Reevaluating the Early Millingstone Complex in Coastal Southern California: VEN-1, A Case Study

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Several Early Period sites have been used to document the Early Millingstone complex in the Central Coast and in the southern California coast. New data from VEN-1, including ^{14}C dates and faunal data will be used to redefine Early occupation along the southern California coast. These data will be examined in the larger context of mobility, population growth, subsistence, and settlement patterns as a whole for southern coastal California. This new data will be compared with other classic Millingstone sites in California. A new radiocarbon date of 8400 years ago B.P. reflects an earlier occupation to the site by almost 1000 years. Another AMS date on Quercus sp. *acorn shell at 6780 B.P. is the earliest date on oak acorns in a coastal site in southern California. The discovery of a rare and now extinct Pleistocene flightless duck in the assemblage reflects an early dietary food that went extinct. New faunal and flotation data indicates that there was a significant reliance on marine/aquatic resources at the earliest period of known occupation at VEN-1 that redefines subsistence strategies at VEN-1 and for the Millingstone complex in southern California.*

In 1952, William Wallace and his students excavated what came to be a key site in California's aboriginal cultural sequence (Wallace *et al*. 1956). The site, CA-VEN-1, also known as the "Little Sycamore" site is located on the Santa Monica coastline between Pt. Mugu and Malibu. The area includes several plant communities including Southern Fore Dunes and Southern Coastal Bluff Scrub. The area has a Mediterranean climate with mild winters. The site has come to help define an early occupation period we now know as the Early Millingstone Period (Wallace 1956: Moratto 1984). Earlier evidence indicated that millingstone tools, hammerstones, and handstones dominated the assemblage with bone tools and extended burials with some grave goods associated with the burials in this early assemblage (Wallace 1956). Reports of his findings appeared in 1954 and 1956 and were landmark studies for their time. This study offers some intriguing new interpretations using data collected at the Little Sycamore site (VEN-1) in recent years. New data will push back occupation dates to about 1000 years earlier than previously reported.

Previous Results:

Three years ago, Dallas (2000, 2001) reported new radiocarbon dates from a single unit excavated at VEN-1. These dates were 6560±80 PB, 7430±70 B.P., 6590±60 B.P., 6,670±80 B.P. reported in 2000 (Dallas 2000, 2001). These new radiocarbon dates indicated that VEN-1 was the earliest dated site along the Santa Monica Coastline. Other new data from this site were similarly surprising. Beads and bone tools were significant components of the tools recovered. Significant quantities of fish remains were recovered (Dallas 2001; Wake 2000) indicating a more maritime focus for the diet. The fish remains accounted for 22 percent of the faunal assemblage by weight and about 27 percent by number. There was a sizable variety of species represented for such as early period occupation. The difference between the newer data and the previous data from Wallace (1956) indicated that recovery techniques might have accounted for the discrepancy rather than the subsistence practices of the inhabitants. Flotation samples while yielding few seeds, except for fragments of *Quercus* sp. acorn shell, seeds of Poceae, and wild cucumber also recovered numerous fragments of fish remains. Other wood charcoal recovered from Unit 1 included *Ceonothus*, *Rhus*, *Salvia*, *Salix*, and *Yucca*. Many of the plant species are still present at the site today except for oaks.

The *Quercus* fragments recovered were most surprising and intriguing. The intriguing aspect is these acorn fragments found at the 100-110 cm level

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Proceedings of the Society for California Archaeology, Volume 17, 2004, pp 151-161

near the lower end of the excavated horizon, might shed light on the antiguity and early use of acorns. Early use of acorns is very rare. The surprising aspect of the find is that the fragments survived and dated as early as the ^{14}C results indicated. Also intriguing were several species of deep-water fish and significant quantities of sea mammal bones from this early context. Several fragments of bone gorges were recovered. The latter finds along with the variety of fish species recovered indicated that many techniques were employed in capturing fish. Some of these fishing techniques probably included the use of dugout canoes and/or tomols, including the use of bone gorges for deepwater fish.

New data recovered from another unit (Unit 4-a ½x1 meter unit) and samples from Unit 1, submitted for analysis from the earlier excavation (Dallas 2001) have yielded important new information on subsistence and settlement patterns for the inhabitants of VEN-1 during this Early Period. These data offer intriguing glimpses into the lifestyle of early inhabitants of the Santa Monica coast and early habitation along the southern California Coast.

NEW DATA

The charred remains of *Quercus sp*. from the 100-110 cm level from Unit 1 at VEN-1 submitted for radiocarbon analysis yielded an AMS date of 6780±110 B.P. Two things are significant about this date. First this date, while consistent with the earlier radiocarbon dates for the site, is currently one of the earlier uses of oak fragments known in Southern California for a coastal cultural context. Acorns later become a staple for the inhabitants of this region, but early uses of acorns are few in number and tend to come from inland sites. This date also does not come from the lowest levels excavated. It also ties into another aspect of the cultural assemblage at VEN-1, that is also found in other Early Period sites.

Four fragments of a rare and extinct bird were identified in the assemblage (Langenwalter 2003). This bird was identified as *Chendytes lawi*; this flightless duck is now extinct. The bird inhabited California from the Late Pleistocene and seemed to survive until at least the middle of the Holocene (5000-7000 B.P.). It may have survived into the Holocene until about 3780 B.P. (Morejohn 1976:207) although this late date seems unlikely. Due to the fact that the bird was large and flightless, it seems unlikely that the bird could have survived long into the Holocene. This species of bird is similar to species of birds that inhabited Hawaii and New Zealand long ago that also became extinct. Remains of this species while rare have been reported from several other Early Period archaeological sites in Orange County (ORA-64 and ORA-83), on Santa Cruz Island, on San Nicholas Island, on Vandenberg Air Force Base (SBA-522), in San Diego (SDI-10,965), in Santa Cruz (SCR-7) and in Northern California at Duncan's Landing (Rae Schwaderer personnal communication 2003; Gallegos 1991; Glassow 1991; Morejohn 1976; Langenwalter personal communication 2003). Few of the fragments recovered from archaeological contexts have been dated to this point. So the earliest use of *Chendytes lawi* and the extinction dates at these sites are still not clear at this point.

Previously Wallace (1956:5) found scarce evidence of fish and underestimated its importance in the aboriginal diet of VEN-1. It was found subsequently that fish were a significant component of the aboriginal diet (Dallas 2001), the latest faunal data is even more compelling. Fish recovered from Unit 4 now account for 42 percent (n=2290) for the faunal assemblage by count (Langenwalter 2003). This would bring the total marine/aquatic count significantly over 50 percent of the diet (adding in sea mammals from Unit 1) with 14 percent without including invertebrates which account for significant quantities as well. *Mytilus californianus* dominates the assemblage in terms of invertebrates with 72 percent by count and about 84 percent by weight. No other shell species accounts for more than 3 percent of the invertebrate assemblage. Mammal quantities are high in the later levels while fish remains dominate the lower (earlier) levels.

A total of 23 new beads were recovered in Unit 4 versus six recovered in Unit 1 (Table 1). Sixteen of these beads are *Olivella biplicata* spire-lopped beads, three were *Olivella* oblique spire-lopped, and four were *Olivella biplicata* wall disc beads. These range from types A1, A2, and G2 (Zepdeda-Herman 2002). Though they are not good time markers by themselves, they range in age from late in the Early Period to the Middle Period (Zepeda-Hermann 2002). One spire lopped bead however, came from the 140-150 cm level which was radiocarbon dated from 8400 B.P. (Zepeda-Hermann 2002). This would suggest that the bead might have had an earlier manufacture than previously known. This would correspond to occupation of VEN-1 between 6930-6950 B.C. The presence of these beads would also confirm King's (1967) earlier appraisal of a Middle Period component at VEN-1 based on artifact types and burial practice changes through time that was not identified by Wallace.

Artifact type or category	Unit 1	Unit 4	Wallace
Charmstones	-	-	4
Stone Pendant	2	1	1
Olivella biplicata Beads	6	29	13
Choppers	-	-	21
Core	3	2	7
Debitage	97	343	?
Flake	106	65	±17
Spall	11	23	-
Hammerstone	3	4	155
Pestle	3	2	12
Mano	8	2	123
Millingstones	-	-	116
FAR	40	194	?
Mytilus californianus	11712	5580	?/present
Olivella biplicata	15	4	present
Haliotis sp	56	256	?/present
Tegula sp.	439	90	?/present
Septifur bifurcatus	582	131	?
Shells other	2952	1509	-
Worked Bone	12	25	60
Bone – Bird	64	144	71
Bone – Fish	600	2363	33
Bone – Mammal	1526	1354	217
Bone – Reptile	6	2	0
Bone-unidentified	88	1476	?
Totals	18,331	13,599	961

Table 1: Artifact categories and totals (Unit 4: size ½x1 meter).

New radiocarbon dates included several dates spanning the occupation periods at VEN-1. These dates corresponded to levels (40-50 cm (first level without significant post-depositional disturbance), 100-110 cm, 130-140 cm, 140-150 cm, and 150-160 cm. Radiocarbon dates were chosen from the lower levels to substantiate the earliest occupation and to determine if there were significant early periods of seasonal occupation or periods of no occupation. We did not concentrate on the Middle Period component or the Late component because it is felt that had already been adequately examined and reported on. The uppers levels related to the late Period occupation also demonstrate the most disturbance. The dates corresponding to these levels were 210±40 B.P., 6780±110 B.P., 8010±110 B.P., 8400±40 B.P., and 6590±40 B.P. The 210 date corresponds to a Late component and probably represents the terminus of occupation of this site. All radiocarbon dates were corrected with $^{12}C/^{13}C$ values.

Chronology and Population Trends

The occupation dates at VEN-1 ranging from 6500-6780 B.P. and 8010-8400 B.P., seem to be recurring at this site. These dates imply two separate and distinct occupation periods. Examining the context for these dates could prove useful. What is significant about these time periods? What is happening along the southern California coast during these time periods? Glassow *et al.* (1988) investigated what was occurring along the Santa Barbara channel in terms of population changes through time. They pointed out some trends along the Santa Barbara channel on the Islands that are intriguing and applicable to this study. They examined the population changes in archaeological sites along the Santa Barbara coast based on frequencies of radiocarbon dates in 500-year increments or intervals. They reported that there appears to have been a drop in coastal population between 5500-7000 B.P. (Glassow *et al.* 68-69) based on numbers of sites dated. They also note there is a low population point 5500-6000 B.P. Later, Glassow (1999:59) noted that 6,000 B.P. yielded the earliest depression in dates and population and postulated that it could have lasted for up to 1000 years. He also pointed out that the dates themselves have qualifiers due to the reservoir effect and fractionization corrections (Glassow 1999:49-54). The dates herein are corrected dates.

Dates from VEN-1 correspond to the maximum point of the low range during this population drop with dates ranging from 6500-6780 B.P. This would infer that occupation was still occurring at VEN-1 during a time, when sites in Santa Barbara are showing a lower density in population relative to frequencies of dated archaeological sites. Glassow *et al.* (1988:68-77) note that some combinations of environmental and cultural changes seem to be related to this population decline. About 7000 B.P. the climate approached what it is like today. The warming trend reached its peak bout 5000-6500 B.P. The question that begs to be asked is, are these trends and dates related in some way? Is there a cultural change manifest in the archeological record. New data would infer that there is and it is somehow related to adaptive peaks.

Recharting the data from Glassow, Erlandson, and Wilcoxon (1988), the ^{14}C dates from sites ranging geographically from Santa Cruz to San Diego, to determine if the regional trends in Santa Barbara held for most of Central to southern California and the data infers that the answer is affirmative. Data in the chart (Figure 1), clearly indicates that the trends seem to hold for the central and southern California coast. The chart data indicates that overall there are two periods

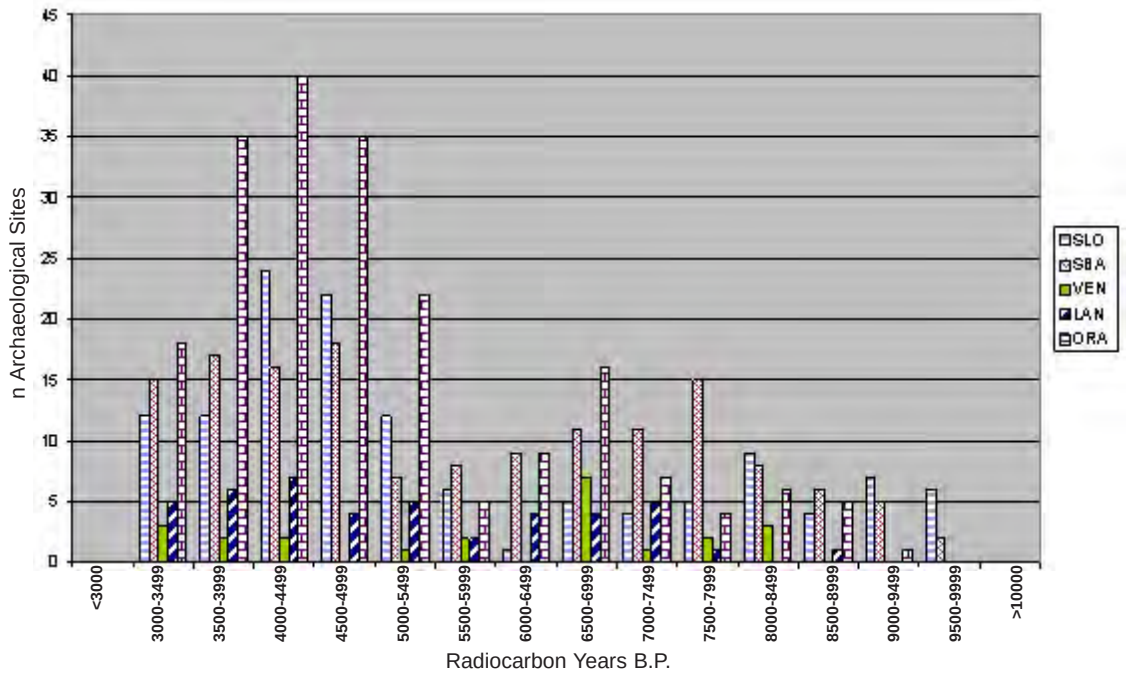

Figure 1: Population growth and mobility chart.

of population increases and declines in the early 7000 years of human occupation in this state. The population increases from early on until 5000-6500 B.P., based on data by county. There are two main troughs or population declines from 5500-6000 B.P. and 3000-3500 B.P. Then it rises again to a peak around 4000-4500 B.P. and 6500-7500 B.P. This local trend seems to be applying to the whole southern half of coastal California, which is the region being examined by this study. Though not every county shows the exact same time period changes, the general trends seems to apply. This is important data to review.

If we accept the premise by Glassow *et al*. (1988), that the dated component of each 500 year interval is somewhat representative of that age in a given region and the village size is roughly equivalent during the early-middle periods, then the pattern seems to hold for not only Los Angeles and Ventura Counties but the counties from Santa Cruz to San Diego! This is all logical and intriguing. That would infer that whatever settlement pattern occurred for any of these counties and hence respective aboriginal group that the pattern would apply to them as well.

My specific research question was, where does VEN-1 fit into the general population pattern for southern California? It appears that some cultural event is occurring at VEN-1 that corresponds to these dates and it could be that an adaptive peak was reached at this site at 7400 B.P. and maybe again at about 6500 B.P. The chart data would infer that this "pattern" not only applies to the early inhabitants in Ventura, Los Angeles, and Santa Barbara counties but to other groups in their respective counties as well (Figure 1). When this occurred the inhabitants of VEN-1 probably either moved for a period of time or traveled back and forth between VEN-1 and another site (most likely LAN-92).

POPULATION MOVEMENT

What if these data are actually measuring population shifts and not just growth? Population movements would cause the same spike and drop in the number of dated sites just as "population growth." Also, given the small number of early sites dated, it can indicate that population movement might more accurately reflect Early Period occupation because the population size cannot have been that large 8500 year ago. The troughs and peaks (in Figure 1) could reflect general periods of sedentism and mobility. When these are more dated sites in a particular area, groups may be moving to new site locations due to resource depletion, that would infer mobility. The troughs could represent periods of less mobility or at least less camp movement, that is movement of one camp to another base camp.

Several examples could be used to demonstrate this situation. One example is the Ballona wetland (Altschul *et al*. 1992), where occupation changed from

estuary to higher ground depending on the water level in the Ballona wetlands at a particular point in time. When the Ballona Creek water level was high and the estuary was full, people moved to the upland terraces. When the water level was low and running out to the Pacific Ocean, they occupied the edges of the estuary to be closer to the resources being exploited by the inhabitants. Erlandson and Colten (1991) and other scholars (King 1990) have also commented similarly on the practicality for the locations of early settlements on elevated terraces (Erlandson and Colten 1991:7-8) due to the instability of canyon bottoms during the Early Period.

Comparing the radiocarbon dates from nearby LAN-92 with the new dates from VEN-1, an interesting pattern emerges. The new dates from VEN-1 include 6590, 6780, 8010, and 8400 B.P. The radiocarbon dates from LAN-92 are 7560, 7760, and 7380 B.P. It is interesting to note there is a gap between the occupation of the two sites and the dates from LAN-92 fit nicely between the gap for the two suite of dates from VEN-1. So it would appear as if the inhabitants occupied VEN-1 for a time, left VEN-1, and then returned to VEN-1 after resources at the site of the Little Sycamore recovered. There was probably some overlap with the LAN-92 dates as there is an older 7430 B.P. date from VEN-1 as well as a 6960 B.P. previous date (Dallas 2000; Breschini *et al.* 1996). It looks as though they were located at LAN-92 around 7000 B.P. and back at VEN-1 around 6590-6960 B.P. Both sites could have been occupied for a period of time. I believe more dates are needed from LAN-92 to substantiate this hypothesis.

LAN-92 is an intriguing site as it has a contemporaneous component with VEN-1 and it offers similar resources like VEN-1. It is also located only about 2 miles downcoast from VEN-1. It has yielded dates of 7240±90, 7760±60, and 7160±90 B.P. (Dallas and Mealey 1995). It is located near a major fresh water supply: the arroyo sequit and it abuts the Pacific Ocean on an upland terrace. Occupation and subsistence strategies seem to be very similar between the two sites (Dallas 2001; Dallas and Mealey 1995). Could LAN-92 have been a satellite site to VEN-1? I think it is very likely. When the factor of diminishing returns plagued the inhabitants of VEN-1 after 1200 years of occupation, did the inhabitants move seasonally to take advantage of a similar location and resources at LAN-92? Again, it would appear from the data that it is likely. Given the relative gap of occupation at VEN-1 around 7000-7800 B.P., it would indicate that the inhabitants were spending more time at LAN-92 than at VEN-1, with possibly some simultaneous occupation.

This issue raises the questions, does abundance or subsistence strategies lead to sedentism? Does the lifestyle and resource preferences for the inhabitants dictate their level of sedntism or mobility? Variables seem to converge on the issue of cost/benefit ratio (Kelly 1995). H/G should stop moving residentially if the return rate from the next location minus the cost of moving is greater than at the current residence (Kelly 1995). While this seems obvious, like hunting supporting logistical mobility, there are always cultural factors affecting this simple decision. Hence, sedentism is probably a result of local abundance, subsistence strategies, and even regional resource availability. The type of resource (s) being exploited would seem to be a prime factor encouraging or discouraging sedentism or mobility. In this case, a strong reliance on marine/aquatic resources at VEN-1 and LAN-92 would indicate that residential sedentism, with logistical mobility for fishing is the norm.

Hunter/Gatherers and Mobility

Mobility is hard to separate out from factors such as foraging, hunting, environment, and culture. Like sedentism, it is also difficult to prove as we often assume that mobility is the norm. Hence, change in the cultural system would be needed to explain sedentism rather than mobility as the norm. However, mobility came from te Old Paradigm of Big Game hunters following resources. Since, no big game has ever been found at VEN-1, LAN-92, it would appear than mobility would need a cultural explanation given the data newly uncovered at VEN-1 and LAN-92. Of course it is fairly obvious that mobility permits foraging efficiency (Kelly 1995). There are other resasons to be mobile like curiosity and the need for environmental data. However, these factors are difficult to prove in influencing cultural mobility. They do not manifest themselves as material goods in the archeological record.

Yet, this pattern of sedentism related to maritime culture has also been noted in other areas, like at Vandenberg, where Glassow (1991:23) has noted that 8,500 B.P. "may mark the inception of a collecting subsistence-settlement system as defined by Binford (1990), which replaced a foraging type more akin in structure, at least, to those of Paleoindians." He notes that fish and sea mammals were part of the diet by circa 8500 B.P. He goes on to note that this is also evident at Diablo Canyon, where data from SLO-2 and SLO-585 show a similar pattern (Glassow 1991:123). He points out further that it could be just a subsistence change, but it goes back to the central issue or research

question: what is causing this change in subsistence? We are not seeing a subsistence change at VEN-1 at this time: early in the cultural occupation. The VEN-1 data indicates that the subsistence and settlement pattern evident at VEN-1 is similar to Vandenberg, Diablo Canyon, and other Early Period sites. The settlement pattern, at least, reflects a more sedentary residential pattern, though still augmented by logistical mobility.

Kelly (1995:141) has demonstrated that among a large group of hunter-gatherers (H/G), camp movement occurs when foragers are traveling <3 kilometers from camp to find food. Logistical mobility increases with a dependence on hunting. However, if other resources are significant components of the inhabitant's diet, logistical mobility might be consistent with the occupant's subsistence pattern. For example, a dependence on aquatic/marine resources seems to be associated with low residential mobility (Yessner 1980). So if the inhabitants of a site were dependent on aquatic/marine resources (like at VEN-1), they can be expected to demonstrate a lower level residential mobility unless some other factor forces them to change.

Applying the theory from Kelly (1995) and Yessner (1980) to the data at VEN-1 site seems to add insight into the subsistence and settlement system of the inhabitants. Due to the fact that the inhabitants were not traveling large distances by foot for food or tool materials and they depended on marine/aquatic resources for a majority of their subsistence, they had a lower level of residential mobility than previously thought. The inhabitants of VEN-1 depended on fish remains for about 22 percent of the faunal diet by weight and about 27 percent by count (from the earlier study). More recent data increases this figure to about 42 percent of the faunal diet (Langenwalter 2003). They also depended on sea mammals for about 14 percent of their diet (Wake 2000; Dallas 2001). Reptiles and amphibians were insignificant and it still unclear about birds (our numbers in two units are fairly low and though Wallace found more, but his recovery techniques were not conducive to recovering these remains, therefore the data in inconclusive and the sample size too small to be representative of the site (Langenwalter 2003). Terrestrial mammals only account for about 16.5 percent of the diet. Also, about 90 percent of all material is shellfish and therefore it is clear that shellfish represent at significant percentage of the diet also at VEN-1.

Mytilus californianus or mussel accounts for about 46 percent of the protein, fish about 25 percent, land mammals 24 percent, and sea mammals about 1.3 percent from Unit 4 in terms of protein yield. No other component accounts for more than 1 percent of the diet. Based on the protein multiplier, 72 percent of the food is based on marine/aquatic resources (on data from Unit 4). Unit 1 data would be slightly higher (about 85%) as a greater amount of sea mammal remains were recovered. Clearly some of the subsistence components were not represented in the earlier subsistence data, especially fish (Dallas 2001; Wallace *et al* .1956). The recent findings from VEN-1 would indicate that fish were underrepresented in the Wallace study due to the recovery techniques employed at that time. The use of finer mesh screens and flotation techniques in the current study recovered a more representative variety of the cultural subsistence strategy. This recovery bias affected the earlier interpretation at VEN-1 (Wallace 1956) in terms of subsistence strategies as well as settlement patterns and mobility.

Therefore, aquatic /marine resources are a major component of the inhabitants diet breadth at VEN-1 (at least 72 %). This lifestyle can then account for the long occupation of VEN-1 and less residential mobility as reflected in their dependence on marine/aquatic resources for over 50 percent of their overall diet. The faunal remains and the shellfish recovered demonstrate a strong reliance on marine/aquatic resources (Dallas 2001). Based on the findings of Kelly (1995) and Yessner (1980), this reliance on aquatic/ marine resources suggest the inhabitants of VEN-1 were more sedentary: less likely to have moved their camp often. Camp movement is expensive. The variety of data newly collected from VEN-1 (Dallas 2001), would support such a conclusion. They were not collecting resources far from either camp at LAN-92 or VEN-1. Few to no exotic tool materials or food resources are evident in the assemblages. They would be more tethered to the coastal locations due to this marine resource dependence. VEN-1 offered good sandy level beaches nearby for boat launching and landings. These were a maritime people, whose subsistence strategy depended on fishing and shellfish and whose residential mobility was more sedentary than previously considered. These were not a desert people. Logistical mobility by sea might have been fairly high, due to the presence of boats.

New radiocarbon data, subsistence data, and settlement pattern data indicates aboriginal people were tied to specific locations for significant periods of time (at least Early and in the Middle Period). For this area of the Santa Monica coast sites such as VEN-1, LAN-92, LAN-2263, and maybe LAN-90 represent Early Period sites. These data are also consistent with Glassow's findings from SBA-522 where small

terrestrial game mammals (rabbits and jack rabbits) are dominant rather than large terrestrial mammals (Glassow 1991:118). The recent information indicates that this cultural pattern might be more than even a regional manifestation. Glassow has also noted *Chendytes lawi* remains in the assemblage and postulates a more sedentary lifestyle than previous mobile hunter/gatherers would be. Another factor relevant to the element of mobility, is risk. There is not enough space here to examine this factor in detail. Suffice it to say, that it needs to be considered, though it is beyond the scope of this paper to elaborate and one tactic can be to examine it in terms of return rates (cf Kelly 1995:144-149).

In San Diego, excavations by Gallegos and others have yielded similar findings at sites such as SDI-9649 and SDI-10,965. Radiocarbon dates, while slightly younger, range from 6850-7520 B.P. clearly within at least one of the early occupation periods at VEN-1 and LAN-92. Koerper, Langenwalter, and Scroth (1991:60-61) propose a subsistence strategy that promoted a "carbohydrate revolution." They also note that the environment and strategy would have favored a "fair amount of sedentism," by semi-sedentary groups transitional between a San Dieguito and La Jollan complex. They cite a well-developed maritime adaptation and the inferred degree of sedentism (Koerper *et al*. 1991:61) at SDI-9649. This along with a classic Millingstone toolkit with higher concentrations of manos although few bone tools are noted at SDI-10,965 (Gallegos 1991:40) show s ample similarities to VEN-1 and a "paleo-coastal tradition." Again another location infers an adaptation similar to VEN-1 from a single or multiple waves of immigration down the California coast is not unlikely and contributed to this evident cultural adaptation. Their findings also support a strong maritime economy with a dependence on sedentism like that evident at VEN-1. So rather than being an anomaly, VEN-1 seems to fit into an early adaptive strategy that is consistent with other coastal settlements.

Cultural differences are clearly evident from the Early and Middle Period settlements that reflect changes in subsistence strategies, burial practices, bead making, tool kits, and settlement patterns (King 1967; Leonard 1976). While it is often difficult, if not impossible, to see what triggered cultural changes or evolutionary changes, we can identify the end result of those changes: like a change from manos to pestles in the tool kit. It is possible to pinpoint the timing of those changes in the cultural system as well. Clearly the data would indicate that fishing was an important cultural lifestyle in the Early Period that heretofore has been sorely neglected in the literature.

Interpretation

Previously it was thought that the construction or and use of tomols was a fairly late phenoenum in California (Gamble 2002) that may have been a result of social stratification and hierarchies. Recent studies indicate that the activities associated with these crafts: fishing and trade may have been occurring for thousands of years from the Channel Islands to the mainland of California (Dallas 2001; Erlandson *et al*. 1999; Harrison and Harrison 1966; Wake 2000). The use and construction of some type of ocean-going vessel would have been necessary to make the trip between the mainland and the Channel Islands. Finding, catching, and returning with large varieties of fish and sea mammals requires the use of ocean going vessels. The remains of these animals are now being recovered in significant quantities in coastal middens and Island middens in Early Period components. This indicates that Early inhabitants along the California coast relied heavily on marine and aquatic resources to an extent never before realized (Dallas 2001; Erlandson 2002). It is also indicating that there was a requirement for the use of ocean going vessels significantly earlier than the archeological evidence for planked canoes supports (Fagan 2004). The large quantities of bone gorges in the cultural assemblages also supports this hypothesis despite the fact that early researchers did not always recognize these tools as fishing equipment.

Cultural evidence would now indicate that not only were subsistence strategies more complex, but cultural adaptation was complex in the Early Holocene than presumed. Recent data indicates that multiple migrations around 8,000 B.P. occurred from Berengia and involved migration by boats. Data from VEN-1 is consistent with that data and infers that a wave of migration from north occurred slightly earlier, at least 8500 B.P. The data from VEN-1 shows clearly that the cultural connection is much more likely from the north than from the desert. The inhabitants were clearly involved with a maritime economy and a significant portion of their diet came from marine/aquatic resources. Greater than 50 percent of the diet at VEN-1 is due to aquatic/marine resources (Dallas 2001).

In the past, crude artifact styles have been interpreted as a simple culture when in fact, simple should have been interpreted as functional rather than "simple." A maritime adaptation in not a simple adaptation (Kelly 1995). They probably utilized a variety of tools including abalone pry bars, tomols or dug-outs, paddles, nets, seines, gorges, etc in their tool kit. Many of these perishable tools have not survived in the archeological record. However, since we find

the remains of the targets of those tools, we can reasonably assume they existed based on the faunal and flotation data. This tools kit was more complex and functional than earlier studies admitted (Wallace 1956;1954) while at least a couple of early researchers noted this possibility (Heizer and Lemert 1947) noting multi-functional tools shaped as manos for unspecified activities. The early inhabitants clearly were utilizing these manos to grind small seeds at times, but there is a likelihood that they also used them to process food (s) that required mashing, such as tubers, bulbs, shellfish, fish, or some combination of all. They used these multi-functional tools on the ends like pestles (Dallas 2001; Heizer and Lemert 1947; Parker 2000).

This early experimentation with new foods such as acorns as a potential food supply could have been a precursor to a change in wealth status to those people who inherited the right to maintain large stores of wealth and food from the Early Period into the Middle Period (when this becomes common) or vene some earlier phase of the Early Period (King 1990:117-118). King notes that storage of food increased during the Early Period with the introduction of nutmeats such as acorns. If such experimentation such has at VEN-1, were an example of that discovery of the food value of pulpy nutmeats such as acorns and islay, it would indicate a growing need for sedentism or a least a greater reliance on base camps. These camps would have made great logistical camps for early hunter/gatherers due to the stable resources base in the area.

SUMMARY

This recent examination of VEN-1 has reiterated the significance of this site in the cultural adaptation of early coastal inhabitants to the region and the nature of cultural adaptation in the Early Period of the Holocene. It clearly indicates that the cultural adaptation and subsistence economy was more complex and involved a maritime economy strongly reliant on fish and sea mammals as well as shellfish. Significant quantities of these foods are evident in the middens at VEN-1 and LAN-92. Data would infer that the inhabitants of VEN-1 not only utilized boats for subsistence and travel but probably arrived by boats in a wave of cultural migration from the north. The earliest assemblage at VEN-1 indicates the inhabitants started with a largely maritime subsistence economy and this did not change significantly: well into the Late Middle or Late Period when fishing decreases in importance. The inhabitants were fairly sedentary in terms of camp movement but still maintained a relatively mobile logistical strategy for subsistence by fishing and hunting from boats. In other words residential mobility was fairly low, while logistical mobility might have been high or more akin with typical foragers (Binford 1990). They moved when resources became depleted or when the cost to maintain that subsistence became to high and camp movement more reasonable in terms of cost/benefit ratio.

Faunal remains at VEN-1 are dominated by fish bones with about 42 percent. A fairly diverse variety of species is represented including barracuda, yellowtail, sheephead, rockfish, surfperch, herring, sea bass, shark, rays, and silverside to note the most common species represented. No doubt other species were targeted and results from a second study are pending analysis. Mammals make up the next largest component of the vertebrates by number with about 16.5 percent being terrestrial mammals, 14 percent sea mammals, and unidentified 43.7 percent. Invertebrates are the most abundant remains in the assemblage by a huge margin. *Mytilus californianus* dominates the invertebrates with 72 percent by count and most other species make up 3 percent or less. The contributing factor by plants is unknown, although few plant remains were recovered in the flotation studies.

They experimented with new resources and local resources such as acorns and a unique bird species known as *Chendytes lawi*. It appears that the presence and later absence of *Chendytes lawi* is one key indicator of subsistence patterns not only at VEN-1 but at other significant early coastal sites throughout California. Hunting *Chendytes* probably is a result of an opportunistic food resource, which though was never very abundant represented an easy and nutritious meal. This could be the first concrete and demonstrable evidence that he inhabitants were exploiting resources faster than they could be restored. Dates from *Chendytes lawi* at these early sites will offer key evidence to subsistence practices and predation patterns of the early inhabitants and could offer cultural data on the time needed to drive a species to extinction.

Results of the subsistence data from VEN-1 support the hypothesis of a marine/aquatic diet reflecting a true maritime economy. Since the earliest occupation reflects a full maritime economy, then the inhabitants of VEN-1 did not change subsistence strategies upon arriving at Ven-1. They were already a maritime people and hence did not come from the desert. They adapted to other resources available in

this area over time and later adapted to more terrestrial and local resources through time and as their cultural and subsistence practices evolved.

Depletion of the local resources at about 7400 B.P. led to camp movement and/or seasonal forays from VEN-1 to LAN-92 about 2 miles away. This respite from subsistence pressure at VEN-1, after at least 1000 years of occupation, gave the resources around VEN-1 time to restore. However, this camp move did not change the subsistence strategy of the inhabitants, it just encouraged them to find another similar environment nearby (at least LAN-92) (Dallas 2001;Wake 2000). It might have signaled the end of one species in the diet, *Chendytes lawi*, but that hypothesis awaits the results of ^{14}C analysis on the *Chendytes* remains themselves. Camp movement was not common. People were more sedentary as few to no non-local resources are evident in the assemblage at VEN-1. This settlement pattern is also evident elsewhere in coastal California and it is only relatively recently that the reality of this is being examined in detail (Glassow 1991; Koerper *et al.* 1991).

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