knowledge through the collection, processing and distribution of this food, which would result in a broad-based resource and religious taskscape based on the control of *Donax sp.*

The archaeological changes across the topographic landscape related to the chronology or radiocarbon landscape have been addressed throughout this thesis. The chronological changes are seen in the climate and resource landscape. The climate landscape is the dynamic landscape seen within the archaeological record. Even within the relatively stable climate recorded post 700 B.P. there are changes that can be detected. While this period is generally mild and wet, there are periods of dry and possibly drought. The

long drought period recorded prior to 700 B.P. had short periods of increased precipitation (Grissino-Mayer *et al.* 2002), thus allowing the inhabitants of the American Southwest to adapt to increased moisture. The precipitation pattern would change within 10 to 50 years with an adaptation back to a dryer climate. When the “mega” drought ended post 700 B.P. there was a concomitant change in the use of the topographic landscape by the inhabitants of Camp Pendleton. Chronologically this did not occur immediately, but rather the change was fairly slow until at least post 640 B.P. when the variety and numbers of sites increase within this area. It appears to be a delay in the response to the climate change before there is a cultural change with expansion in the number of sites across the physical landscape. The reaction may have been conservative because the drought had been prolonged and previous climate changes were short lived.

Regardless, the adaptive change resulting from the end of the prolonged drought was slow in coming, but when the change did occur, chronologically the change was rapid. It seems that within less than one hundred years expansion into the inland/upland areas had occurred (Chapter 3), the resource base had been expanded to include the broad inland terraces and valleys that now had large residential bases and both limited activity areas and dinner camps. The use of the small bean clam or *Donax sp.* was expanded and shellfish remains (*Donax sp.*, *Chione sp.*, and *Argopecten sp.*) are found in the upland Case Springs area at sites such as CA-SDI-5141. The use of PDL chert also expanded during the late, Late Holocene and is found in large quantities in sites east and south of the inland quarry. Three PDL chert projectile points were recovered from CA-SDI-5139 in Case Springs.

An issue this thesis has tackled is determining if there is a consistent and meaningful change noted through the longer periods represented by the Early through the Late Holocene. Cultural change has been shown to be an element throughout the period from the Middle to Late Holocene with the earlier periods appearing to be relatively conservative with what could be characterized as explosive change occurring in the late, Late Holocene. As

discussed above change during the late portion of the Late Holocene involved expansion of large residential sites, use of non-riverine inland areas, and use of PDL chert and *Donax gouldii*. There can be seen an acceleration of change in the post 700 B.P. period with the expansion of new residential bases, dinner camps and limited activity sites in the inland areas away from the rivers and streams.

Technological changes have been described by archaeologists as a driving factor or at least a visible element in changes in the cultural responses to the physical landscapes (Hale 2010). The principal technological change was the introduction of the bow and arrow, the use of which came into northern San Diego County at least 1,000 years prior to the most visible alteration in use of the physical landscapes, which is after 700 B.P. So based on the chronology, the introduction of the bow and arrow into northern San Diego County did not have a significant effect on how the inhabitants used the physical landscape.

Characterizing the nature of the occupation in the study area during the Late, late Holocene can be difficult since it was more than just the ocean and coastal plain and terraces, slough or river but rather is a broad physical landscape made up of diverse elements that include sacred areas, residential and resource procurement and processing areas, and broad fields manipulated by anthropogenic fire. Based on the numbers and size of the sites it is probable that the people practiced a sedentary way of life.

According to Willey and Phillips agriculture is a primary criterion for considering when a culture has passed into a Formative stage of development (1955: 756). Although as they state the role of agriculture in an Early Formative culture is a significant determinate of when that culture has moved from Archaic "hunting and collecting are still followed, with, almost certainly, the greatest emphasis on the second. It is even theoretically possible that collecting, rather than agriculture, was the effective stabilizer; sedentary life may have been a prerequisite for agriculture rather than the other way around" (Willey and Phillips 1955:756). This is evident along the Camp Pendleton

coast and inland area. However we have evidence for increasing sedentism only in the relatively recent past in the Late Holocene, and more particularly post 700 B.P. In this period the number of residential bases grew and they moved from being focused along the coastal streams and major rivers and the coast to more inland locations. The use of locations for resource harvesting, camping and processing resources expands to the inland during this time.

As was shown in Chapter 3 occupation of the upland area of Case Springs dates generally from 700 B.P.-500 B.P. with CA-SDI-5139 dating 540 B.P.-315. In the Las Pulgas area to the southwest of Case Springs, the limited activity areas date 700 B.P. - 500 B.P. with one site CA-SDI-10710 dating 305 B.P.-0 B.P. The large residential base CA-SDI-19392 dates 500 B.P. - 110 B.P. and CA-SDI-106712/10713 dates 250 B.P.-50 B.P. CA-SDI-14631, another Las Pulgas residential base, dates within the same time range. Even though this is a small sample of dated sites it appears that use of Case Springs occurred for a short period of time, ending at about the time the inland residential bases were forming. Case Springs sites were being used after the end of the prolonged drought, but use of the area was generally abandoned as the residential bases aggregated. A similar pattern is seen among the limited activity areas and dinner camps within the Las Pulgas Study Unit.

Archaeologically the late, Late Holocene sees significant changes in economic, social organization, and complexity. By recognizing that significant changes were going on, we recognize that the cultures in northern San Diego County were not static nor fixed into an easily definable pre-existing culture history. We are able to see that a more complex reorganization of their physical landscape, which cannot be understood simply as a series of unrelated individual archaeological sites. As the climate landscape changed and generally became more stable, generally wetter and milder (see Chapter 4) their population expanded requiring new ways of organizing the landscape away from the coast and major river valleys. It appears that they used fixed resource procurement, limited activity areas as the population grew and the large residential bases formed. To understand the relationship between the

residential bases and the wider landscape and how it is used we may return to earlier observations on such issues. Beals and Hester (1974), for example, suggested that only five percent of the ethnohistoric Luiseno territory was not used. White (1963) indicated the typical Luiseno village intensively used 85 km². “Considering a typical settlement pattern, it is apparent that a significant portion of the landscape was potentially influenced by the indigenous populations” (Keeley 2001:29). The pattern of large residential bases appearing late at Camp Pendleton, a decline in dinner camps and limited activity areas combines with the ethnohistoric data to show a more intensely used physical landscape. The data presented in this thesis point to an expanded use of the physical landscape and a more sedentary lifestyle and possible move from a foraging economy.

Using the ethnographic record has provided some clues to the use of landscapes and has assisted in created in the interpretations of the archaeological record offered here. As with much ethnography, use of analogy should be done with care. However, the ethnographies can be used to inform about the archaeology and provide clues on use of landscapes. White (1963:63) stated:

...each Rancheria [ethnohistoric village] is composed of several definite topographical units, arranged so that all necessary types of terrain are included within these boundaries, for example, oak groves, chaparral-covered slopes, river bottoms, springs, and so forth. None is so large that a man could not reach any part of it on foot in about half a day, starting from the major swelling site or village; each included all features necessary for maximum efficiency in the harvesting of food and other resources according to daily need, seasonal availability accessibility, and defensibility

To better understand White’s description of a typical Luiseno village and what is present archaeologically at Camp Pendleton post 400 B.P. we need to look to Sparkman, a shopkeeper and neighbor of the Luiseno who described movements of Luiseno people across the physical landscape.

[The Luiseno] formerly occupied not only the river valley, but also Palomar Mountain [in the mountains east of Camp Pendleton], and

there is a tradition among them that they formerly went to the coast in winter. It must not be supposed that they wandered at will over the territory; on the contrary, each band had its allotted district, in which it alone had the right to gather food and hunt...Each band seems to have guarded its allotted territory with the greatest jealousy, and more quarrels are said to have arisen over trespassing than from all other causes combined.

Taking White's figure of 85 km² of intensely used land for each Luiseno village, the seven late, Late Holocene residential bases recorded as named ethnohistoric villages would need approximately 59,000 hectares. Such an amount is slightly larger than the 50,580 hectares of land within the Camp Pendleton study area. So there would be no territory within the study area that was not being intensely used. Such a figure would then suggest that, according to Sparkman's estimate, these populations might have ranged over the whole study area but within their allotted district. Figure 5.1 shows the locations of the known ethnohistoric villages (*rancherías*) from the late 1800's. The density of the villages patterns that of Camp Pendleton. The studies by True (1966), True *et al.* (1974 and 1991) point to a similar density of sites within the traditional Luiseno territory. White's estimate also supports the need for aggregated residential bases from which most resources can be reached by a short walk. These residential bases would reduce the need for dinner camps and in some cases for limited activity areas, as has been shown above to be occurring in the Late Holocene post 400 B.P. It is possible that the later Holocene period dinner camps and limited activity areas are the result of people from other residential base/villages coming into another village's territory to collect specific resources. In fact this may be an additional twist to the movement of PDL chert across the physical landscape. The sites such as CA-SDI-14170 may be dinner camps or small temporary residential bases used by groups of people coming into the territory of Chacape (CA-SDI-19393) and trading for the chert for direct use or for other trading.

The late, Late Holocene cultural organization is focused around landscapes that included areas for growing, collecting and hunting food. As we also enter a period for which ethnographic information can inform our interpretations, we

suggest the existence of spiritual landscapes that involved a complex spiritual life, seen for example in the role of rock art sites and other important physical landscape features within their cosmology. Katuktu or Morro Hill is an example of a spiritual place, representative of other locations at which significant religious events or stories may have taken place. The religion of the Luiseno Indians is complex and multilayered (Kroeber 1925, DuBois 1908). It is reflective of their worldview which is also manifested in the archaeological landscapes.



Figure 5.1 Map of Luiseno Ethnohistoric Villages (From: Johnson and O’Neill).

For future work, correlating named elements such as Katuktu of the physical landscape with residential sites may provide other means of understanding how the late, late Holocene people organized and conceptualized their physical and spiritual landscapes. Figure 5.1 shows the relationship of Katuktu to the named ethnohistoric villages. This important physical feature is surrounded by residential sites and they are arranged around this feature. Since it is between the San Luis Rey River and Topomai, which is the major

village, it may well be that feature falls within the territory of that residential base/ethnohistoric village. If indeed this spiritual landscape element is associated with one particular village, that village would accrue *ayelkwi*.

The very Late Holocene people of northern San Diego County were at least semi-sedentary, practicing some level of agriculture or horticulture coupled with gathering and hunting: their villages become the centerpieces and focus of their daily lives. It seems the idea that the entire or at least large part of a village getting up and moving seasonally (True and Waugh 1982) is counter to the idea that the village clans controlled their territory (White 1963). It is evident that as the residential bases aggregated, the need of dinner camps and limited activities outside of the territory controlled by the village diminished and resources were brought back to the base and that resources moving out from the base such as PDL chert were imbued with *ayelkwi*. It is probable that moving outside one's village territory would involve some agreements between the clans and villages that permit either resource extraction or trade within the territory of the controlling village.

Control over resources is apparent at the large village of Chacape (CA-SDI-19392) which is the closest residential area to the PDL chert quarry and where the procurement and trade in this material, particularly to the south and east occurred. The organization of their various landscapes suggests a level of complexity that typically comes with sedentism seen in the greater Southwestern America (Willey and Phillips 1955). By recognizing the greater complexity of the late period Holocene culture we have the opportunity to better understand the complexity of the landscapes that were used and modified by the people of the Late Holocene in northern San Diego County. We can perhaps begin to see how the landscapes of this region affected the people and aided in their perceptions of place. During a public meeting on the disposition of human remains on Camp Pendleton, the Luiseno elders specified that what is important in considering archaeology and the early people is time and place. To many archaeologists time and place is a very literal concept. We identify the time a place was used and what was found

there and develop our models and propositions about the culture that used the place. To the inhabitants and descendants of that place, time and place have broader meanings and relate to knowledge or *ayelkwi*. Without stretching our views of the early people living in our study area it will be difficult for archaeologists to achieve a better understanding of the American Indian cultural and historic dynamism and sophistication that was so completely interrupted by Spanish and later Anglo-American settlers. A landscape approach for southern California, such as that suggested throughout this thesis, has many implications for the ways that archaeologists work, as well as for the past people concerned and for their descendants and contemporary representatives.

5.2 Research Trajectory and Final Remarks

Cultural Resource Management since its inception is increasingly, but not always moving from a purely descriptive to a more research-oriented discipline. Compliance with laws and regulations has been and continues to be its primary driving force. Early in CRM practice this has often resulted in purely descriptive studies. But even these descriptive studies have data that clearly have huge potential to be organized and presented in synthetic studies, looking beyond the single site. Fortunately, over the past 16 years at Camp Pendleton, the CRM studies have been strongly influenced by research, allowing the development of more goal-driven compliance studies and documentation. Being the cultural resources manager I was able to influence the studies and direct evaluation towards a landscape approach. I see the future trajectory of archaeological study in the United States generally and specifically in California continuing to move towards compliance-driven research.

Over the past few years I have seen the overall CRM approach broadened and synthetic studies of the past has begun to include more than just sites (locations and age) and artifacts (types and age). The relationship between people and the landscapes has begun to be a topic of discussion and analysis. The trajectory of the research in CRM projects is aimed at such

things as causes of social disruption in the later part of the Late Holocene, changes in diet, artifact assemblages, exchange systems, and settlement patterns. The information contained in these studies is often part of the gray literature and some is published. Regardless of its ultimate disposition, CRM research provides the archaeologist an opportunity to use what are now massive amounts of existing data in original research. The need for original excavation is diminishing at least in California as this body of CRM derived data is continuing to expand, providing a data base about which a multiplicity of questions can be asked.

As CRM research expands there is a growing realization that the climatic landscape and histories are significant factors in the development of California prehistoric cultures and indeed throughout the greater Southwestern United States (Stine (1994), Larson and Michaelson (1989), Larson (unpublished, 1994), Larson, Neff, Graybill, Michaelson, Ambos (1996). As has been shown in this thesis, while climate is a significant factor influencing the directions cultures take, it should certainly not be considered fully deterministic. During times of stress in the climate landscape it is the nature of the responses of the people being affected by climate that determines the ultimate direction of culture change. For example, as Jones *et al.* (2004:24) have demonstrated, projectile points changed very little during the Middle and early Late Holocene roughly 5500 B.P. to 1200 B.P. After this period there was a very rapid change in the technology from spear and dart points to arrowheads/bow technology.

This technological transition is coeval with a major disruption in settlement indicated by radiocarbon-based occupation sequences that show that few, if any; sites were continuously occupied through the Medieval Climatic Anomaly ... Sites occupied earlier than A.D. 1200 show signs of abandonment, and settlements first inhabited ca. A.D. 1200-1400 [750 B.P. - 550 B.P.] are single components with no signs of earlier use (Jones *et al.* 2004:24).

It is the same as seen in Camp Pendleton with sites from this time period, although within the Camp Pendleton area the change in technology was not couple with an immediate change in use of the physical landscape. As shown

in Chapter 3 most of the sites within the date range called out by Jones *et al.* the single component sites dating from post 700 B.P. and especially post 500 B.P. are being influenced by the end of the period of climatic stress with the “mega” drought (Stine 1994) ending and a prolonged period of increased precipitation beginning. Moratto *et al.* (1978) identified evidence of social disruption in the southern Sierra Nevada Mountains in the period of 1350 to 650 B.P. It is interesting that Arnold (1992) suggested development of social complexity in the Santa Barbara Channel area was people’s response to environmental stress resulting from the Medieval Climatic Anomaly. It is possible that within the Camp Pendleton area change towards increased social complexity began with the end of the period of climatic stress.

Jones points to changes in uses of the Mojave Desert northeast of San Diego during the MCA: “Occupations in the Mojave Desert during the 500-year period preceding the Medieval Climatic anomaly (1650 B.P. to 1150 B.P.), the Medieval Climatic anomaly itself (1150 B.P. to 650 B.P.), and the following 500-year period (650 B.P. to 80 B.P.) shows signs of significantly reduced use of the desert” (Jones *et al.* 2004:28). It may be that with the wetter conditions along the coast post 700 B.P. there were fewer reasons to use the desert and more to use the coastal and immediate inland areas as seen at Camp Pendleton.

While ethnographic analogy and extrapolation from the ethnographic record can be tricky, it will provide a body of information that needs to be used in determining how and why various physical landscapes were used. The Luiseno Theory of Knowledge was posited as a possible factor in site use and selection. Further research into the relationship between *ayelkwi* and site use and selection is needed. The location and use of sites post 700 B.P. can be tied to specific physical factors. These factors include resources that provide “knowledge” or power of the resource to the user. As discussed in Chapter 4 PDL chert and *Donax sp.* are two items that would confer power onto an individual or perhaps an entire village. The collection of PDL chert was focused around CA-SDI-19392; it was moved from the territory of the village of

Chacape to the territory of Topomai at CA-SDI-10156 from here it could be traded into the Kumeyaay territory. The Kumeyaay were one of the few tribes in California that recognized colors as related to direction (Waterman 1910). As described in Chapter 4 they have a story of the red stone coming from the north. So, as this stone is possessed by various people on Camp Pendleton, *ayelkwi* is gained and would likely enhance the status of the possessor. The development of a taskscape around the PDL chert quarry and the village of Chacape (CA-SDI-19392) then provides the necessary way to extract, prepare, and trade this material. It is also interesting that no trade items from the Kumeyaay territory have been noted during excavation of this site during CRM projects. So if nothing physical is flowing back to the procurers of the lithic material, then I propose it would be power through the control of the knowledge inherent in the stone.

Other pieces from the ethnographic record are very useful in understanding the use of the physical landscape such as the use of fire by the residents during the late, Late Holocene and how it was used to modify the physical landscape.

In the discussion of the Las Pulgas Study Unit it was pointed out that the QAL2 alluvium within Terrace 2 may incorporate buried archaeological deposits dating from the Middle to Late Holocene (Pearl and Waters 1998:16). The QAL2 alluvium is buried but is outside the active Las Pulgas Creek channel. As a result there may be more sites within the terrace that are not visible on the surface. Since Middle Holocene sites may be buried beneath up to three meters of alluvial fill, their discovery would demonstrate an earlier use of the inland areas than is currently thought. The implication of this could demonstrate that inland/upland uses were greater throughout the region during periods of relative increased precipitation.

Within this thesis a theme of relative settlement stability and use of the physical landscape has been shown for much of the Holocene. The Early and Middle Holocene were periods of stable land use focused around the rivers,

streams and coastline. The Late Holocene, particularly at the end of the period shows cultural changes and distinct changes in use of the land, aggregation of sites into large residential bases that require significant tracts of land to maintain a generally sedentary way of life. It is my contention that the sedentary lifeway would have developed into full agriculturalists had the Spanish not interrupted that development.

As shown in this thesis there was a significant aggregation of late, Late Holocene people in northern San Diego County. At the time of Spanish contact there were at least seven named villages in the Camp Pendleton boundaries. These residential bases held territory that as White said was made up of several definite topographical units. These were organized in such a way that the terrain with vegetation types needed to support the villages were to be found close by. This included oak groves, chaparral-covered slopes, river bottoms, springs, and (while not explicitly stated) grass-covered slopes and valleys. This aggregation into more centralized residential bases happened over a 200 to 300 year period starting around 700 B.P. and continuing through 400 B.P. During this time the population also seems to have expanded, coming together in sedentary residential bases, and began to exhibit significant social ordering. It may be suggested that at this time roles developed for individuals to be responsible for such things as when to burn the grass fields that were later harvested for their seeds, and specialists in growing and maintaining oak groves, as noted by Shipek (1971) She has proposed that the Late Holocene residents of San Diego County ancestors of the Kumeyaay, who live just south of the Luiseno and whose sites based on personal experience are indistinguishable from their northern neighbors, managed the landscape to promote the growth of a seed-bearing grass that they harvested much like wheat. They would "cultivate" the land first by burning and then by broadcasting the seed. The implication is that these seeds were a domesticated or at least partially-domesticated plant. Hale (2010) has shown that collection and processing of acorns came late to San Diego County. Again this occurs in the late, Late Holocene at a time of aggregation into large residential sites, controlled territory, social controls

being developed and if not full scale agriculture at least use of “garden” plots of cereal grasses and oak trees. The Late Holocene inhabitants of Camp Pendleton, post 400 B.P., were transitioning from forager to a forager/farming lifeway. They had accepted elements of farming including items such as pottery, sedentary life, and plants that if not fully domesticated were, on their way to domestication. We can only speculate if they would have accepted maize cultigens from farmers living to the east along the Colorado River. These late period people do demonstrate that the transition to farming in western North America was an ongoing process throughout the entirety of the Holocene and was not the result mass migration, but was driven by the force of climate and cultural factors and fits the discussion for Europe offered by Robb (2013).

5.3 Final Comment

The information used to develop this thesis was based on data collected from CRM studies, arranged and evaluated resulting in an original analysis of the prehistoric area of Camp Pendleton, California. This thesis has accomplished what it set out to do, to show that it is possible to take CRM data derived from intensive survey and associated investigations to inform about Holocene occupation in southern California. Using personal experience as a guide, CRM archaeologists have for the past 40 years told clients, private and government that the information developed from projects funded by them will be used in the future for studies of our prehistory. However, so often those data have been reported, archived and just become another part of the vast gray literature that makes up so much of outputs of CRM archaeology in the United States. Often it never sees the light of day again. This thesis shows that the CRM data can be used to investigate the prehistory of our area. Admittedly it helps when there is a consistent approach to the studies as is the case with Camp Pendleton. But as sites become scarcer in California due to their loss by land development, archaeologists will by necessity have to use the gray literature to test and develop their ideas about prehistory. Hopefully, this will result in better and more research-oriented CRM projects and studies.

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APPENDIX
RADIOCARBON DATES

Table A
Red Beach Study Unit Residential Base

Site ID	Material Type	2 SIGMA C14BP	Source
CA-SDI-811	Shell	7740 - 7500	Reddy 2004
CA-SDI-811	Shell	7740 - 7390	Reddy 2004
CA-SDI-811	Shell	5550 - 4869	Reddy 2004
CA-SDI-811	Shell	5270 - 4950	Reddy 2004
CA-SDI-811	Shell	5230 - 4860	Reddy 2004
CA-SDI-811	Shell	5130 - 4530	Reddy 2004
CA-SDI-811	Shell	4410 - 4130	Reddy 2004
CA-SDI-811	Carbon	4355 - 3840	Rasmussen 1998
CA-SDI-811	Shell	3345 - 2445	Rasmussen 1998
CA-SDI-811	Carbon	2300 - 1880	Rasmussen 1998
CA-SDI-811	Carbon	2080 - 1700	Rasmussen 1998
CA-SDI-811	Shell	1775 - 1345	Rasmussen 1998
CA-SDI-811	Shell	1285 - 0990	Rasmussen 1998
CA-SDI-811	Shell	1280 - 0980	Rasmussen 1998
CA-SDI-811	Shell	1285 - 0950	Rasmussen 1998
CA-SDI-811	Shell	1220 - 980	Byrd 1996
CA-SDI-811	Shell	1420 - 1130	Byrd 1996
CA-SDI-811	Shell	1385 - 1135	Byrd 1996
CA-SDI-10726	Shell	965-690	Byrd 1996
CA-SDI-10726	Shell	935-665, 495-265	Byrd 1996
CA-SDI-10726	Shell	920-650	Byrd 1996
CA-SDI-10726	Shell	495-255	Byrd 1996
CA-SDI-10726	Shell	225-135	Byrd 1996
CA-SDI-10726	Shell	210-140	Byrd 1996
CASDI-10726	Shell	305-0	Byrd 1996
CA-SDI-10726	Shell	145- 0	Byrd 1996
CA-SDI-10726	Shell	145-70	Byrd 1996
CA-SDI-10728	Shell	8095-7 950	Byrd 1997
CA-SDI-10728	Shell	8015-7795	Byrd 1997
CA-SDI-10728	Shell	7930-7605	Byrd 1997
CA-SDI-10728	Shell	7795-7460	Byrd 1997
CA-SDI-10728	Shell	7780-7480	Byrd 1997
CA-SDI-10728	Shell	7005- 6615	Byrd 1997
CA-SDI-10728	Shell	6700-6420	Byrd 1997
CA-SDI-10728	Shell	5060-4780	Byrd 1997
CA-SDI-10728	Shell	720-515	Byrd 1997
CA-SDI-10728	Shell	685-495	Byrd 1997
CA-SDI-10728	Shell	575-350	Byrd 1997
CA-SDI-10728	Shell	515-275	Byrd 1997
CA-SDI-10731	Shell	500- 240	York 2003
CA-SDI-10731	Shell	630-480	York 2003
CA-SDI-14522	Shell	3000-2700	Reddy 1998
CA-SDI-14522	Shell	2750-2315	Reddy 1998
CA-SDI-14522	Shell	1950-1970	Reddy 1998

CA-SDI-812	Shell	990 - 790	Hale & Becker 2005
CA-SDI-812	Shell	330 - 0	Hale & Becker 2005
CA-SDI-812	Shell	420 - 240	Hale & Becker 2005
CA-SDI-812	Shell	445 - 135	Foster 2001
CA-SDI-812	Shell	460 - 120	Hale & Becker 2005
CA-SDI-812	Shell	425 - 145	Rosenthal <i>et al.</i> 2000
CA-SDI-812	Shell	430 - 140	Hale & Becker 2005
CA-SDI-812	Shell	420 - 135	Foster 2001
CA-SDI-812	Shell	390 - 105	Rosenthal <i>et al.</i> 2000
CA-SDI-812	Shell	435 - 55	Rosenthal <i>et al.</i> 2000
CA-SDI-812	Shell	540 - 320	Hale & Becker 2005
CA-SDI-812	Shell	565 - 195	Hale & Becker 2005
CA-SDI-812	Shell	520 - 240	Hale & Becker 2005
CA-SDI-812	Shell	470 - 260	Hale & Becker 2005
CA-SDI-812	Shell	635 - 400	Hale & Becker 2005
CA-SDI-812	Shell	565 - 385	Hale & Becker 2005
CA-SDI-812	Shell	540 - 365	Rosenthal <i>et al.</i> 2000
CA-SDI-812	Shell	1182 - 942	Rosenthal <i>et al.</i> 2001
CA-SDI-15254	Shell	7590-7320	Byrd 2003
CA-SDI-15254	Shell	7585-7365	Byrd 2003
CA-SDI-15254	Shell	7570-7300	Byrd 2003
CA-SDI-15254	Shell	7470-7195	Byrd 2003
CA-SDI-15254	Shell	7430-7205	Byrd 2003
CA-SDI-15254	Shell	7385-7050	Byrd 2003
CA-SDI-15254	Shell	1075-925	Byrd 2003
CA-SDI-15254	Shell	605-390	Byrd 2003
CA-SDI-15254	Shell	530-290	Byrd 2003
CA-SDI-15254	Shell	485-250	Byrd 2003
CA-SDI-4538	Charcoal	965-700	Byrd 1996
CA-SDI-4538	Shell	780-545	Byrd 1996
CA-SDI-4538	Shell	660-500	Byrd 1996
CA-SDI-4538	Charcoal	630-460	Becker & Daniels 2010
CA-SDI-4538	Shell	605-435	Byrd 1996
CA-SDI-4538	Shell	540-370	Becker & Daniels 2010
CA-SDI-4538	Shell	450-220	Becker & Daniels 2010
CA-SDI-10723	Shell	8590 - 8330	Becker & Iverson 2007
CA-SDI-10723	Shell	8390 - 8180	Hale & Becker 2005
CA-SDI-10723	Shell	8560 - 8300	Becker & Iverson 2007
CA-SDI-10723	Shell	8150 - 7930	Hale & Becker 2005
CA-SDI-10723	Shell	760 - 540	Hale & Becker 2005

CA-SDI-10723	Shell	550-400	Becker & Iverson 2007
CA-SDI-10723	Shell	560 - 320	Becker & Iverson 2007
CA-SDI-10723	Shell	550 - 320	Hale & Becker 2005
CA-SDI-14494	Shell	1130-845	Reddy 1997
CA-SDI-14494	Shell	1045-750	Reddy 1994
CA-SDI-10006	Shell	630-245	Reddy 2000
CA-SDI-10006	Shell	465-150	Reddy 2000

Table B
Red Beach Study Unit Shell Scatters
Limited Activity

SITE_ID	Material Type	2 SIGMA C14BP	Source
CA-SDI-14501	Shell	720-540	York 2003
CA-SDI-14503	Shell	475-240	Reddy 1998
CA-SDI-14503	Shell	310-0	Reddy 1998
CA-SDI-14504	Shell	530-290	Reddy 1998
CA-SDI-14506	Shell	510-180	Reddy 1997
CA-SDI-14516	Shell	530-290	Reddy 1998
CA-SDI-14519	Shell	390-0	Reddy 1998
CA-SDI-14519	Shell	290-0	Reddy 1998
CA-SDI-14520	Shell	540-330	

Table C
Red Beach Study Unit Shell And Lithic Scatter
Dinner Camps

SITE_ID	Material Type	2 SIGMA C14YBP	Source
CA-SDI-10724	Shell	550-435	-----
CA-SDI-10731	Shell	500-240	York 2003
CA-SDI-10731	Shell	630-480	York 2003
CA-SDI-4413	Bone	833-520	-----
CA-SDI-14516	Shell	530-290	Reddy 1998
CA-SDI-14516	Shell	520 - 280	Reddy 1998
CA-SDI-14571	Charcoal		Reddy 1998
CA-SDI-14521	Charcoal	660-445	Reddy 1998
CA-SDI-14521	Charcoal	590-385	Reddy 1998
CA-SDI-15254	Shell	7585 - 7365	Byrd 2003
CA-SDI-15254	Shell	7590 - 7320	Byrd 2003
CA-SDI-15254	Shell	7570 - 7300	Byrd 2003
CA-SDI-15254	Shell	7430 - 7205	Byrd 2003
CA-SDI-15254	Shell	7470 - 7195	Byrd 2003
CA-SDI-15254	Shell	7385 - 7050	Byrd 2003

SITE_ID	Material Type	2 SIGMA C14YBP	Source
CA-SDI-15254	Shell	1075 - 925	Byrd 2003
CA-SDI-15254	Shell	605 - 390	Byrd 2003
CA-SDI-15254	Shell	485 - 250	Byrd 2003
CA-SDI-15254	Shell	530 - 290	Byrd 2003
CA-SDI-14497	Shell	515 - 275	Reddy 1997
CA-SDI-14497	Shell	450 - 135	Reddy 1997
CA-SDI-14520	Shell	560 - 330	Reddy 1998
CA-SDI-14520	Shell	515 - 260	Reddy 1998

Table D
Red Beach Study Unit Milling
Limited Activity Area

SITE_ID	Material Type	2 SIGMA C14YBP	Source
CA-SDI-4540	Shell	395-130	Reddy1997
CA-SDI-4540	Shell	200-115	Reddy 1997
CA-SDI-14495	Shell	305-0	Reddy 1997
CA-SDI-14495	Shell	270-0	Reddy 1997

Table E
Las Pulgas Creek Study Unit Lithic Scatters
Limited Activity

SITE_ID	Material Type	2SIGMA C14YBP	Source
CA-SDI-12983	Shell	750-660	Hale 2004
CA-SDI-12983	Shell	750-660	Hale 2004
CA-SDI-12983	Shell	730-650	Hale 2004
CA-SDI-14682	Organic Material	900-850/810-670	Underwood & McFaden 2006

Table F
Las Pulgas Creek Study Unit
Limited Activity Area Milling

Site ID	Material Type	2SIGMA C14YBP	Source
CA-SDI-10688	Organic Soil	480-290	Underwood & McFaden 2006
CA-SDI-10688	Organic soil	910-650 soil	Underwood & McFaden 2006
CA-SDI-10705	Charred Material	305-0	Byrd 2003

Table G
Las Pulgas Creek Study Unit
Dinner Camp/Lithic Scatter

Site Id	Material Type	2SIGMA C14YBP	Source
CA-SDI-10700	Shell	490-250	Byrd 1999
CA-SDI-10700	Shell	370-0	Byrd 1999

Table H
Las Pulgas Creek Study Area
Dinner Camp/Milling

Site ID	Material Type	2SIGMA C14YBP	Source
CA-SDI-10706	Shell	530-305	Byrd 1999
CA-SDI-10712	Shell	300-0	Reddy 2000
CA-SDI-10714	Shell	510-310	Becker <i>et al.</i> 2008
CA-SDI-14571	Shell	550-510	
CA-SDI-10697	Soil	420-400/320-270	Becker <i>et al.</i> 2008
CA-SDI-10697	Soil	210-140/20-0	Becker <i>et al.</i> 2008
CA-SDI-10697	Soil	640-590/560-510	Becker <i>et al.</i> 2008

Table I
Las Pulgas Creek Study Area
Residential Bases

Site ID	Material Type	2SIGMA C14YBP	Source
CA-SDI-10713		280-50	
CA-SDI-14631	Charcoal	270-200	Cheever <i>et al.</i> 2006
CA-SDI-14631	Carbon	430 - 110	Cheever <i>et al.</i> 2006
CA-SDI-14631	Shell	530 - 420	Cheever <i>et al.</i> 2006
CA-SDI-14631	Carbon	440 - 350	Cheever <i>et al.</i> 2006
CA-SDI-19392*	Shell	460-270	York <i>et al.</i> 2009
CA-SDI-19392	Shell	270-40	York <i>et al.</i> 2009
CA-SDI-19392	Shell	270-50	York <i>et al.</i> 2009
CA-SDI-19392	Shell	490-300	York <i>et al.</i> 2009

CA-SDI-14665*	Shell	640-305	York 2004
CA-SDI-14665	Shell	635-0	York 2004
CA-SDI-14665/14666	Shell	430-250	York 2004
CA-SDI-14665/14666	Shell	420-240	York 2004
CA-SDI-14665/14666	Shell	310-110	York 2004
CA-SDI-14665/14666	Charcoal	540-405/405-315	York 2004
CA-SDI-18990*	Shell	280-40/30-0	Berryman <i>et al.</i> 2009
CA-SDI-18991*	Shell	460-280/170-160	Berryman <i>et al.</i> 2009
CA-SDI-18991	Shell	320-0	Berryman <i>et al.</i> 2009
CA-SDI-18991	Shell	290-0	Berryman <i>et al.</i> 2009
CA-SDI-18992*	Shell	390-110	Berryman <i>et al.</i> 2009

Table J
Case Springs Study Area Lithic Scatters
Limited Activity

Site_ID	Material Type	2SIGMA C14YBP	Source
CA-SDI-5137	Charcoal	730-575	Reddy 1997

Table K
Case Springs Study Area Lithic Scatters
Limited Activity Milling

Site_ID	Material Type	2SIGMA C14YBP	Source
CA-SDI-5135	Charcoal	790-680	Reddy <i>et al.</i> 1997
CA-SDI-5135	Charcoal	1160-950	Reddy <i>et al.</i> 1997
CA-SDI-5141	Charcoal	655-505	Reddy <i>et al.</i> 1997
CA-SDI-5141	Charcoal	550-465	Reddy <i>et al.</i> 1997
CA-SDI-5143	Charcoal	680-550	Reddy <i>et al.</i> 1997
CA-SDI-5144	Charcoal	545-455	Reddy <i>et al.</i> 1997
CA-SDI-5146	Charcoal	540-315	Reddy <i>et al.</i> 1997
CA-SDI-5146	Charcoal	445-0	Reddy <i>et al.</i> 1997

Table L
Case Springs Study Area Lithic Scatters
Dinner Camp/Milling

Site_ID	Material Type	2SIGMA C14YBP	Source
CA-SDI-5138	Charcoal	691-520	Reddy <i>et al.</i> 1997
CA-SDI-5138	Charcoal	640-595	Reddy <i>et al.</i> 1997
CA-SDI-5139	Charcoal	640-595	Reddy <i>et al.</i> 1997
CA-SDI-5139	Charcoal	665-505	Reddy <i>et al.</i> 1997
CA-SDI-5145	Charcoal	525-310	Reddy <i>et al.</i> 1997
CA-SDI-5145	Charcoal	545-455	Reddy <i>et al.</i> 1997

Table M
Santa Margarita River Study Area Limited
Activity Area

Site_ID	Material Type	2SIGMA C14YBP	Source
CA-SDI-12632	Shell	4830-4560	York 2011
CA-SDI-14007	Shell	770-630	York 2001
CA-SDI-14007	Shell	420-370	York 2009

Table N
Santa Margarita River Study Area Milling
Dinner Camps

Site_ID	Material Type	2SIGMA C14YBP	Source
CA-SDI-13936	Shell	6660-6390	York 2009
CA-SDI-13936	Shell	6930-6620	York 2009
CA-SDI-13936	Shell	8330-8050	York 2009
CA-SDI-13936	Shell	8400-8180	York 2009
CA-SDI-12628	Shell	7460-7215	York 2001
CA-SDI-12628	Shell	6825-6265	York 2001
CA-SDI-12628	Shell	1945-1405	Pigniolo 1996
CA-SDI-12628	Shell	1485-1130	York 2001
CA-SDI-12628	Anodonta	1150-920	York 2001

Site_ID	Material Type	2SIGMA C14YBP	Source
CA-SDI-12628	Anodonta	975-665	York 2001
CA-SDI-12628	Anodonta	635-320	York 2001
CA-SDI-12628	Anodonta	515-300	York 2001
CA-SDI-12628	Charcoal	535-30	York 2001
CA-SDI-12628	Charcoal	305-0	York 2001
CA-SDI-12628	Charcoal	280-0	York 2001
CA-SDI-12569	Shell	280-50/30-0	York 2011
CA-SDI-12569	Shell	300-90	York 2011
CA-SDI-14748	Shell	2025-1660	York 2001
CA-SDI-14748	Shell	1800-1410	York 2001
CA-SDI-14748	Shell	1220-700	York 2001
CA-SDI-14748	Shell	605-270	York 2001
CA-SDI-14748	Shell	540-260	York 2001
CA-SDI-14749	Shell	240-260	Reddy 1998
CA-SDI-14749	Shell	605-270	Reddy 1998
CA-SDI-14749	Shell	495-295	Reddy 1998
CA-SDI-4416	Shell	7915-7755	Reddy 2004
CA-SDI-4416	Shell	7500-7255	Reddy 2004
CA-SDI-4416	Shell	4350-3835	Reddy 2004
CA-SDI-4416	Shell	535-295	Reddy 2004
CA-SDI-4416	Shell	505-270	Reddy 2004
CA-SDI-4417	Shell	7540-7320	York 2009
CA-SDI-4417	Shell	1440-1260	York 2009
CA-SDI-4417	Shell	470-270	York 2009
CA-SDI-4417	Shell	480-290	York 2009
CA-SDI-4417	Shell	300-90	York 2009
CA-SDI-4417	Shell	750-620	York 2009
CA-SDI-14751	Shell	680-550	York 2001
CA-SDI-14551	Shell	770-520	York 2001
CA-SDI-14751	Shell	691-520	York 2001

Table O
Santa Margarita River Study Area Milling
Residential Base

Site_ID	Material Type	2SIGMA C14YBP	Source
CA-SDI-14170	Shell	1285-790	York 2001
CA-SDI-14170	Shell	990-665	York 2001
CA-SDI-14170	Shell	925-510	York 2001
CA-SDI-14170	Shell	730-500	York 2001
CA-SDI-14170	Shell	670-385	York 2001

Site_ID	Material Type	2SIGMA C14YBP	Source
CA-SDI-10156/12599/H-A	Charcoal	270-205	York <i>et al.</i> 2002
CA-SDI-10156/12599/H-A	Charcoal	1165-935	York <i>et al.</i> 2002
CA-SDI-10156/12599/H-A	Shell	6165-5885	York <i>et al.</i> 2002
CA-SDI-10156/12599/H-A	Shell	6320-5880	Strudwick 1996
CA-SDI-10156/12599/H-A	Shell	6505-6040	Strudwick 1996
CA-SDI-10156/12599/H-A	Shell	6400-6200	York <i>et al.</i> 2002
CA-SDI-10156/12599/H-A	Shell	7240-6895	York <i>et al.</i> 2002
CA-SDI-10156/12599/H-A	Shell	7705-7235	York <i>et al.</i> 2002
CA-SDI-10156/12599/H-B	Bone	280-170	Strudwick 1996
CA-SDI-10156/12599/H-B	Shell	330-75	Strudwick 1996
CA-SDI-10156/12599/H-B	Shell	420-95	Strudwick 1996
CA-SDI-10156/12599/H-B	Shell	285-70	York & Kirkish 2000
CA-SDI-10156/12599/H-B	Shell	310-105	York & Kirkish 2000
CA-SDI-10156/12599/H-B	Shell	315-125	York & Kirkish 2000
CA-SDI-10156/12599/H-B	Shell	405-195/165-150	York & Kirkish 2000
CA-SDI-10156/12599/H-B	Shell	415-145	York & Kirkish 2000
CA-SDI-10156/12599/H-B	Shell	550-290	York & Kirkish 2000
CA-SDI-10156/12599/H-D	Charcoal	665-530	Pignuolo <i>et al.</i> 1998
CA-SDI-10156/12599/H-D	Charcoal	280-170	Pignuolo <i>et al.</i> 1998
CA-SDI-14060	Shell	775-250	Pignuolo & Cleland 1996
CA-SDI-12572	Shell	1525-1260	Reddy & O'Neill 2004
CA-SDI-12572	Shell	1165-885	Reddy & O'Neill 2004
CA-SDI-12572	Shell	930-660	Reddy & O'Neill 2004
CA-SDI-12572	Shell	665-505	Reddy & O'Neill 2004
CA-SDI-12572	Shell	530-290	Reddy & O'Neill 2004
CA-SDI-13986	Organic Mat	6913-6611	Schroth <i>et al.</i> 1997
CA-SDI-13986	Organic Mat	5328-4876	Schroth <i>et al.</i> 1997
CA-SDI-13986	Organic Mat	3700-3541	Schroth <i>et al.</i> 1997
CA-SDI-13986	Organic Mat	496-303	Schroth <i>et al.</i> 1997

Table P
San Mateo Study Unit
Limited Activity Area

Site_ID	Material Type	2SIGMA C14YBP	Source
CA-SDI-15123	Shell	1280-1090	Iverson & Becker 2008

Table Q
San Mateo Study Unit
Dinner Camp

Site_ID	Material Type	2SIGMA C14YBP	Source
CA-SDI-15122	Shell	1280-1070	Iverson & Becker 2008

Table R
San Mateo Study Unit
Residential Base

Site Number	Material Type	2SIGMA C14YBP	Source
CA-ORA-22	Shell	6911 - 6549	Romani 1997
CA-ORA-22	Shell	4235 - 3940	Romani 1997
CA-ORA-22	Shell	490 - 310	Romani 1997
13322	Shell	530 - 250	Byrd 2002
13322	Shell	510 - 130	Byrd 2002
13322	Shell	290 - 0	Byrd 2002
13324	Charcoal	775 - 645	Reddy <i>et al.</i> 1996
13324	Charcoal	520 - 305	Reddy <i>et al.</i> 1996
13324	Charcoal	472 - 0	Reddy <i>et al.</i> 1996
13325	Charred Material	4260 - 3860	Byrd <i>et al.</i> 1995
13325	Shell	2750 - 2350	Byrd <i>et al.</i> 1995
13325	Shell	2310 - 1950	
13325	Charred	1760 - 1420	Byrd <i>et al.</i> 1995
13325	Shell	1710-1340	Reddy 2001
13325	Charred	1510 - 1250	Byrd <i>et al.</i> 1995
13325	Shell	1380 - 1250	Reddy <i>et al.</i> 1996
13325	Shell	1440-1150	Reddy <i>et al.</i> 1996
13658	Shell	7180 - 6910	Shaver& York 2005
14255	Shell	1250 - 1040	Iverson & Becker 2008
14791		650 - 500	Byrd 2002

Site Number	Material Type	2SIGMA C14YBP	Source
	Shell		
14791	Shell	600-450	Byrd 2002
14791	Shell	630 - 390	Byrd 2002
14791	Shell	510 - 300	Byrd 2002
04411	Charred	550 - 440	Byrd <i>et al.</i> 1996
04411	Charred	620 - 295	Byrd <i>et al.</i> 1996
08435	Charcoal	1350 - 1000	Walters 1996
08435	Charcoal	470 - 280	Walters 1996
08435	Charcoal	480 - 280	Walters 1996
08435	Charcoal	920 - 660	Walters 1996
01074	Charred	460 - 270	Byrd <i>et al.</i> 1996
01074	Charred	420 - 270	Byrd <i>et al.</i> 1996
16283	Charcoal	3070 - 2760	Byrd 2002
16283	Shell	510 - 240	Byrd 2002
16283	Shell	455 - 240	Byrd 2002
16283	Bone	715 - 545	Byrd 2002