A Revised Culture Sequence for the Monterey Peninsula Area, California

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Abstract

We have made significant advances in our understanding of the Monterey Bay area's culture history since we focused on dated site components as our primary units of analysis. Aided by a large number of single specimen radiocarbon dates, our research has shown that the existing regional sequence does not accommodate the data from the Monterey Peninsula area. We propose a revised culture sequence which is derived from dated site components.

Introduction

The existing culture classification sequences for the central California coast contain temporal subdivisions at different times from those we have documented for the greater Monterey Peninsula area. Consequently we have developed a culture classification sequence that more accurately reflects the archaeological evidence.

Our study has given rise to several questions. Are other local sequences being missed because of an overreliance on the larger regional sequences? Is this a frequent problem elsewhere in California? In other words, are local sequences being inappropriately forced to fit into those regional sequences? What information are we losing or misinterpreting because of this?

We strongly believe that the standard texts which uncritically pass on these regional sequences are doing a disservice with regard to many potential differences that might be found locally. We further suspect that many local culture histories are in need of revision.

Previous Culture Sequences for the Monterey Peninsula Area

The Monterey Peninsula area, as we define it, extends from just north of Big Sur on the south to a little beyond the Pajaro River on the north (Figure 1). Archaeological excavations have been conducted in this area for at least seven decades. During this time efforts have been made to fit data from these investigations into the larger regional classification sequences.

Figure 2 presents two regional culture sequences for the central California coast derived from investigations conducted by Terry Jones. Figure 2 also includes a bead sequence for the San Francisco Bay area based primarily on the work of Randy Milliken (Milliken, personal communication 2006; Milliken et al. 2007). This latter sequence is strictly based on *Olivella* shell beads, which Milliken is careful to point out. For example, Milliken et al. (2007) note:

> We reiterate that the bead horizons are units of time, with no cultural implications other than the fact that they are defined by widely traded shell bead types [Milliken et al. 2007:105].

The first of Jones' regional sequences appeared in a technical report prepared for the Castroville bypass

project (Jones et al. 1996:40). The report notes that this sequence is based on two earlier works by Jones dealing with the Big Sur area (1993, 1995). The second almost identical regional sequence appeared in Jones and Klar's recent *California Prehistory* volume (2007:137). Comparison of these two sequences with Milliken's bead sequence illustrates the degree to which Jones apparently relied on shell beads in establishing his subdivisions.

Unfortunately, neither of these regional sequences accurately portrays the culture history of the Monterey Peninsula area. There are significant differences in both the timing and the nature of the subdivisions.

A Brief Look at Data from the Monterey Peninsula Area

The Monterey Bay area and particularly the Monterey Peninsula provided bountiful environments during the past 8,000 years. In modern times, Pebble Beach and the Del Monte Forest have attracted thousands of residents, and the nearby towns of Carmel, Monterey, and Pacific Grove have been largely built out for nearly a hundred years. One of the problems in obtaining archaeological data, particularly on the Monterey Peninsula, stems from this extensive building. In Pacific Grove and Carmel, where many of the current construction projects are

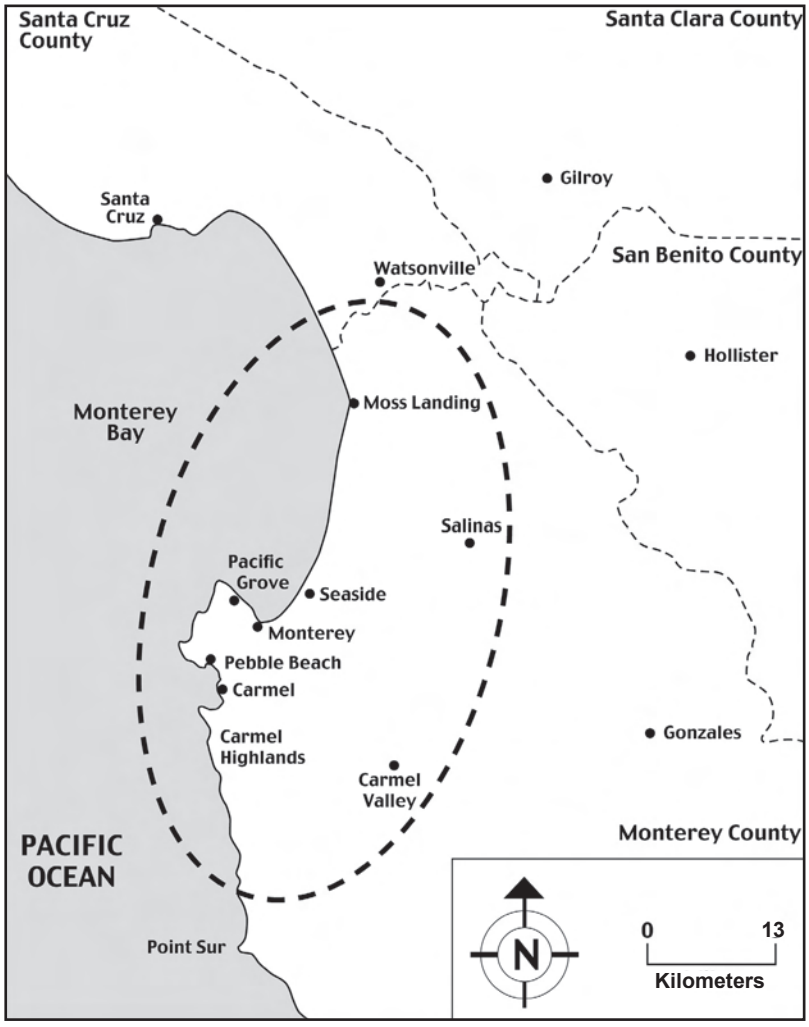

Figure 1. The greater Monterey Peninsula area.

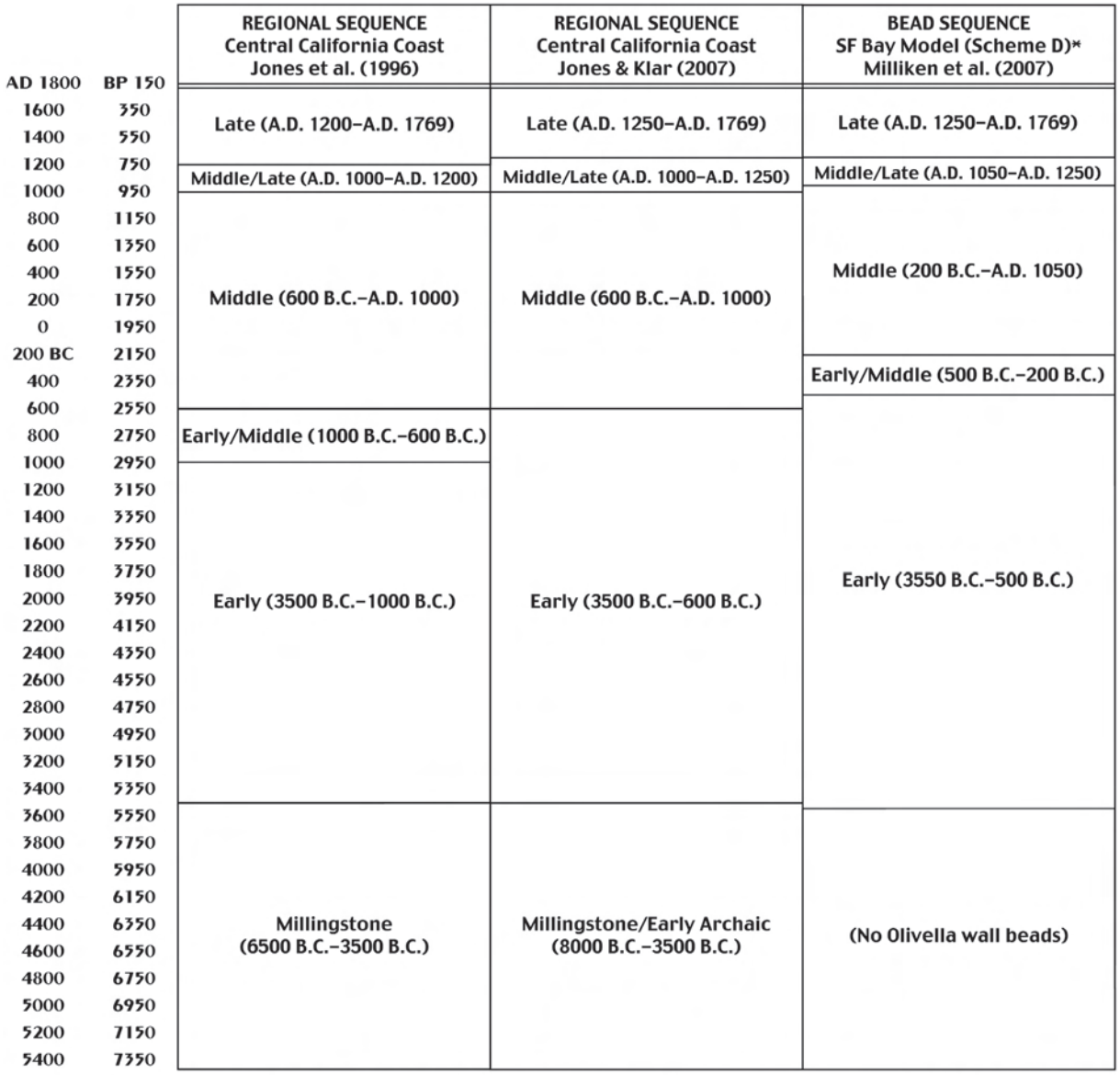

Figure 2. Regional sequences for the central California coast.

small, involving foundation rebuilds and additions, archaeologists seldom have a large scale project which provides abundant information, and they are usually constrained by limited budgets. We have obtained much of our information piecemeal from hundreds of small projects.

Typical of our habitation sites is midden that looks fairly homogeneous (Figure 3). Stratigraphy is almost never apparent in the larger residential sites, and if sites contain more than one component, these components are generally mixed through bioturbation. For example, from CA-MNT-103, a Monterey Peninsula residential site, we obtained 17 radiocarbon samples from a vertical column taken in 5 cm increments (Figure 4). Upon analysis, it was found that these samples lacked any correlation between age and depth. As is the case with many local deposits, this site has early and late components but no Middle Period component (Figure 5).

Because of this pervasive bioturbation and the limited number of temporally diagnostic artifacts recovered from Monterey Peninsula sites, we have found it necessary to increase the number of radiocarbon dates in order to more accurately define site components. Only by obtaining single specimen radiocarbon dates in sufficient numbers can we adequately define temporal components in these sites.

Although widely used in other areas, beads and bifaces have played a limited role in local investigations. In a recent project we wet screened (using 1/8-inch mesh) over 14 cubic meters of soil at multi-component site CA-MNT-831. The investigation produced several hundred ground and battered stone artifacts but only four diagnostic shell beads and only two biface fragments sufficiently intact to provide useful information (Breschini and Haversat 2008a).

Nevertheless, the data recovered from local projects show that the Monterey Peninsula area has a culture history which differs significantly from other parts of the central coast. For example, large Late Period "abalone pavements" (Figure 6), which we have defined as "Late Period Abalone Processing Sites" (Breschini and Haversat 1991), are features not found elsewhere.

Figure 3. A typical Early Period midden (CA-MNT-831).

Similarly, some site types common elsewhere have little or no representation in the Monterey Peninsula area. Finally, a "gap" of about a thousand years in our radiocarbon database is not reflected in the regional sequences.

Dated Site Components

Diagnostic artifacts, particularly beads and bifaces, are not found as frequently in most of the sites on the Monterey Peninsula as they are in many other areas of California. As a result, rather than using beads and bifaces to define our temporal components, we have developed a technique for identifying these components through large numbers of single piece radiocarbon dates. Once we identify the components, we can then begin to determine which midden constituents and which artifacts are contemporaneous.

Figure 4. A residential site containing both Early and Late Period components thoroughly mixed together (CA-MNT-103). The radiocarbon dates from this site are depicted in Figure 5.

Figure 7, a chart based on 89 single piece radiocarbon dates, provides an example of four dated components identified at four separate sites in the Moss Landing area. Even with the bioturbation that is often present, radiocarbon dating can provide detailed information about the components and culture history of these sites.

We investigated 12 sites at Rancho San Carlos, a 20,000 acre development in the Carmel Valley southeast of the Monterey Peninsula. As shown in Figure 8, the 54 single piece radiocarbon dates obtained from several sites suggest there is only one temporal component, with a slow beginning followed by a long period of steady, continuous occupation.

Radiocarbon dates from CA-MNT-1701 in this large ranch project (Figure 9) clearly illustrate that site occupation crosscuts the Middle-Late Transition as defined by other central California archaeologists. Altogether (see Figures 8 and 9), there is no temporal break; that is, the radiocarbon evidence suggests a single continuous and unbroken cultural component. The archaeological data support this view. The question arises, then, as to which is more accurate and more useful, the regional classification sequences which show a transition at 950-700 BP (A.D. 1000-1250) based largely on changing bead styles or the radiocarbon dates which suggest continuous occupation with no substantial change in subsistence and settlement?

In an effort to sort out the temporal components from various sites and to see if there is a consistent local pattern, we organized all the single piece radiocarbon

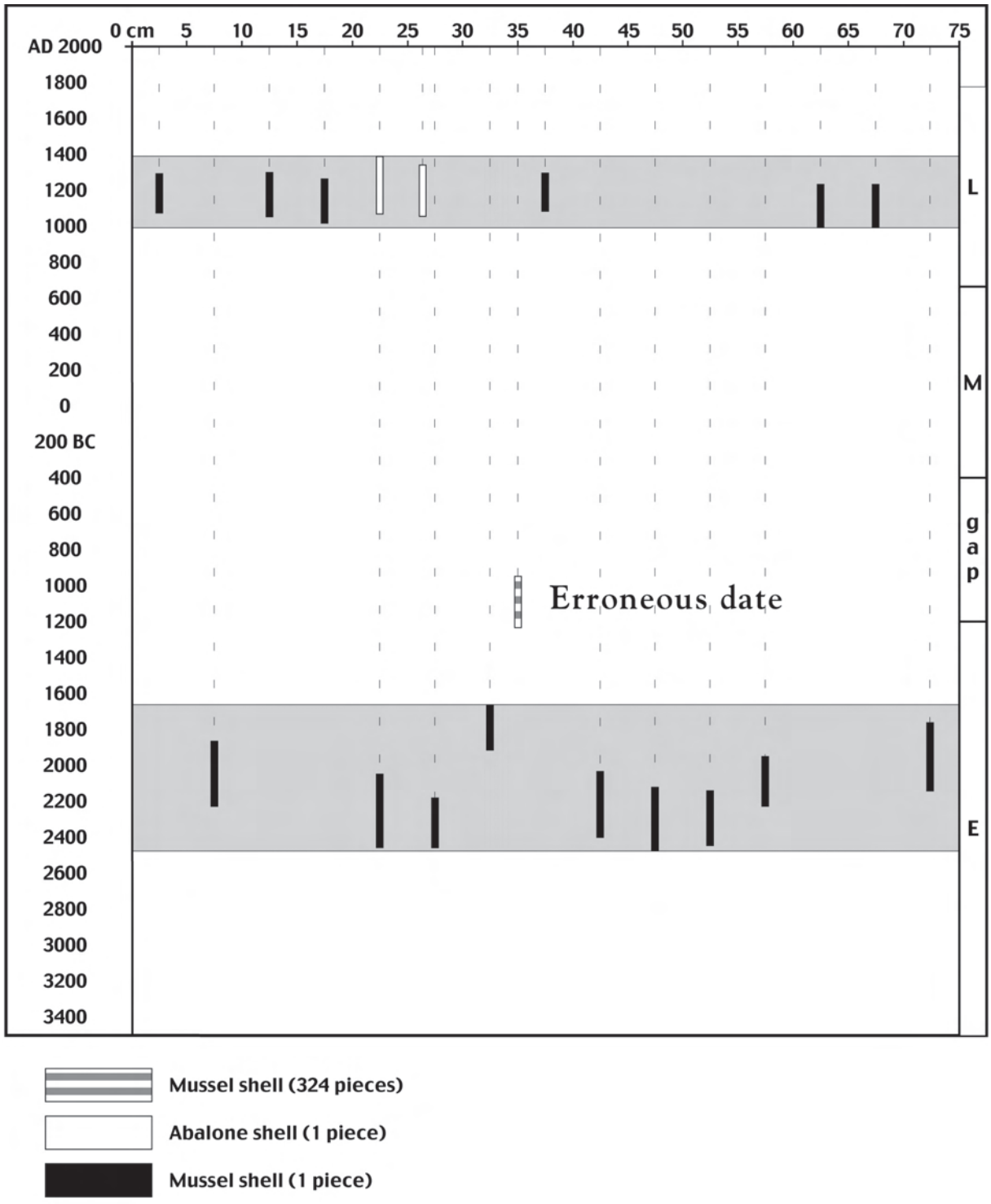

Figure 5. Radiocarbon dates from CA-MNT-103, a two component site in the Cannery Row area of Monterey. Note the lack of correspondence between age and depth for these samples. Note also that the sample obtained from multiple pieces of shell produced a homogenized date, and reliance on this sample would suggest a component which is not present.

Figure 6. An example of a Late Period “abalone pavement” from the Monterey Peninsula (CA-MNT-1084).

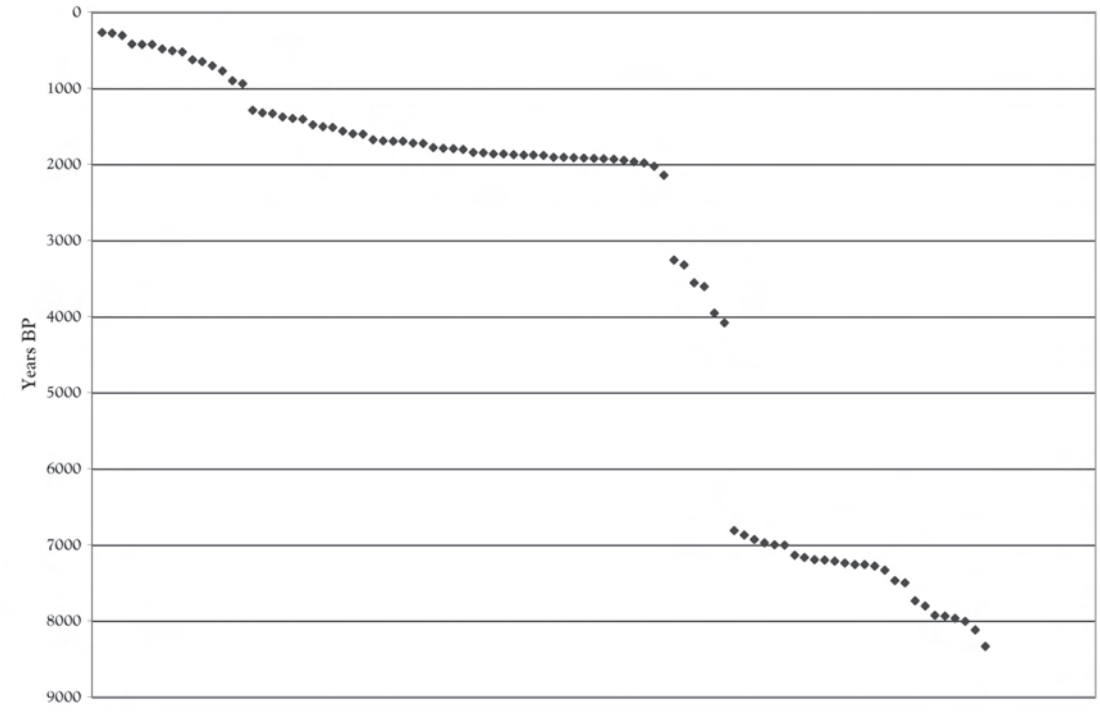

Figure 7. Radiocarbon dates from dated components as seen in four separate sites in the Moss Landing area (CA-MNT-228, -229, -234, and -1570). This chart includes 89 single-piece samples, 51 from CA-MNT-234, 18 from CA-MNT-229, 13 from CA-MNT-228, and 7 from CA-MNT-1570.

dates from our study area into a single chart (Figure 10). Ignoring the samples which used bulk soil and bulk shell, there remain 554 radiocarbon dates, each of which was obtained from a single piece of material.

By illustrating and comparing the dates in this manner, it is possible to identify components that are consistent across the entire study area. Figure 11 identifies early, middle, and late components along with a gap of about a thousand years from which only four dates have been obtained.

When examining individual sites or groups of sites in Figure 11, it is apparent that there are abrupt beginnings and ends for some of these temporal components. These patterns are apparent only with a substantial number of single specimen dates. Previously, before we eliminated bulk shell and soil dates from our data set, these patterns were masked by misleading data.

A Revised Culture Sequence

Based on the radiocarbon dated site components shown in Figure 11, we can begin to establish a culture sequence that actually reflects the prehistory of the Monterey Peninsula area. This revised sequence differs in a number of significant respects from those proposed by Jones (Jones et al. 1996; Jones and Klar 2007) (see Figure 2). The following sections discuss

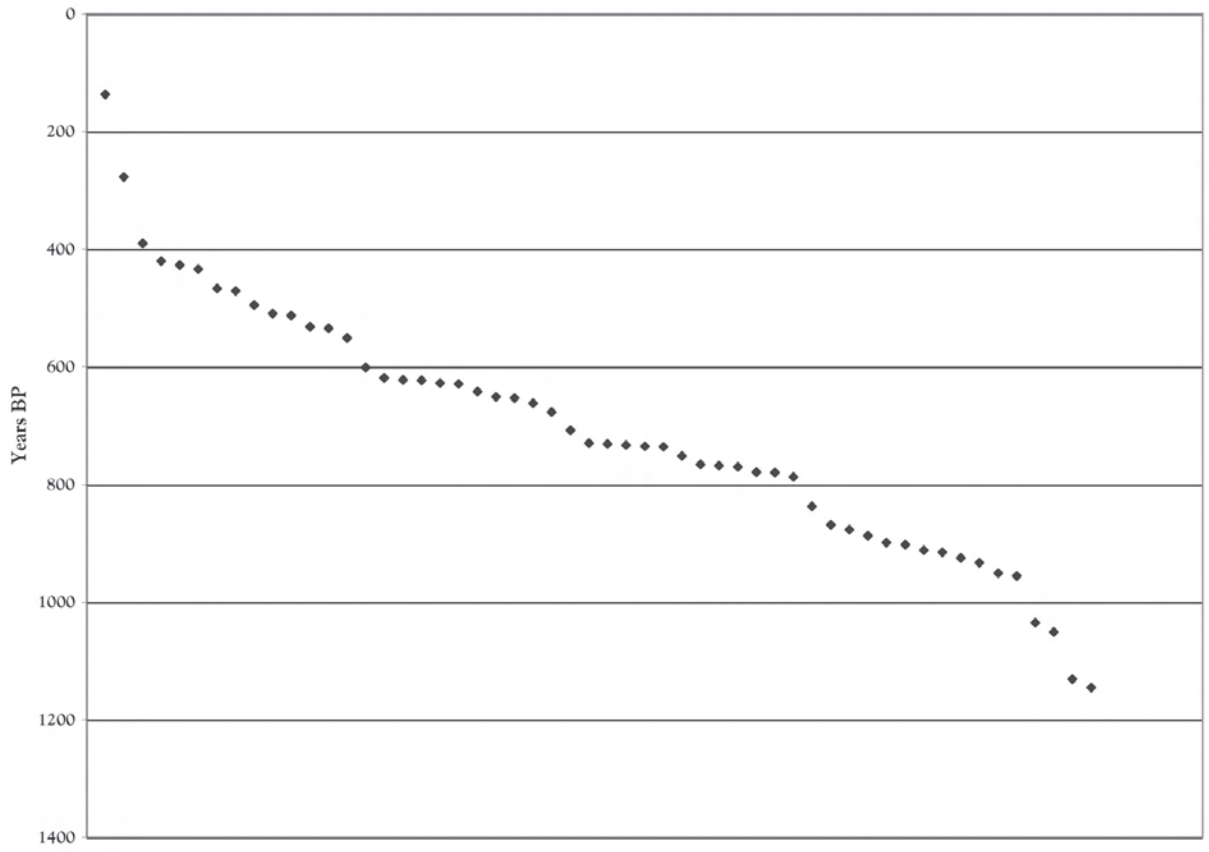

Figure 8. Late Period radiocarbon dates from Rancho San Carlos, southeast of Carmel. These 54 dates from 12 sites were all obtained from single pieces of material. The distribution does not suggest a significant cultural break at A.D. 1250 (700 BP), as is postulated by current regional sequences.

each of the temporal periods we have identified within this study area.

PaleoIndian, >10,000 BP (>8000 B.C.)[1]

There is presently no evidence of a PaleoIndian occupation (prior to 8000 B.C.) in our study area.

Archaic, 10,000-6000 BP (8000-4000 B.C.)

We have chosen to call the earliest known cultural manifestation in our study area Archaic. This differs from the two Jones models which associate this period with the Millingstone Culture or the Millingstone/Early Archaic. However, the association of Millingstone with the Monterey Peninsula study area seems to have been based more on the time period rather than cultural materials.

Jones et al. (2007) describe the Millingstone Culture as follows:

> In both its northern and southern expressions, Millingstone is consistently marked by large numbers of well-made handstones and/or millingslabs, crude core and cobble tools, and less abundant flake tools and large side-notched projectile points [Jones et al. 2007:135].

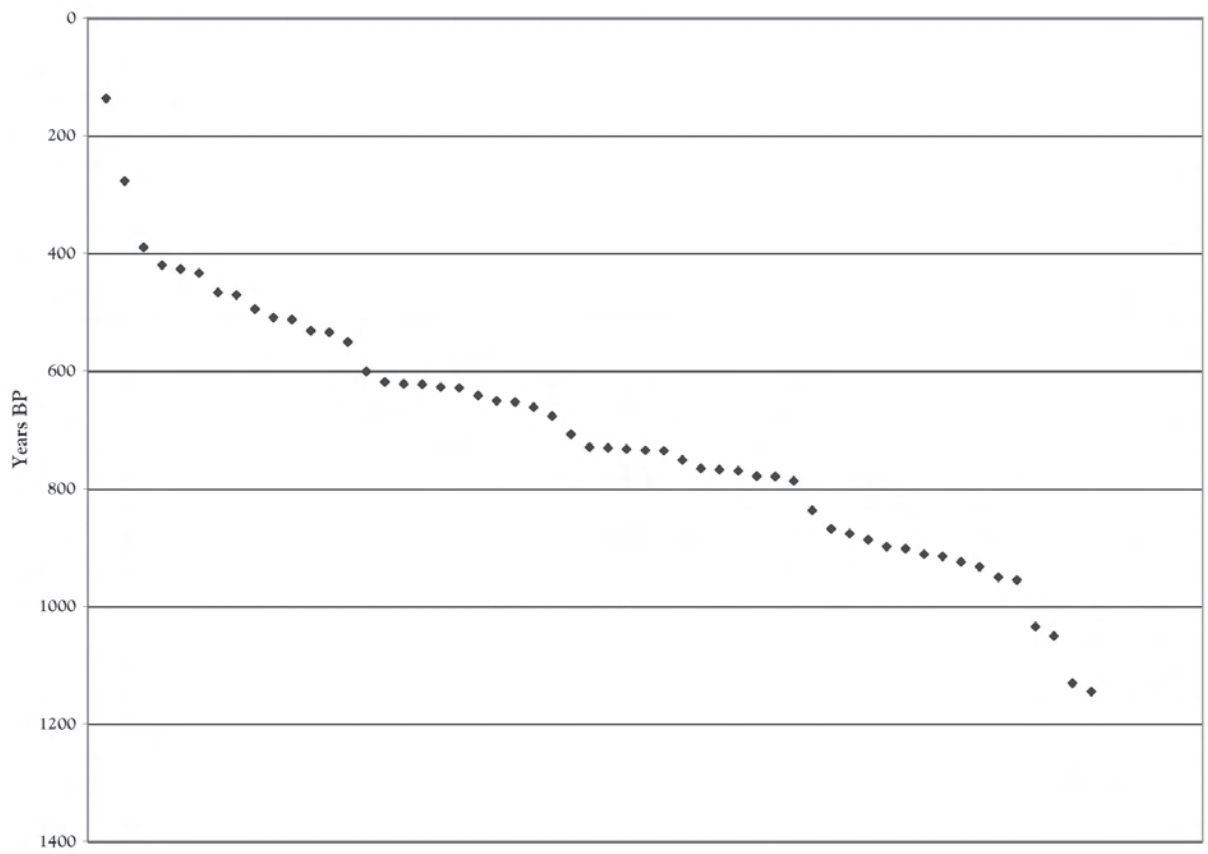

Figure 9. Radiocarbon dates from CA-MNT-1701, in Rancho San Carlos. These 24 single-piece dates cross-cut the Middle/Late Transition (A.D. 1000-1250, or 700-950 BP). In this site there does not seem to be evidence of any significant changes in subsistence and settlement at this time period.

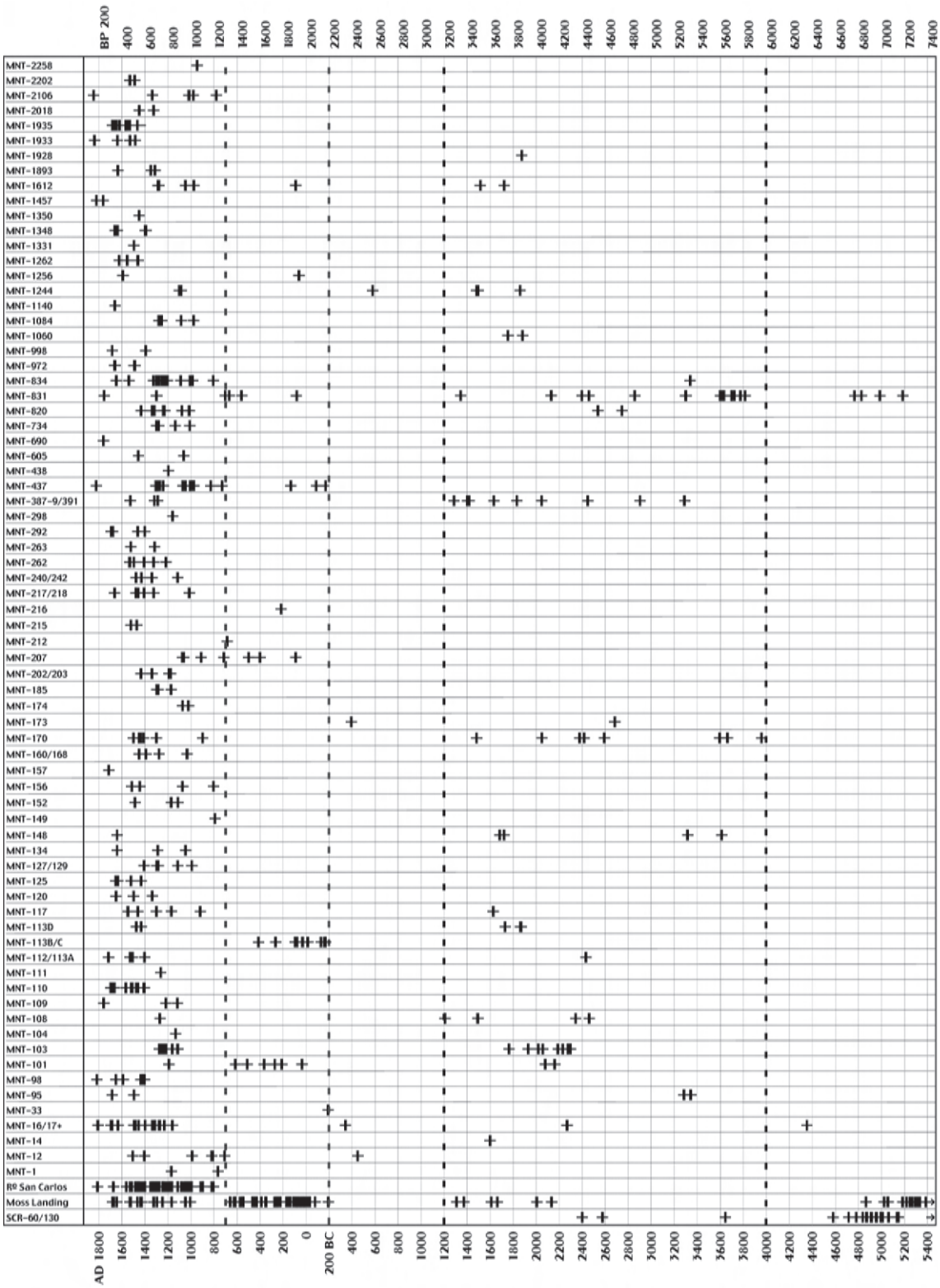

Figure 10. Single piece radiocarbon dates from the greater Monterey Peninsula area (n=554).

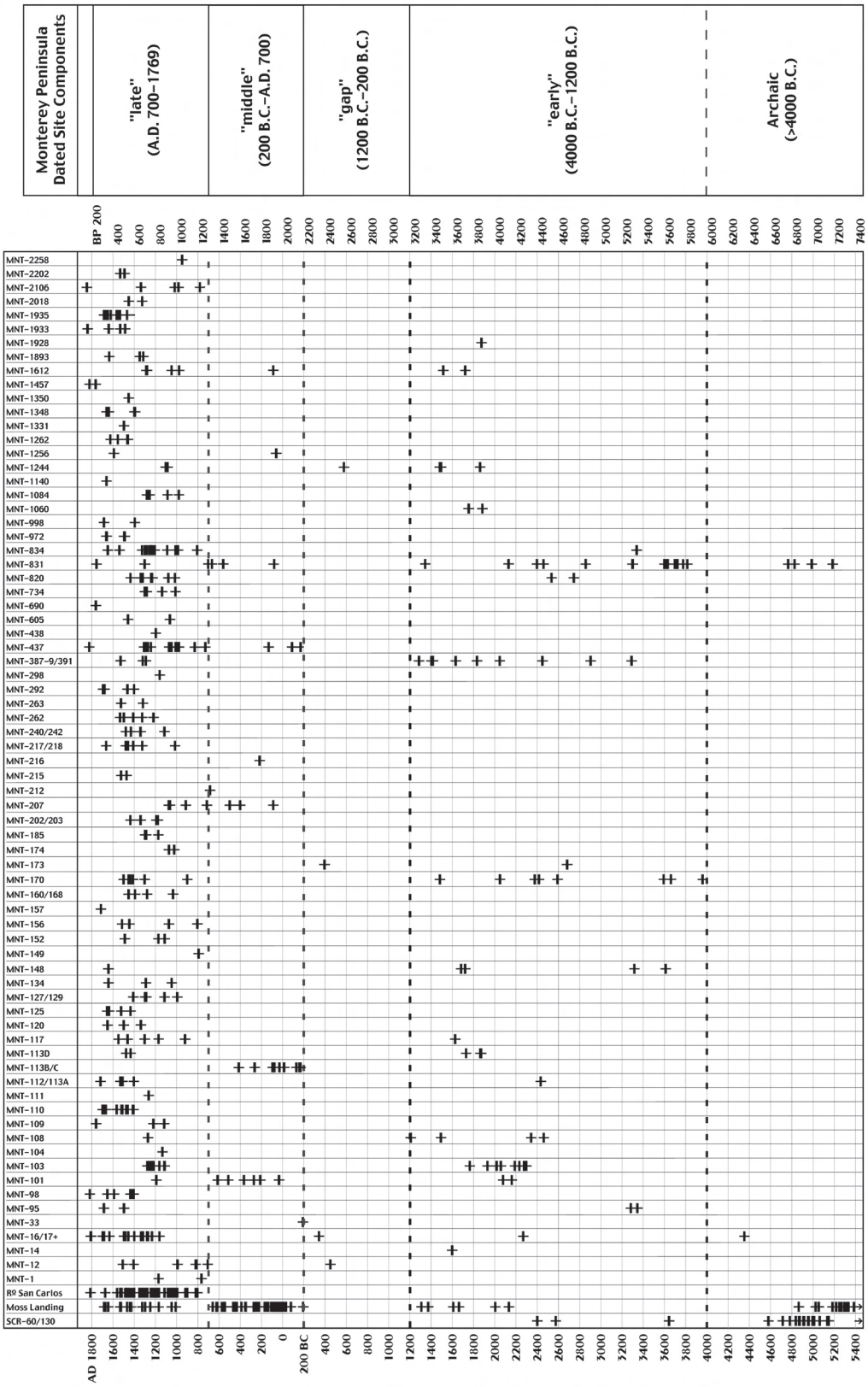

Figure 11. Cultural sequence based on dated site components from the greater Monterey Peninsula area.

The problem with this definition is that none of the Monterey Peninsula area sites contain an assemblage resembling the Millingstone Culture as described above. So far, only seven sites have even been dated to this time period. These are discussed below.

CA-SCR-60/130, near the mouth of the Pajaro River, was investigated by Pacific Legacy (Culleton et al. 2005). They recovered an Early Holocene component dated between 7650 and 6400 BP (based on 17 radiocarbon dates). The faunal bone assemblage and dietary reconstruction based on stable isotopes showed that the inhabitants "consumed a diet composed of 75 percent marine resources, with a heavy reliance on pinnipeds and marine fish" (Culleton et al. 2005:94). The Early Holocene component shellfish species were dominated by clams and cockles, primarily *Protothaca s.* and *Clinocardium* sp., which were not found in the subsequent Middle Holocene component. Groundstone included 36 handstones and 11 milling slabs, along with mortars, pestles, and other items. Culleton et al. (2005) concluded:

> Because we could not establish the chronological context of the milling implements at SCR-60/130, we refrain from employing the Millingstone Culture concept and the inherent biases and circular reasoning such a name brings to the interpretation of past subsistence pursuits [Culleton et al. 2005:95].

CA-MNT-228, -229, -234, and -1570, in the Moss Landing area, have been subject to a number of investigations and have produced results generally similar to one another. Each site produced radiocarbon dates in the same general range as did CA-SCR-60/130 (26 dates spanning ca. 6800-8300 BP), and each had a lower component dominated by clams and cockles. Of these sites the largest assemblage of milling tools came from CA-MNT-234 (18 handstones and three milling slabs). CA-MNT-1570 produced two milling slabs, and CA-MNT-229 produced only a few fragments which may have functioned as milling tools but which were too small to permit positive identification. The Early Holocene component at CA-MNT-228 failed to produce any handstones or milling slabs. It is likely that if dietary reconstruction and stable isotope studies were performed, the results would show a maritime adaptation similar to that at CA-SCR-60/130.

CA-MNT-831, in Pacific Grove, produced four radiocarbon dates in the range 7150-6700 BP, as well as a very robust component dating between ca. 5800-5200 BP (Breschini and Haversat 2008a). Concerning this site, Jones et al. (2007:135) note that "...another [component], at CA-MNT-831 on the Monterey Peninsula, suggests that Millingstone may have persisted to 3000 cal B.C."

CA-MNT-831 produced no metates and only one possible mano even though nearly one acre of midden was bulldozed under archaeological supervision. Stable isotope analysis was conducted on four burials. Two burials produced estimates for marine diet biomass at 80 percent and 82 percent, just above the range that Culleton et al. (2005) reported for the Early Holocene Group at CA-SCR-60/130, while one burial produced an estimate of 92.5 percent, far above their range. The radiocarbon ages for these three burials were 1870, 4810, and 5250 BP. Although no burials were recovered from the earliest component, these data suggest a substantial reliance on marine organisms in the diet, a trait most likely shared with the Archaic component. Macrofloral and phytolith analyses from the Archaic component suggest that seed processing was not a major activity at that time. Finally, residential sites on the Monterey Peninsula are dominated by mussel shell; clams and cockles are rare on the rocky coast, and so no direct comparisons with the Moss Landing area can be made.

CA-MNT-17C, at the mouth of the Carmel River in Carmel, is the final site in our study area to have produced a radiocarbon date older than 6000 BP. The

several projects in that site have been small, associated with single family dwelling remodels or rebuilds, and so little is known about the deposit. One radiocarbon sample from a deep caisson excavated during a construction project returned an age of 6300 BP. The site has produced at least six handstones and six milling slab fragments, but otherwise the deep midden from which this early date was obtained resembles that at CA-MNT-831. More recent components have been identified at this site as well.

Based on their examination of the data from those sites that were then available, Fitzgerald and Jones, in their 1999 paper titled "The Milling Stone Horizon Revisited," identified no Millingstone sites within our study area. A decade later, with data from additional investigations, we find no reason to disagree with them.

The seven Archaic sites that have been examined to date in our study area all exhibit a substantial reliance on marine organisms, with local variation in terrestrial resources depending on location. Handstones and millingstones are present but not in large quantities. Mortars and pestles are most likely absent. *Olivella* type A1 (Spire-lopped) beads are the primary shell beads associated with this time period (all bead types are after Bennyhoff and Hughes 1987). Lanceolate points are found during this time period but extend into subsequent time periods as well. The only artifact that is probably diagnostic of this period is the crescent, of which very few examples have been found locally (e.g., CA-MNT-229).

One additional site, CA-MNT-2074, located between Moss Landing and Salinas, has produced 43 manos and nine milling slabs or milling slab fragments. These were obtained by a local collector. Because this site is in agriculture, which does not require permits, no studies have been possible. Although no radiocarbon dates have been obtained, it is likely that this site will be found to be Archaic as well.

Early Period, 4000-1200 B.C. (5950-3150 BP)

The Early Period saw a proliferation of dated site components in the Monterey Peninsula area (Figure 11). This may be due in part to the decreased use or abandonment of the Moss Landing area about 4500-2000 B.C. following an increase in fresh water in the slough systems. Jones and Waugh (1997) suggest that the increased levels of fresh water destroyed the shellfish beds and the local fishery.

Early Period sites are generally found along the shoreline of the Monterey Peninsula (Figure 12). Only one site in the list below, CA-MNT-1928, is in the interior.

At present, the following sites have been radiocarbon dated to the Early Period:

CA-MNT-14	CA-MNT-17C	CA-MNT-95
CA-MNT-101	CA-MNT-103	CA-MNT-108
CA-MNT-112	CA-MNT-113D	CA-MNT-117
CA-MNT-148	CA-MNT-170	CA-MNT-173
CA-MNT-387	CA-MNT-391	CA-MNT-820
CA-MNT-831	CA-MNT-834A	CA-MNT-1060
CA-MNT-1244	CA-MNT-1612	CA-MNT-1928

Evidence from the Moss Landing sites indicates that the area was not as heavily occupied during the Early Period as it had been previously. Six radiocarbon dates from CA-MNT-229 and CA-MNT-234 range between 2150-1300 B.C. (4100-3250 BP). The upper component at CA-SCR-60/130 also was dated to the Early Period.

Subsistence during the Early Period appears to have been generalized, with hunting, fishing and gathering all being conducted, and with local emphases depending on the availability of specific resources. This pattern has been described as a "forager" subsistence strategy (Breschini and Haversat 1980; Dietz and Jackson 1981; Breschini 1983; Dietz 1987). Dietz (1987) summarizes foragers as follows:

Characteristics of foragers include seasonal residential moves among a series of resource patches, gathering of foods daily on an "encounter" basis with return to the residential base near the end of each day, no use of storage, a limited foraging radius around residential bases, considerable variability in the size of foraging groups and the number of residential moves made in a year, considerable variability in the redundancy of land use from year to year, possible occasional occurrence of extended resource procurement trips from residential bases, and the use of residential bases and locations. Such a system is in marked contrast to that of the collectors [see below] and essentially moves consumers to available goods after they have "mapped onto" whatever resources may be

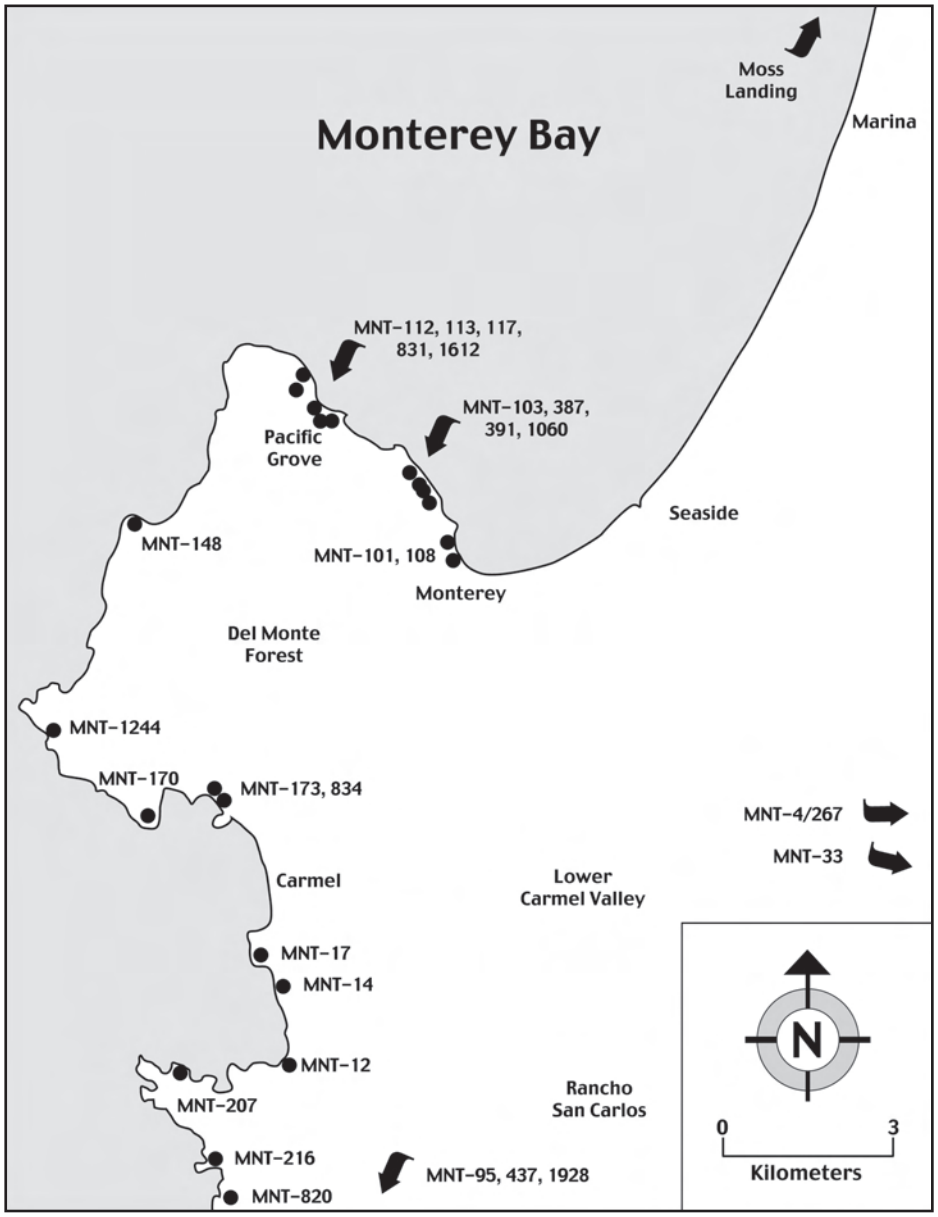

Figure 12. Selected Monterey Peninsula area sites.

> procured in the area. Archaeological evidence to date suggests that forager residential bases are, for the most part, confined to the coast where a diverse set of pelagic, littoral, and terrestrial resources were available to forager populations [Dietz 1987:67].

The two best examples so far of the Early Period in the Monterey Peninsula area are CA-MNT-391 and CA-MNT-831. Both sites exhibited a high percentage of marine organisms in the diet. For CA-MNT-391, an estimated 82 percent of the mammal contribution was made up of marine taxa (Hildebrandt and Hall 1993:217). The figure was even higher at CA-MNT-831, with the meat weight contribution from marine mammals estimated at over 86 percent. Stable isotope analyses on two Early Period burials from CA-MNT-831 found evidence for an average of about 87 percent marine organisms in the diet (Breschini and Haversat 2008a).

A variety of artifacts are commonly found in Early Period components, but the only one that appears truly diagnostic of this period is the Type L2 *Olivella* bead (Small Thick Rectangle). On the Monterey Peninsula, four examples of this bead type have been radiocarbon dated, with a range of about 4100-3450 BP. An additional L2 bead, fashioned from *Mytilus* shell, has been radiocarbon dated to about 3300 BP. These five beads were obtained from sites MNT-831, -1060, and -1612. Based on radiocarbon dates, L2 beads are only found during the later half of the Early Period. It is likely that type L3 (Ovoid Thick Rectangle) and L4 beads are representative of this time period as well.

Other artifacts common in the Early Period include a variety of point types (contracting-stemmed, Año Nuevo long-stemmed, Rossi square-stemmed, and large side-notched). Also common were bone gorges, and there were small numbers of mortars and pestles.

Early Period middens are rarely stratified due primarily to bioturbation which has produced deposits that appear visually uniform from top to bottom (Figure 3). Often there are abalone layers near the surface, but these have been dated to the Late Period and are unrelated to the Early Period components. In most of these sites, there is no Middle Period deposit between the Early and Late components. Two sites which share all these characteristics are CA-MNT-103 and CA-MNT-170.

The "Gap," 1200-200 B.C. (3150-2150 BP)

Our data set of 554 calibrated single piece radiocarbon dates reveals an uneven distribution of dates (Figure 11). Beginning about 1200 B.C., the number of dates drops off sharply. The next thousand years are represented by only four dates, all within the last 400 years of the gap. These occur at sites CA-MNT-12, -17, -173, and -1244, all on the southwestern side of the Monterey Peninsula.

The Jones models (Jones et al. 1996; Jones and Klar 2007) do not show this gap. It was only discovered when we began using dated site components and purged our radiocarbon data set of bulk soil and bulk shell dates.

A couple of cautions should be added here. First, we infer a gap in occupation from an absence of radiocarbon dates. The vast majority of our dates were obtained from marine shell, which introduces a possible source for error. If some event caused the inhabitants of the area to discontinue the use of shellfish for most of the thousand years, we would obtain the same suite of dates as if the area had been abandoned for that time. Only by dating other site materials, particularly bone and charcoal, can this possible bias be addressed. While the data set from Moss Landing includes 26 bone or charcoal dates (out of 89 dates), the Monterey Peninsula area data set includes only 14 (out of 445 dates). A larger data set of non-shell materials would be useful in evaluating the apparent temporal gap demonstrated by the shell dates.

Secondly, the gap may represent a significant change in the subsistence/settlement pattern rather than abandonment of the area. Sites representing 3150-2150 BP might be missed during field survey if they are not characterized by marine shell. Further, if discovered, they might also be considered too peripheral or ephemeral to be tested and analyzed.

At this point, we suspect that the gap was not caused by climate or other environmental change. Our initial data suggest that the gap does not extend to the northern Monterey Bay, Santa Cruz and beyond, or to the coast south of Big Sur. However, we have not analyzed the radiocarbon dates from those areas as thoroughly as we have for the greater Monterey Peninsula area. Our suspicion is that the gap is a cultural phenomenon, possibly related to the interactions between the incoming Penutian speakers and the Hokan or Esselen speakers who had occupied the coastal area previously. (It is still being debated whether Esselen is a language isolate or a member of the Hokan family.)

One additional clue comes from an interior site located about 12 miles east of Monterey. This site, CA-MNT-4/267 was tested recently and found to have two components, Early and Late (Pulcheon 2006). The Late Period component dated to about A.D. 1670, while the Early Period component produced five radiocarbon dates between 3130 and 3045 BP—right at the beginning of our gap. The lower component produced moderate quantities of marine shell, with mussel dominant, as is the case for residential sites in the Monterey area. Screened through 1/4-inch mesh, the 120-140 cm level produced 736.8 g of shell, of which 91 percent was mussel.

The Early Period component at CA-MNT-4/267 was occupied during the first 100 years of the gap which we have identified on the Monterey Peninsula and in the Moss Landing area. This shows that people were still active in the region, if not on the Monterey Peninsula, and it shows that marine shell was still being harvested. But after about 100 years this site was also abandoned, not to be occupied again until the Late Period.

Middle Period, 200 B.C.-A.D. 700 (2150-1250 BP)

There is clear evidence for the onset of the Middle Period in the greater Monterey Peninsula area. Several large site components in Moss Landing begin abruptly about 200 B.C. (including CA-MNT-229 and CA-MNT-234). On the Monterey Peninsula, sites CA-MNT-101, -113B/113C, and -437 have produced dated components starting about that time.

While Jones and Ferneau (2002:213) suggest that Middle Period sites are ubiquitous, they are actually somewhat scarce on the Monterey Peninsula, with fewer than a dozen radiocarbon dated examples. Several additional sites are suspected of containing Middle Period deposits on the basis of their shell bead types, but these deposits appear small and thoroughly mixed into much larger Early Period components. Examples are CA-MNT-108 and CA-MNT-148.

Middle Period sites can be differentiated from Early Period sites in both subsistence/settlement patterns and artifact assemblages. Many Middle Period sites on the Monterey Peninsula are found in locations which had either not been used previously or which had seen only minimal Early Period use. (This is not the case for the Moss Landing sites.)

One characteristic that stands out is the intensity of habitation. The more generalized "forager" subsistence strategy of the Early Period was replaced by a "collector" strategy (Breschini and Haversat 1980; Dietz and Jackson 1981; Breschini 1983; Dietz 1987). Dietz describes this as follows:

> Based on available archaeological, ethnographic, and linguistic data, it would appear that the Monterey Peninsula and adjacent areas, specifically the Carmel Valley, were,

> sometime after ca. 2,000 BP, populated by "collectors" which were ancestral to the ethnographic Rumsen. Characteristics of collectors include "the storage of food for at least part of the year," "logistically organized food-procurement parties," and the use of certain site types in their procurement strategies. As collectors, these people not only utilized residential bases and field camps, but employed "locations," "stations," and "caches" (cf., Binford 1980) as well to exploit their environment for resources [Dietz 1987:67].

Virtually all the known Middle Period sites on the Monterey Peninsula are in close proximity to the shoreline, and evidence suggests that coastal resources continued to play a significant role in the economy just as they had during the Early Period. Only one Middle Period deposit, CA-MNT-33, has been identified in the adjacent Carmel Valley.

In addition to faunal collections, we have direct radiocarbon evidence of continued reliance on coastal resources. The one Middle Period burial at CA-MNT-831, which was radiocarbon dated to about 1870 BP, was analyzed using stable isotopes. The analysis suggested the marine component of the diet was about 80 percent.

Fishing appears to have become an important part of the settlement/subsistence system on the Monterey Peninsula during the Middle Period. Sites CA-MNT-101 and CA-MNT-113B/C both have produced a number of fishhooks (17 and 6, respectively), while CA-MNT-108 has produced large quantities of fish bone.

We initially thought that the quantities of fish bone at CA-MNT-108 were associated with the Early Period. This was based on Early Period radiocarbon dates obtained from abalone shells (Breschini and Haversat 1989). We now believe that the large quantities of fish bone were part of a Middle Period component which was not initially recognized. On reexamining the data, we find that one multiple shell mussel date falls within the gap, suggesting that the sample contained a mix of shell fragments from before and after the gap.

Additionally, 13 G2 *Olivella* beads were recovered from CA-MNT-108. Based on 15 radiocarbon dates from sites between the San Francisco Bay area and San Luis Obispo County, the *Olivella* G2 bead appears to span almost all the Middle Period as we define it (range: 200 B.C.-A.D. 550), and we now know that these beads are evidence of Middle Period use of the site.

Finally, a very similar situation existed at CA-MNT-234 in Moss Landing. A component with similarly large quantities of fish and sea mammal bones was initially thought to be associated with the Early Period (Breschini and Haversat 1995a), but 20 radiocarbon dates subsequently obtained on those bones by researchers from UC Santa Cruz have conclusively documented their Middle Period origin.

Artifacts associated with the Middle Period include a variety of point styles, including square and contracting stem types, but many of these types persist through time and are not exclusive to the Middle Period. Mortars and pestles are found even in coastal sites such as CA-MNT-113C (formerly CA-MNT-115), attesting to the increasing use of terrestrial resources. Carved mussel shell fishhooks appear near the beginning of the Middle Period, with three specimens from CA-MNT-113C dating to about 2100-1850 BP and an additional specimen from CA-MNT-216 dating to about 1750 BP. One abalone shell fishhook very similar in style to the mussel shell fishhooks was found at CA-MNT-113C (Morley 2010). Mussel shell fishhooks continue into the Late Period.

In addition to the G2 bead mentioned above, the *Olivella* F2, based on 12 radiocarbon dates, spans most

of our Middle Period (range: 125 B.C.-A.D. 650). A third bead, the *Olivella* G6, is also associated with the Middle Period, but the radiocarbon dating of that type is not yet sufficient to document its temporal range. Based on radiocarbon dates, the *Olivella* F3 bead spans parts of the Middle and Late periods, as we define them.

CA-MNT-33, the one interior site in our study area known to date to the Middle Period, provides evidence that terrestrial adaptations were already starting to develop. That site was excavated by an amateur (Howard 1974:39-41) and never fully analyzed or reported, but fortunately some of the collection was recovered. An abalone shell found at the base of the site returned a radiocarbon date of 2140 BP. The site contained a number of *Olivella* G2 and F2 beads (Fenenga 1988), as well as numerous mortars and pestles. Bedrock mortars were also found on the site.

It is likely that other Middle Period sites will be found, both in the interior and on the coast. We anticipate that our understanding of this period will improve with time.

One hypothesis is that the Middle Period sites in our study area may represent incoming Penutian speakers (Costanoan/Ohlone) who were facing adaptation to new and unfamiliar coastal environments. This idea has been variously explored by Breschini and Haversat (1980), Dietz and Jackson (1981), Moratto (1984), and Dietz (1987).

Shaul (1988; personal communication 2003) noted the borrowing of "sea" oriented words from Esselen into Costanoan; Esselen words containing certain suffixes were borrowed directly into Costanoan languages, where new suffixes were added, leaving a trail easily followed by linguists. This supports the idea that the Costanoan were originally from inland and had to learn about the coast from previous inhabitants.

It is not known whether the incoming Costanoans pushed earlier peoples to the south and into the mountains, whether they absorbed them in what became Costanoan territory, or both. Recent mtDNA evidence does show that haplotypes thought to be associated with the earlier Esselen peoples persist on the Monterey Peninsula to the Late Period and into modern times (Breschini and Haversat 2008b).

Late Period, A.D. 700-1769 (1250 BP-contact)

The collector economic system continued from the Middle Period into the Late Period. The Late Period, which we see beginning around A.D. 700, is evidenced by a rapid proliferation of sites. Both habitation sites and gathering sites spread to new areas of the Monterey Peninsula. In many cases they are situated directly on Early Period sites. On the Monterey Peninsula it is common to find sites with both Early and Late Period components but which are lacking Middle Period components.

The Medieval Warm Interval (formerly known as the Medieval Climatic Optimum) occurred between A.D. 800 and 1200 (Fagan 2000:9) or A.D. 900-1350 (Moratto 2004:909). This period was characterized by warmer sea temperatures, decreased precipitation, and elevated summer temperatures (Jones 1995:217). In some parts of California, this caused severe environmental problems, including drought, and led to a decrease in population and significant changes in settlement and subsistence strategies. Drought was reportedly particularly severe between about A.D. 912-1112 and 1210-1350 (Moratto 2004:909).

However, because of the local microclimate, the conditions that led to drought in some areas of California are more likely to have brought an increase in summer fog to the Monterey Peninsula. There is no evidence of a reduction in population or a change in subsistence/settlement strategies around A.D. 900-1350. Rather, it appears that this was a time of population expansion in the Monterey Peninsula area

since the number of Late Period sites increased significantly. Residential bases became larger and more numerous, especially in the interior.

In addition to population expansion, we also see significant shifts in the settlement and subsistence system. Terrestrial resources used during the Middle Period became increasingly important. Fewer residential bases are found on the coast, particularly after ca. A.D. 1400. The Carmel Valley, and in particular the Rancho San Carlos area, became the location for large permanent villages. This was noted by Dietz, who wrote:

> Ethnographic evidence (cf., Milliken 1981) suggests that collector populations eventually established five residential bases in the Carmel Valley and at San Francisquito Flat [Rancho San Carlos], and that the areas adjacent the residential bases and the Monterey Peninsula proper were exploited through the use of field camps, locations, stations, and caches [Dietz 1987:67].

The 12 Rancho San Carlos sites which have been radiocarbon dated have all returned Late Period dates (although a slight Middle Period occupation is suggested by seven *Olivella* type F beads). We now have 54 dates obtained using single piece samples from Rancho San Carlos. They range from A.D. 800 to after A.D. 1800, with a significant drop off after A.D. 1600. This large site complex includes bedrock mortar sites and smaller possible special-use sites. After a gradual start around A.D. 800, the dates reflect a steady habitation for over 800 years (Figure 8). This differs from Jones' models which depict the Late Period beginning about A.D. 1200.

We find no evidence of Jones' Middle/Late Transition period in the dated Monterey Peninsula site components. Radiocarbon evidence from one of the Rancho San Carlos sites (CA-MNT-1701) provides a steady progression of 23 dates across that "transition," suggesting minimal change in the local subsistence/settlement pattern during that time.

Bead types associated with the Late Period, as we define it for the Monterey Peninsula area, are shown in Table 1.

The Desert Side-notched point has traditionally been associated with the Late Period. For example, Jones et al. (1989:40) and Jones (2003) stated that the Desert Side-notch point marks the beginning of the Late Period (the Dolan Phase on the Big Sur coast) which they placed at about A.D. 1250. We find that the Desert Side-notch is neither characteristic of most Monterey Peninsula sites nor a temporal marker for most of the Late Period. Rather, this artifact appears to have been introduced to the area significantly after the beginning of the Late Period.

On the Monterey Peninsula, Desert Side-notched points are found primarily in sites containing historic materials (Breschini and Haversat 1995b). Further, many Late Period sites are completely lacking in these points. For example, CA-MNT-834B was the subject of three different projects (Jackson 1996; Breschini and Haversat 2008c) which excavated and screened approximately 50 cubic meters of midden soil without finding a single Desert Side-notched point. Fourteen radiocarbon dates from the site span the period A.D. 1000-1650. Based on this and other similar results, it is much more likely that the Desert Side-notched type was introduced to the Monterey Peninsula area closer to the end of the Late Period rather than at ca. A.D. 1250.

Table 1. Late Period Bead Types.

Bead Type	Approx. Range	Number of Dates
G1	A.D. 800-1350	6
M1	A.D. 1000-1350	16
M2	A.D. 1250-1500	7
K1	A.D. 1000-1500	8
E1, 2, 3	A.D. 1550-1700	8

This late date for the spread of the Desert Side-notched point has also been noted by Cartier (1980:39-50) and by Hildebrandt and Mikkelsen (1993:111, 113) for the southern Santa Clara Valley. The idea that the Desert Side-notched point was most likely introduced after A.D. 1650 appears in Hudson's monograph on Chumash archery equipment (1974:9), and he attributes the original idea to Glassow (1965). All these researchers have suggested that the Desert Side-notched projectile style represents only a part, or even just a small part, of the Late Period.

Three radiocarbon dated burials from the Late Period have been subjected to stable isotope analyses. Two of these (one from a site without a trinomial in the lower Carmel Valley and one from CA-MNT-831) dated to about 780 and 200 BP, respectively, and exhibited about 10 percent marine organisms in their diet. The third burial from CA-MNT-391 dated to about 660 BP and had evidence of a diet containing about 70 percent marine organisms. These data show that the trend toward increasing use of terrestrial resources continued into the Late Period, but it was not universal. Some individuals maintained a heavy reliance on marine resources, while others relied almost entirely on terrestrial resources.

Conclusions

Archaeologists in central California have traditionally relied on beads and other artifacts to construct regional temporal sequences. In the past, information from local areas was often unavailable, and regional sequences spanned those gaps, providing an initial framework within which to organize local archaeological data. In the absence of radiocarbon dates, beads and some artifact types provided temporal data which otherwise may not have been available.

Now that we have more advanced radiocarbon techniques, we can directly date a wider range of materials from prehistoric sites. With a much larger database on which to draw, we can fill in some of those local sequences. However, in the case of the Monterey Peninsula area, we have found that our local data does not fit comfortably into the current regional sequence, and thus we propose a sequence which reflects local data. Perhaps the regional sequence needs to be revised to better accommodate this and other local data.

Finally, for the greater Monterey Peninsula area, we have found that emphasis on well dated site components has produced better results in our efforts to determine the temporal structure of local prehistory. We suspect that this may also prove true for other areas of California.

Endnote

1. The fifty-year difference has been rounded off for the earliest time periods.

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