

# PREHISTORY IN THE SANTA BARBARA CHANNEL REGION AND ITS CONTEXT WITHIN CALIFORNIA PREHISTORY

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The prehistory of the Santa Barbara Channel region is arguably better known than any other region of California, partly because its archaeological record is unusually rich and has attracted the attention of archaeologists since the 1870s. The Chumash people occupied this region throughout most or all of its prehistory, which began about 13,000 years ago, earlier than has been documented in other parts of the state. As is true throughout most of the state of California, the Chumash people never adopted agriculture. Instead, they depended on a variety of marine, riverine, and terrestrial natural food resources. By 11,500 years ago the Chumash occupants of the Channel Islands, forming the southern margin of the Santa Barbara Channel, were utilizing a variety of marine resources. By 8,500 years ago occupants along the coastal mainland used stone implements to mill seeds and nuts, and these implements became more diverse starting about 6,000

years ago. Social complexity began to increase at this time, and by 2,500 years ago, this complexity was even more apparent. Marine fishing benefited from the adoption of the circular shell fishhook at this time, and the development of the plank canoe around 1,500 years ago. The canoe also facilitated economic exchange between the Channel Islands and the coastal mainland. The complex socio-political and economic systems of the Chumash people were in place by 700 years ago. In central and northern California, few sites are known to date earlier than about 5,000 years ago, but by 700 years ago, social and political complexity in parts of central California reached levels similar to that in the Santa Barbara Channel region.

*Keywords:* California, Santa Barbara Channel, Chumash people, subsistence, mortuary goods, islands, paleoenvironment, socio-economic complexity.

## INTRODUCTION

The Santa Barbara Channel region of coastal southern California (fig. 1) has attracted the attention of many archaeologists since 1875, partly because of its unusually rich archaeological record consisting of a relatively high density of sites, many having substantial volumes of habitation deposits containing an impressive variety of artifacts. As well, many of these deposits date to the earliest periods of California prehistory, before 7000 BP, and within the last few decades archaeological investigations have documented an antiquity as early as 13,000 BP. Investigations over the decades also have demonstrated that cultural complexity reached an unusually high level for a society that did not depend on agriculture.

The Chumash people occupied the Santa Barbara Channel when Spanish explorers passed through their territory beginning in 1542, and Chumash descendants still live in the region. At the time of contact with Spanish explorers, the Chumash people lived in settlements along the coast and in the interior as much as 60 km from the coast. They spoke a series of related languages grouped into

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Figure 1. Map of the Santa Barbara Channel region

the Chumashan family, and the distinctiveness of this language family, compared to others in California and North America generally implies habitation in their territory for many thousands of years. Each Chumash settlement was politically independent and was governed by one or more chiefs. The settlements with the largest populations were in environmentally optimal locations on the coast, some having populations of over 500 individuals (Gamble 2008:67-70; Glassow and Johnson 2019; King 1971:30; Johnson 1999). Smaller settlements, some with as few as 15 individuals, were located in the interior. Larger settlements had multiple chiefs, each of whom was the leader of a kin group, but one of these chiefs was recognized as the paramount chief of the settlement. Although smaller settlements also were headed by a chief, they often recognized the prominence of the chief of a larger nearby settlement. Settlements interacted with each other during ceremonial events or “fiestas” hosted by the chief of one of them. Economic exchange managed by chiefs often took place during these occasions (Gamble 2008:224–226), but trade between settlements, and perhaps also between individuals living in different settlements, was frequent (King 1971). Exchange was facilitated by currency consisting of strings of shell beads, and commodities moving through this exchange network included various food products, raw materials, and a variety of manufactured items.

These distinctive characteristics of the region’s archaeological record probably are due to its unique geographic position. The coastline along the channel mainland is south-facing whereas along the rest of the California coast the coastline is primarily west- or southwest-facing. Consequently, the channel coastline gains some protection from prevailing winds and heavy surf from the northwest. The four offshore Channel Islands, between 20 and 44 km from the mainland (fig. 1), also provide some protection from heavy surf. More importantly, however, the prehistoric occupants of the Channel Islands maintained social and economic ties with mainland populations in order to acquire desired mainland products. Especially during later periods of prehistory, these island-mainland relationships developed into an economic exchange system more sophisticated than anywhere else in California, as well as a high level of socio-political complexity that was linked to it. The semiarid climate of the channel region (450 mm annual precipitation) also contributes to its rich archaeological record in that various kinds of faunal remains are preserved in better condition than is the case in many parts of northern California, where higher precipitation and acidic soils adversely affect faunal remains.

Although the archaeology of the Santa Barbara Channel region has many distinctive and intriguing features, other regions of California also have attracted considerable attention of archaeologists over the decades. The huge shellmounds around the perimeter of San Francisco Bay (fig. 2) still are of considerable interest among archaeologists working in the central portion of the state, even though most of the deposits at these distinctive sites have been removed during urban land development during the last century. In fact, archaeological investigations in all parts of the state have revealed many distinctive sequences of cultural development since the end of the Pleistocene epoch.

In large part, these distinctive sequences are due to the diverse environments of California. In southeastern California there are the arid Mojave and Colorado Deserts with predominantly sparse scrub vegetation. Coastal and near-coastal areas of southern California are semiarid and covered with grasslands, scrub, and chaparral. Annual precipitation increases northward along the Cali-

ifornia coast, and vegetation becomes more verdant. Related to this precipitation gradient, coastal coniferous woodlands become increasingly more prevalent northward. The central interior of the state is dominated by the extensive Central Valley flatlands, which before agricultural development were covered with grasslands, scrublands, and intermittent marshlands. The Central Valley is bounded by mountain ranges, and the range to the east, the Sierra Nevada, rises to elevations of more than 3,000 meters. Throughout California except in desert regions, lands of intermediate elevation contain oak woodlands, and the acorns they produced were a major food staple among native peoples throughout much of the state. The higher levels of precipitation in the northern part of the state fostered many perennial streams and rivers containing a variety of fish species, particularly those within the salmonid family, and these also were a major food staple in this part of the state. Throughout prehistory, agriculture was not prac-



Figure 2. Map of California showing locations of cities and geographic features mentioned in the text

ticed in most parts of the state. Instead, populations depended on a wide variety of naturally occurring plants and animals. Fish also were important along the coast and perennial watercourses.

Archaeologists have created many different chronological schemes to characterize cultural development over the millennia in different regions of California. In some regions, multiple chronological schemes are used. The diversity of schemes is partly the result of differing trajectories of cultural development from one region to another and partly the product of archaeologists placing different emphases on particular characteristics of the archaeological record. Regional variation in the history of the development of archaeological research is also a factor. For example, the growing number of radiocarbon dates for various regions of California has caused many of the schemes to be refined. For present purposes, no established scheme will be used. Instead, prehistory will be divided into time intervals during which distinctive aspects of cultural development occurred.

#### EARLIEST OCCUPANTS, 13,000-9000 BP

The earliest occupation in North America south of the continental ice sheets dates to approximately 15,500 BP, and although the number of sites is still small, it appears that populations were widely dispersed between 15,000 and 14,000 BP (Davis et al. 2019; Waters 2019). Over the past several decades, researchers have proposed two alternative migration routes southward from Beringia (the land bridge between northeastern Asia and Alaska exposed during the last glaciation) southward into North American lands south of the glaciers: 1) through the ice-free corridor that developed between the Cordilleran and Laurentide Ice Sheets as they began to melt and 2) along the Pacific coast from Alaska to the western United States. The coastal route would have been possible because the Cordilleran Ice Sheet apparently did not cover most lands close to the coast during the latter part of the Pleistocene epoch. Currently, the coastal route is favored because the ice-free corridor may not have developed until sometime between 14,000 and 13,000 BP, which is later than the earliest known sites in the United States and Mexico, whereas the coastal route appears to have been viable at least by 15,000 BP (Froese et al. 2019).

If the earliest migration south of Beringia occurred along the Pacific coast between 15,500 and 14,000 BP, California should have sites dating within this range of time. However, the earliest California site dates much later, at nearly 13,000 BP. This site is located on Santa Rosa Island, one of the Channel Islands forming the southern boundary of the Santa Barbara Channel (fig. 1; Johnson et al. 2002). The site consists of just two human femora and a few other small pieces of human bone; no habitation deposits or artifacts are associated with the bones. Eight other sites on Santa Rosa and San Miguel Islands are associated with radiocarbon dates falling between 12,000 and 11,400 cal BP (Erlandson 2012; Erlandson et al. 1996; Erlandson et al. 2011; Rick et al. 2013). These sites contain flaked stone artifacts and varying amounts of faunal remains, but compared to later time periods, little is yet known about lifeways during this period, aside from the fact that marine fauna were a focus of subsistence activities. Two kinds of bifacially flaked stone artifacts are distinctive of this time period: small stemmed projectile points and crescents (fig. 3, Erlandson et al. 2011:1183). These sites, as well as others dating as young as 9000 cal BP, are considered to be

manifestations of the Paleocoastal Period or Tradition, the first well-documented period in coastal southern California prehistory.

Until recently, archaeologists thought that the first occupants of North America were people of the Clovis culture, defined by the use of the distinctive Clovis-style spear point. It is now clear that the Clovis culture dates no earlier than approximately 13,000 cal BP and apparently lasted until about 12,650 cal BP (Jennings and Smallwood 2019; Waters and Stafford 2007). The Clovis culture is well documented at many sites in the central and eastern United States (Jennings and Smallwood 2019); but none of the many occurrences of Clovis points in California have been found in deposits that can be associated with radiocarbon dates (Rosenthal and Fitzgerald 2012:71). The only find of a Clovis point in the Santa Barbara Channel region is a small basal fragment from a coastal mainland site associated with deposits that clearly date much later in time (Erlandson et al. 1987).

The period between 10,000 and 9000 BP appears to be one of transition in the Santa Barbara Channel region and elsewhere in California. Significantly, small numbers of milling implements—metates (millingslabs) and manos (handstones)—have been encountered at some sites during this millennium, but many, particularly those on the northern Channel Islands, lack milling implements (Rosenthal and Fitzgerald 2012). Most sites dating within this millennium are at or near the coast, and shellfish and other marine fauna continue to be the focus of subsistence.

#### EXPANSION OF SUBSISTENCE TO INCLUDE SEEDS AND NUTS, 9000–6500 BP

Most mainland site deposits dating between approximately 9000 BP and 6500 BP contain abundant metates (stone milling slabs) and manos (handstones) (fig. 4a) often mixed with hammerstones and flaked core tools, as well as large quantities of fire-affected stones. Shell beads also occur, these being made by grinding off the spire of Purple Olive shells (fig. 8b). The abundance of milling implements indicates a significant shift in subsistence activities, involving the addition of various small seeds and nuts such as grass seeds and acorns to the diet (McGuire and Hildebrandt 1994:42-43, Wallace 1955:219-221). Sites of this time period at or near the coast also contain abundant shellfish remains indicating that shellfish were an important source of protein (Erlandson 1991, 1994). Most of the known sites of this time period are in the southern half of California. Considerably fewer sites are documented in the northern half of the

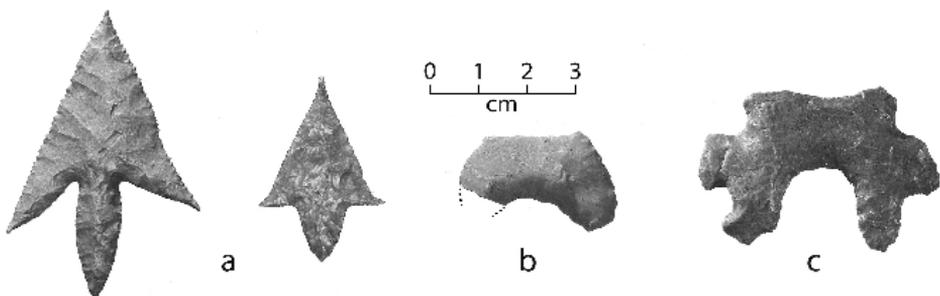


Figure 3. Artifacts associated with the earliest occupants of the Santa Barbara Channel region; a: Channel Islands Barbed points; b: crescent; c: eccentric crescent

state (Fitzgerald and Jones 1999), probably due to higher annual precipitation that caused site deposits of this period to be buried under sediments or perhaps to be destroyed by erosion. The abundance of milling implements and other sorts of artifacts at sites of this time period implies that they were foci of settlement. Specifically, inhabitants spent more time at these sites than was typical at sites dating earlier in time. However, the nature of settlement patterns during this time interval still are largely unknown.

A distinctive characteristic of artifact assemblages from mainland sites of this time period, compared to site assemblages dating later in time, is the rarity of projectile points. Many have attributed this rarity to a focus on small game rather than large game (Hildebrandt and McGuire 2002:248; McGuire and Hildebrandt 1994:48-49), but some sites do have significant quantities of large-game bone, particularly of deer and occasionally also elk (e.g., Glassow 1991:12.61; Jones et al. 2008:298-299). In fact, the reported absence or rarity of large-game bone may be partly the result of high degrees of bone fragmentation in site deposits of this age, rendering identification of large-game bones particularly difficult (Glassow n.d.). Projectile points also rarely occur at sites on the

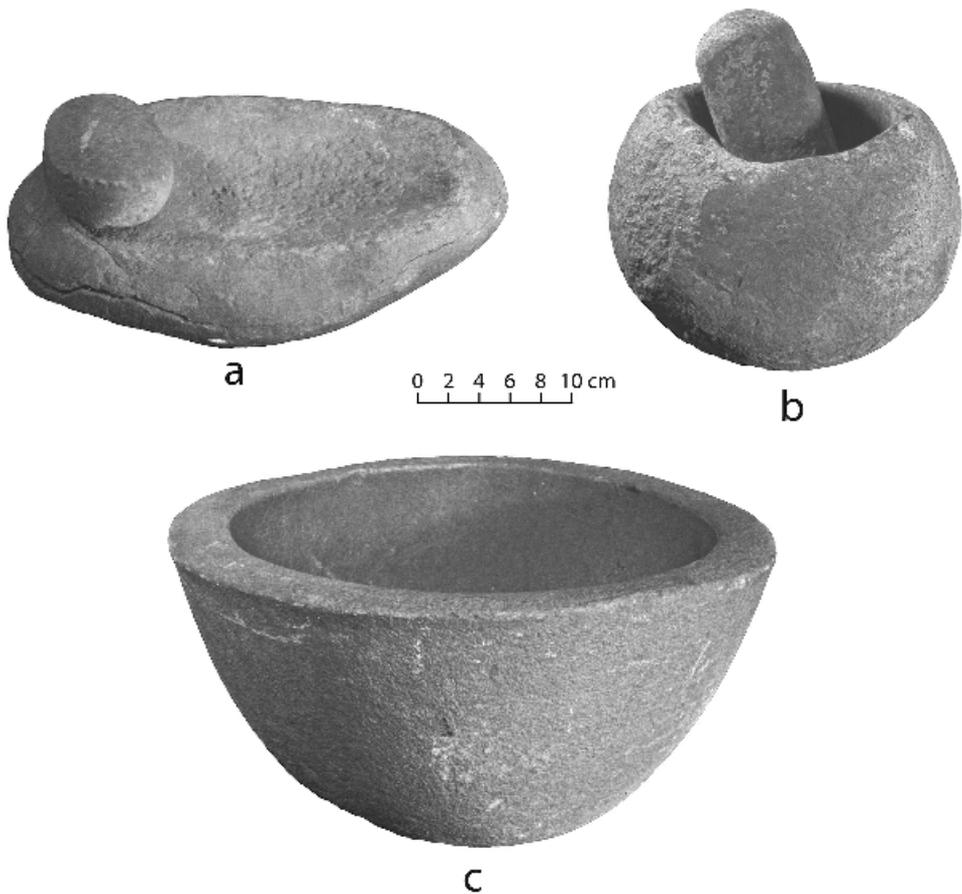


Figure 4. Milling tools used in the Santa Barbara Channel region; a: metate and mano typical of the 9000-6500 BP period; b: mortar and pestle typical of the 6500-5000 BP period; c: mortar typical of the 700-200 BP period

northern Channel Islands during this period, and milling implements also are very rare. Earlier, researchers attributed the lack of milling implements at island sites to the minimal presence of plants yielding edible seeds and nuts (Erlandson et al. 2005:682; Rick et al. 2001:605), but it is now clear that islanders focused instead on the underground corms of Blue Dicks (*Dichelostemma capitatum*), a plant that is especially abundant on the northern Channel Islands (Gill 2013; Reddy and Erlandson 2012).

#### EMERGING COMPLEXITY, 6500-5000 BP

Environmental changes during this period appear to have fostered technological innovation. Paleoenvironmental evidence indicates that climate during the period was generally cooler and drier (lower annual precipitation) than before or after. About 6500 BP or perhaps as much as 500 years later, stone mortars and pestles (fig. 4b) began to be used alongside metates and manos for crushing or milling seeds and nuts. This is clearly the case in the Santa Barbara Channel region and is also generally so in central and northern California. However, in many parts of southern California, south of the Santa Barbara Channel, metates and manos remained the dominant milling implements, and mortars and pestles did not become important until much later in time.

That both were in use in many regions of California during this period implies a dietary shift toward a greater emphasis on foods that are more efficiently crushed using a mortar and pestle. However, the relationship between abundance of various sorts of seeds and nuts represented in macrobotanical remains

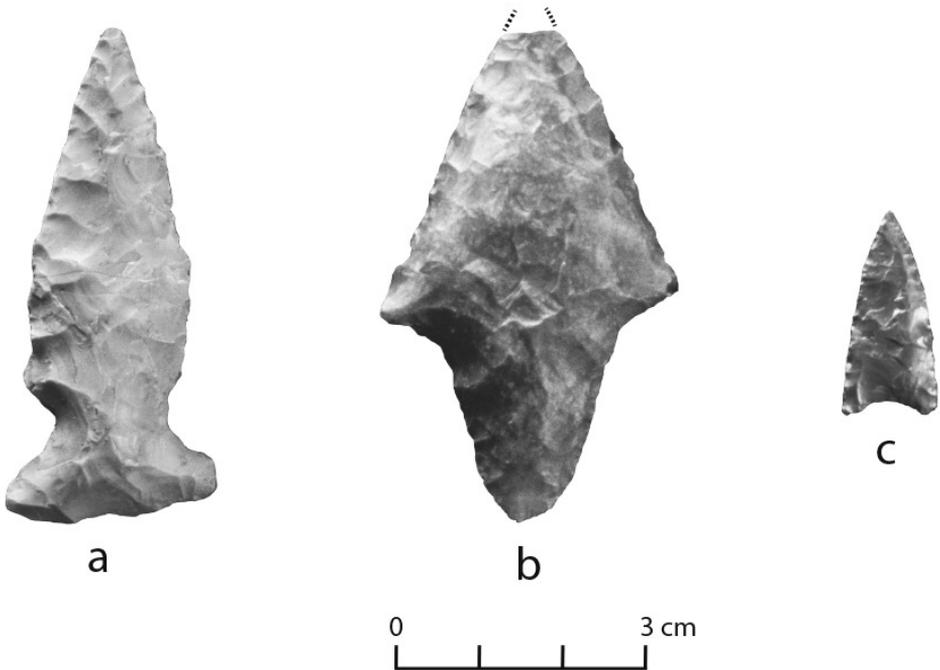


Figure 5. Projectile points used in the Santa Barbara Channel region and southern California; a: side-notched point typical of the 6500-5000 BP period; b: stemmed point typical of the 5000-2500 BP period; c: arrow point typical of the 700-200 BP period

and these two kinds of milling tools reveals that this may not be the case. For many years, acorns from a variety of species of oaks, which are abundant in many parts of California, were thought to be the principal product milled into flour using mortars and pestles, based on their ethnographically documented use among native Californians at the time of European colonization of the state (Kroeber 1925). However, macrobotanical remains indicate that acorns had become important during the preceding period, when only metates and manos were the milling tools (Rosenthal and McGuire 2004:148–153). Although dietary shifts may be related to the introduction of mortars and pestles, their increasing use may have had more to do with an increasing emphasis on sedentism, given that manufacture of mortars and pestles require more time and effort than do metates and manos, and because they are more valuable, they would not be left behind when a residential group moved from one site to another (Rosenthal and McGuire 2004:157–158). Another likely reason, however, may have been the increasing dietary importance of acorns over time, which made use of mortars and pestles increasingly more efficient than metates and manos (Stevens and McElreath 2015).

Another technological change during this period is an increase in the use of projectile points, as well as a change in their form. Points of the previous period typically are lanceolate or stemmed forms, whereas most points of this period are side-notched or corner-notched (fig. 5a). Archaeologists have attributed this shift in the form and abundance of projectile points to an increased emphasis on large-game hunting, but amounts of large-game bone at many sites of this period is not necessarily greater than in site deposits of the previous period. However, bones of pinnipeds (seals and sea lions) in site deposits of this period at or near the coast appear to be more abundant. Bones of marine fish also appear to be more abundant. Significantly, shellfish remained an important, if not the most important, source of protein in the diet of people living at or near the coast (Glassow i.p., 1997:88).

Curiously, projectile points remain rare in site deposits of this period on the Channel Islands, implying that hunting of pinnipeds did not entail the use spears. Instead, a simpler weapon such as a club may have been used. At a few sites on the Channel Islands, deposits dating to this period contain unusually abundant dolphin bones of various species, perhaps because dolphins were more accessible in ocean waters near these sites (Glassow 2005; Glassow et al. 2008:27–32; Porcasi and Fujita 2000).

Asphaltum (tar) nodules begin to appear in site deposits dating to this period, and so-called “tarring pebbles” occur as well. These are rounded pebbles about 3–4 cm long that are coated with tar, and they also occur in site deposits dating to the rest of prehistory and into the early historic period. Asphaltum presumably was collected from natural deposits that occur at various locations in the Santa Barbara Channel region. Ethnographic information reveals that tarring pebbles were used to coat the interiors of basketry water bottles (Hudson and Blackburn 1983:40). Pebbles heated in a fire would be placed inside the newly woven water bottle along with nodules of asphaltum. The water bottle then would be shaken so that the heated pebbles would become coated with asphaltum and then rub against the interior surface, making it waterproof. The stones and remaining asphaltum then would be poured out.

A distinctive characteristic of some site deposits of this age along the central California coast and on the northern Channel Islands is the abundance of

Red Abalone (*Haliotis rufescens*) shells compared to site deposits dating both earlier and later in time (Glassow 1993; Glassow et al. 2008:76–81; Greenwood 1972:67, 87; Joslin 2010:163). Because of cooler ocean water temperatures during this period, this large shellfish, which prefers relatively cool waters, may have been more abundant in shallow waters, perhaps even present in intertidal waters. Consequently, Red Abalone would have been more accessible to shellfish collectors than would have been the case when water temperatures were warmer both earlier and later in time (Glassow et al. 1994).

Social organization appears to have become somewhat more complex during this period, as indicated by a greater abundance and diversity of shell beads and shell and bone ornaments as mortuary goods within cemeteries. More complexity of social organization may be related to the manufacture, ownership, and use of watercraft on the Channel Islands for fishing and dolphin hunting (Glassow 2004). However, data indicative of greater social complexity are still very few. Regional populations of this period still were small, and the number of people comprising a residential group probably also was small. As well, residential groups appear to have moved frequently between sites, as they did earlier in time. Consequently, the degree of social complexity that may have existed during this period still was minimal.

#### CONTINUING DEVELOPMENT, 5000-2500 BP

During this period, populations throughout California appear to have continued to develop and refine cultural lifeways, building upon changes that had occurred during the previous period. In some but not all parts of California population density appears to have increased, based on larger numbers of archaeological deposits associated with radiocarbon dates. This is especially evident in regions of central California, where sites dating earlier than 5000 BP are comparatively rare. However, as mentioned earlier, this rarity may be partly due to environmental conditions affecting their preservation and visibility.

In addition, expansions into California of new ethno-linguistic groups are more evident during this period. Between about 3500 and 3000 BP, Tatic-speaking people from the interior of southern California, perhaps the southern San Joaquin Valley and the southern Sierra Nevada Mountains, expanded southward, eventually settling in the Los Angeles basin, along the adjacent coast, and onto the southern Channel Islands (Sutton 2009). They appear to have replaced populations that had been residing in these areas prior to this time. Another major expansion of peoples into California was of Penutian-speaking people. These people may have come from various regions east of California, and possibly at different times. Penutian speakers began occupying the central part of the state by 4500 BP (Golla 2011:252; Moratto 1984:552), and over the next 2000 years they expanded from there throughout California's Central Valley and also to the coast in the vicinity of San Francisco Bay and southward to the vicinity of Monterey Bay.

During this period the large shellmounds around the perimeter of San Francisco Bay began to be created, although most of their growth occurred during the next period. The earliest radiocarbon dates for occupation around the bay are about 5000 BP, but the earliest radiocarbon dates from basal deposits of the shellmounds are about a millennium or more later. Studies of deeply buried natural sediments indicate that the bay did not become a productive estuarine habitat until the rate of sea level rise slowed significantly between 7000 and

5000 BP. In fact, the bay did not exist during much of the early Holocene epoch (Bickel 1978; Lightfoot 1997:137–138).

Throughout those regions of California where oak trees are common, acorns milled with mortars and pestles appear to have become an increasingly important dietary staple during this period (Basgall 1987), and the metate and mano ceased being used by about 3500 BP in these regions. In the Mojave Desert, mortars and pestles began to be used later in time, beginning sometime between 4000 and 5000 BP (Warren 1984:416, 419), but in this region they probably were used to process mesquite pods, given that oaks are rare in desert regions. In the Santa Barbara Channel region as well as in other regions of California, mortars and pestles were more carefully shaped than during the previous period, perhaps indicating their greater importance in food preparation.

In the Santa Barbara Channel region, data from mortuary goods in a cemetery on Santa Cruz Island indicate greater social status differentiation and possibly also stronger political leadership by about 3000 BP (King 1990:95-96). The nature of settlement systems during this period is still largely unknown, but many sites, most being relatively small, clearly were residential bases where occupants resided for extended periods of time. On the northern Channel Islands the majority of sites dating to this period are in interior settings (Kennett 2005:130-133; Perry and Glassow 2015). These sites often contain stone mortars and pestles as well as digging-stick weights, indicating the importance of plant foods. However, marine shell fragments and fish bones are relatively abundant in their deposits, revealing that marine resources also were important even though residence often was more than a kilometer from the coast.

The shape of projectile points changed at the beginning of this period in the Santa Barbara Channel region. The new form was stemmed, and generally they were not carefully manufactured (fig. 5b). Many have asphaltum deposits adhering to their stems, implying that asphaltum was used in hafting the points to shafts. The earlier side-notched form lacks asphaltum deposits, implying a different method of hafting. As mentioned earlier, asphaltum also was used to waterproof basketry water bottles.

At about 3000 BP, the number of radiocarbon-dated island site deposits in the interior of Santa Cruz Island declined, and frequencies did not increase again until about 1500 BP. The reasons for this decline are unknown, but some sort of environmental fluctuation is suspected (Perry and Glassow 2015:201). Farther south in San Diego County, occupation around the large coastal lagoons of this region also declined beginning about 3500 BP, as a result of the loss of rich lagoon resources when their mouths were closed by sand and cobble bars (Gallegos 2016:89). Frequency distributions of radiocarbon-dated archaeological deposits within other regions of central and southern California also show declines beginning around 3500-3000 BP (Breschini et al. 1996).

#### INCREASING SOCIAL AND ECONOMIC COMPLEXITY, 2500–700 BP

Populations appear to have increased at a higher rate during this period, coincident with new technological innovations and an increasing dependence on plant foods that were processed using stone mortars and pestles. Populations appear to have increased dramatically in some regions such as parts of the Sierra Nevada, where chronologies of occupation begin sometime between 3000 and 2500 BP (Hull 2007), and this is the period during which the large shellmounds

of the San Francisco Bay region were created, even though some began to be occupied during the previous period. In addition, settlement systems appear to have become more complex; some sites clearly are much larger than others, implying that they were focal points of settlement, whereas smaller sites were satellite settlements, or were camps occupied by small groups for short periods of time. In essence, populations were becoming more sedentary and were successfully occupying regions of California where populations were very low or even nonexistent previously. For reasons not yet clearly understood, the rate of population growth increased again in many parts of California beginning about 1500 BP.

A significant technological change occurring near the end of this period was the introduction of the bow and arrow, which replaced the throwing stick and dart or the simple spear. This technology appears to have spread from directly east of California, where it occurs several hundred years earlier (Kennett et al. 2013:125). It appears to have been adopted first in southern California at about 1300 years ago, and several hundred years later in central and northern California (Kennett et al. 2013:127). Some have argued that this new technology was a factor in the increasing sedentism and population aggregation in California (Bettinger 2013), although adverse environmental conditions (discussed below) that began to occur in California around the time the bow and arrow began to be used also was a likely factor.

The introduction of the bow and arrow is indicated by a reduction in the size of projectile points. The first arrow points in the Santa Barbara Channel region, dating to about 1300 BP or perhaps a few hundred years later, are leaf-shaped (foliate) in form, but by the end of this period they were triangular in form with

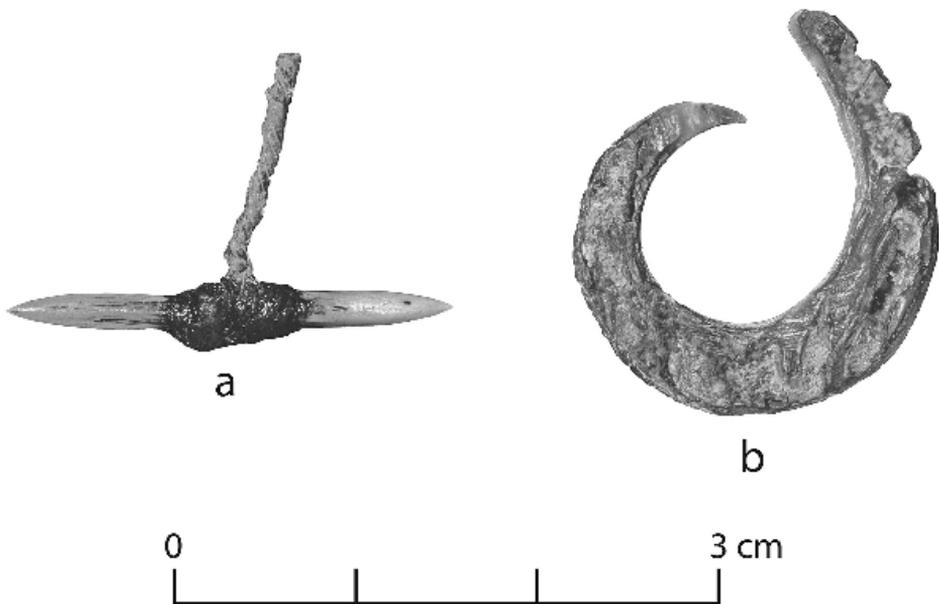


Figure 6. Fishhooks used in the Santa Barbara Channel region and in central and southern California; a: replication of a gorge with a line attached, typical of the periods between 13,000 and 2500 BP; b: replicated shell fishhook typical of the 2500–700 BP period

concave bases (fig. 5c). This form was used throughout much of southern California, and other forms were used elsewhere in California.

In the Santa Barbara Channel region, fishing within nearshore waters appears to have increased during this period. In fact, ocean fishing was more important in the Santa Barbara Channel region than it was anywhere else along the California coast, mainly because the south-facing coastline of the Santa Barbara Channel does not experience the heavy surf that prevails along the more west-facing coastlines of the state, and the waters of the channel generally are not as rough. The increased importance of fishing during this period undoubtedly is related to the adoption of the shell fishhook (fig. 6b) near the beginning of this period (Rick et al. 2002). Interestingly, this type of fishhook may have come into use 500-700 years earlier on the southern Channel Islands, although it was slightly different in shape (Raab et al. 1995). Earlier devices used in fishing were the fish gorge (fig. 6a) and the composite fishhook, the latter consisting of two pointed bone pieces, one serving as the barb and the other as the shank, that were tied together to form a hook shape. Both began to be used by 7000 BP (King 1990), if not earlier, and both continued to be used after the introduction of the shell fishhook. However, they became increasingly less important over time, presumably because they were not as effective in catching fish (in particular, the gorge [McKenzie 2007]). The largest marine fish obtained during this period was the swordfish (*Xiphias gladius*), which typically is 2 to 3 m in length (Davenport et al. 1993). It possibly could have been captured using a large gorge or compound fishhook (King 1990:81), but it seems more likely they were obtained with either a spear or, after about 500 BP, a harpoon.

There is some evidence that occupation of coastal residential sites became more intensive beginning sometime between 2500 and 2000 BP, most likely because of the increasing importance of fish in the diet (e.g., Gusick et al. 2015). Huge amounts of shell midden began to accumulate at some of the coastal sites, implying that populations in at least some parts of the region were becoming more sedentary (fig. 7). Another reason for the importance of coastal settlement, as well as the increasing importance of fishing, was the development of the plank canoe. At the time of Spanish exploration of the California coast in the late 1700s, the Chumash people of the Santa Barbara Channel constructed canoes of split wood planks that were sewn together, and the seams between the planks were caulked with tar mixed with other materials. These were seaworthy watercraft, each capable of holding several people or large amounts of cargo. The Tongva people living along the coast adjacent to the Los Angeles and on the southern Channel Islands also used this type of watercraft. Comparable watercraft were not constructed elsewhere along the California coast. Not only were they used for fishing, they also facilitated more intensive interaction between the Chumash and Tongva people living on the Channel Islands and those living along the mainland coast (Hudson et al. 1978; King 1971). Although the canoes are not preserved in archaeological deposits, aside from portions buried with the dead in cemeteries dating to the late prehistoric and protohistoric periods, flaked stone artifacts associated with their manufacture date to about 1300 BP. This distinctive watercraft probably began to be constructed about this time or perhaps a few hundred years earlier (Arnold 1995:737; Gamble 2002).

Jones and Klar (2005; Jones and Klar 2012) proposed that the stimulus to begin constructing plank canoes came from Polynesia, as a result of Polynesian seafarers sailing across the Pacific Ocean to the southern California coast.

Part of their argument is based on linguistics: for example, the Chumash term for their canoe was *tomol* (or *tomolo*), which is similar to the Polynesian word, *tumu rakau*, meaning something made of wood (Jones and Klar 2012:228). Jones and Klar also proposed that other artifacts that began to be used at about the same time, including the composite harpoon, a later style of shell fishhook having a grooved rather than straight shank, and a later style of compound bone fishhook, are also very similar to Polynesian styles. Although their proposal of Polynesian contact has been met with some skepticism among colleagues, it is a viable hypothesis worth considering as more evidence becomes available.

Another development tied to increasing social and economic complexity is a shift from a shell bead type made by abrading off the spire of a Purple Olive (*Olivella biplicata*) shell and a rectangular bead with a central perforation made from the wall of this shell to a new type of bead, a disc-shaped bead with a central perforation, also made from the wall of a Purple Olive shell (fig. 8a). In some site deposits dating near the end of this period, these beads are relatively abundant, implying that bead production may have increased. Probably strings of these beads were used not only to denote social status but also in economic exchange, both of which became increasingly more obvious during this period. The beads also were used to decorate various kinds of ritual artifacts by gluing them onto their surfaces with asphaltum (King 1990:128–130).

During the latter part of this period, beginning about 1200 BP and lasting until about 700 BP, a significant climatic event, the Medieval Climatic Anomaly (MCA), impacted populations living in California as well as other parts of western North America (Jones et al. 1999) and elsewhere around the world. In California, a series of significant droughts occurred during this time interval, which resulted in declines of terrestrial food resources and availability of fresh water, particularly in the semi-arid lands of coastal and pericoastal southern Califor-



Figure 7. A large shellmound site on the coast of Santa Cruz Island; house depressions ~30 m in diameter cover the top of the shellmound. Basal deposits date to ~2000 BP

nia. Droughts occurring near the end of the MCA were especially severe, and population size in the Santa Barbara Channel region appears to have declined until the end of period (Glassow and Johnson 2019). Many sites were abandoned during this interval (Arnold 1991:956). Physical anthropologists who studied human skeletal populations from Santa Barbara Channel cemeteries dating to the MCA have identified an increased incidence of diseases related to subsistence stress and also an increased incidence of wounds related to warfare (Lambert and Walker 1991; Walker and Lambert 1989).

Shell bead manufacturing was affected near the end of the MCA. Manufacture of some of the beads made from wall portions of Purple Olive shells became very expedient in that they were larger and their shape was irregular. One type of these larger beads had a hole that was punched out rather than drilled. These beads were traded over a large area beyond the Santa Barbara Channel region, implying that they were the principal type of bead used as currency in economic exchanges (King 1990:153). However, smaller, well-shaped disc beads continued to be made, and their production appears to have intensified. In fact, some of these beads are very small, implying considerable effort devoted to their manufacture.

Intensification in the production of beads during the MCA is indicated by a change in how holes in the bead blank were drilled. Earlier, the drill was made from a randomly shaped chert flake that was held in one hand during drilling. Beginning about 1000 BP, drill bits were manufactured from chert microblades struck from prepared cores (Arnold 1987, 1992:73; fig. 9a-c). Each apparently was hafted onto a wood shaft. This type of drill was rotated between the palms of a person's hands while the bead blank was in a small, cup-shaped depression on a flat slab of stone to hold it in place. In essence, the drilling process was

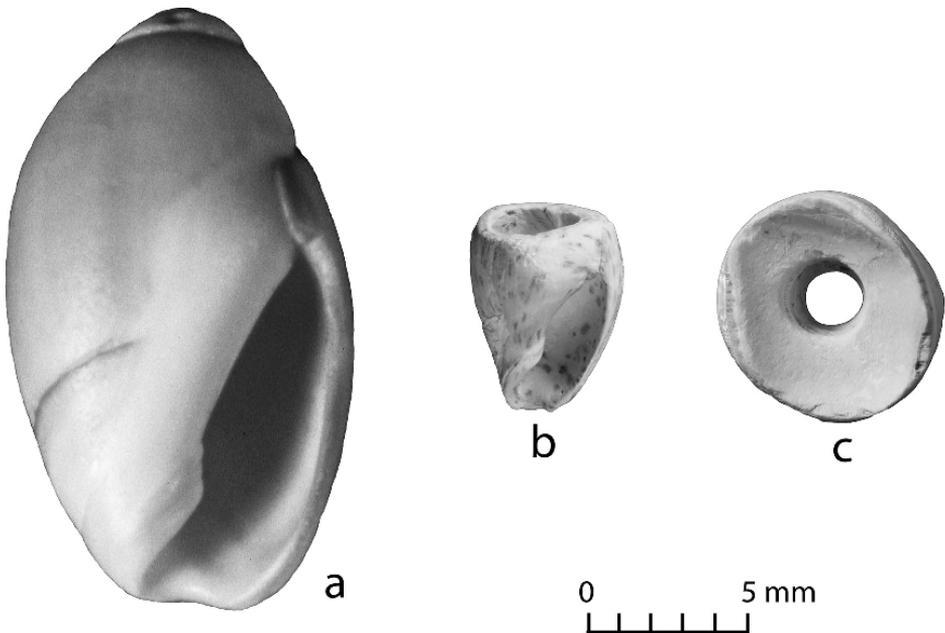


Figure 8. Beads made from Purple Olive shells; a: a complete Purple Olive shell; b: a small spire-ground bead; c: a callus “cup” bead

industrialized. Most of these microblades were manufactured on the Channel Islands, particularly Santa Cruz Island, and so were most of the disc-shaped beads, but some also were manufactured at sites along the mainland coast. Some chert quarry sites on Santa Cruz Island were the focus of microblade manufacture (Arnold 1987).

These developments at the end of this period set the stage for those at the beginning of the next period, at the end of the MCA. A response to subsistence stress caused by the MCA involved more intensive exchange between the different settlements within the Santa Barbara Channel region, and related to this, a rise in status of individuals who coordinated this exchange, as seen in mortuary practices derived from analysis of cemetery data. As a result, status differentiation appears to have increased (Gamble et al. 2001), although there is disagreement over the degree to which status was hereditary (Arnold and Green 2002; Gamble et al. 2002).

#### CULMINATION OF COMPLEX SOCIO-POLITICAL AND ECONOMIC DEVELOPMENT, 700-200 BP

Near the beginning of this period, the cultural patterns as they were at the time of Spanish colonization in the late 1700s came into existence. The MCA had ended, and environmental conditions generally were favorable throughout the remainder of prehistory. Settlements with populations of several hundred and in some instances over 1000 people were established in the Santa Barbara Channel region and along the lower Sacramento River in the Central Valley (Gamble 2008). Fishing became the principal source of protein in the diet in parts of California. In the northern part of the state, salmon began to be harvested in larger quantities than earlier, using fish weirs along streams and rivers where these fish were seasonally abundant. In the Santa Barbara Channel region marine fishing became more important than it was previously. Mortuary practices as revealed in the distribution of grave offerings in cemeteries indicate that social stratification became well developed in those areas of California where populations were most dense. A variety of ritual activities became more formalized, indicated by the abundance of ritual artifacts, particularly within cemeteries. Many of these activities were documented during the historic period by ethnographers. In addition, particular forms of shell beads became currency in economic exchange relationships that came into existence, these being documented in historical accounts shortly after the beginning of Spanish colonization. It is important to acknowledge, however, that complexity in social, political, and economic organization varied within California. In some parts of the state, communities remained relatively small, and their societies resembled those that existed hundreds of years earlier.

At the beginning of this period in the Santa Barbara Channel region, the cultural lifeways of the Chumash people, as they were at the time of initial contact with Spanish explorers, came into existence. The significant droughts near the end of the previous period, related to the MCA, apparently stimulated the development of more formal distinctions between social classes and stronger political leaders who acquired more control over trade relationships between settlements. Indeed, trade between settlements was more intensive than earlier. Populations living on the Channel Islands developed a sophisticated economic relationship with the populations living on the mainland. Production of shell bead currency became the almost exclusive domain of the island dwellers, and

the volume of production increased significantly. Shell beads made from the Purple Olive shell are more common in archaeological deposits dating to this period than they were during the previous period, and ethnohistorical accounts indicate that a particular type made from the callus (interior portion) of the Purple Olive shell (fig. 8c) was used as currency, its monetary value being defined as a specific length of strung beads (Arnold and Munns 1994; Hudson and Blackburn 1987:268–169). These callus beads began to be made at the beginning of this period. They required greater time and effort to manufacture than the ones made from the outer wall of the Purple Olive shell, in part because only one callus bead could be made from an individual Purple Olive shell (King 1990:155). Economic exchange between the people living on the Channel Islands and those living along the mainland coast became more intensive, and as

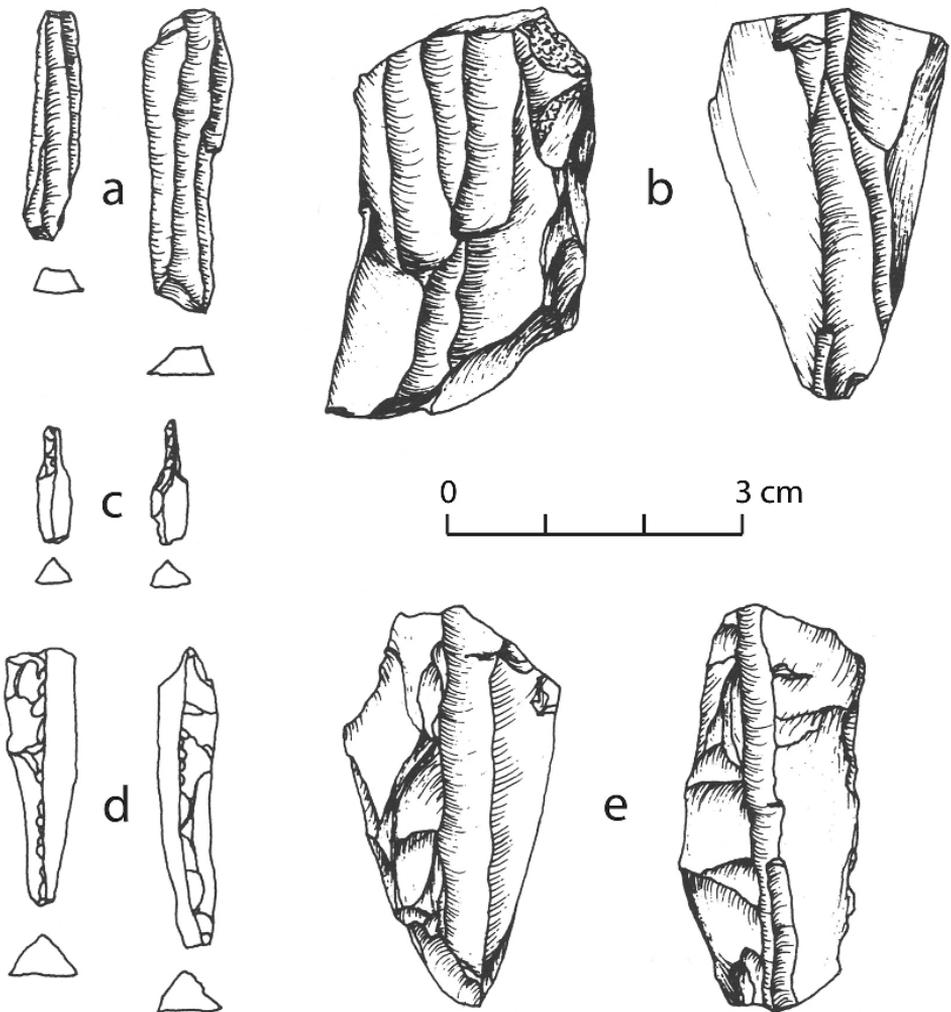


Figure 9. Microblades and microblade cores;  
 a: trapezoidal microblades; b: trapezoidal microblade cores; c: microblade drill tips;  
 d: triangular prepared microblades; e: triangular prepared microblade cores.

Adapted from Figures 14 and 19 in Arnold 1987

a result, the shell bead currency also was extensively used on the mainland. It was also used throughout much of southern California.

The chert drill tips made from microblades also changed at the beginning of this period. The new type required more time and effort to manufacture. Chert cores were more carefully prepared so that a microblade struck from it would have a triangular cross-section, making it stronger than the earlier type that had a trapezoidal cross-section and therefore was thinner (fig. 9d, e, Arnold 1987). On Santa Cruz Island, individuals living in settlements in the eastern part of the island became specialists in the manufacture of microblades for drill tips, whereas individuals living in settlements in the western part of the island specialized in bead manufacture, having obtained microblades for drill tips through trade.

The items purchased with shell bead money include various manufactured artifacts, raw materials, and food resources. Manufactured artifacts included a variety of both utilitarian and ritual items, including large, carefully shaped mortars and pestles (fig. 4c) that probably were used in the context of ritual gatherings. Projectile points of obsidian imported from the southern Sierra Nevada Mountains occasionally are found, and far more commonly found are small flakes of obsidian resulting from rejuvenation of broken projectile points. Artifacts of deer bone, both utilitarian and ritual, also have been found, and those found at sites on the Channel Islands clearly would have come from the mainland given that deer did not inhabit the islands. Artifacts made of deer bone are found mostly as grave goods in cemeteries, but small fragments of deer bone artifacts are common in habitation deposits. Large bifaces made of chert from the mainland and presumably used in ritual contexts also have been found as grave goods in cemeteries (King 1971). Ethnohistorical and ethnographic data indicate that various food products also were traded in both directions across the channel (King 1971), but few of these have been identified archaeologically (Arnold and Martin 2014; Fauvelle 2013).

Fish acquired from nearshore waters became an even more important food resource to people living both on the Channel Islands and along the mainland coast than they were earlier, and ethnohistorical evidence indicates that they often were prepared and dried for storage. Shellfish and sea mammals also continued to be consumed. On the mainland, acorns continued to be a plant food staple, although a variety of seeds and nuts also were acquired. On the Channel Islands, however, acorns were of minimal importance, mainly because oaks were not as abundant as on the mainland. Instead, a wide variety of seeds and nuts were acquired, and Blue Dicks corms continued to be important.

Prehistory of the Santa Barbara Channel, and elsewhere in California, came to an end when Spanish explorers from Mexico began exploring the California coast. The first contact between native peoples of coastal California and Spanish explorers occurred in 1542, when the ships of the sea expedition of Juan Rodriguez Cabrillo passed along the southern and central California coast. The expedition stopped at several locations along the Santa Barbara Channel, and the brief account of his journey provides the first written descriptions of the Chumash people (Kelsey 1998). The first land expedition was in 1769–1770, led by Gaspar de Portolá. Members of his expedition interacted with Chumash people at several of their settlements as they traveled along the mainland coast of the Santa Barbara Channel (Smith and Teggart 1909). Several other Spanish

expeditions contacted the Chumash people, and the accounts of these contacts include descriptions of many aspects of Chumash lifeways (Landberg 1965).

Most of the settlements occupied at the beginning of Spanish colonization have been identified through archaeological investigation. The locations of many settlements—and their Chumash names—were mentioned by Spanish explorers and missionaries in journals and other documents, and they have been verified by finding glass trade beads and other objects of European manufacture in their habitation deposits. In addition, these sites have yielded types of shell beads distinctive of the historic period. As glass beads began to be acquired, they were used as currency along with the beads made from the callus of Purple Olive shells that had served as currency prior to Spanish colonization (King 1978:60).

Missions were established in the territory of Chumash people in the late 1700s and early 1800s, and by about 1806 most Chumash people living in settlements along the mainland coast were now living at the missions (Johnson 1988:135; 1989:368). This more intensive interaction between the Chumash and the Spanish resulted in epidemics caused by European diseases such as measles (Brown 1967). Because they had not been exposed to such diseases before, many died, and Chumash population numbers began to decline. Some scholars suspect that such epidemics, as well as venereal disease, began to impact Chumash populations earlier, during the era of Spanish exploration (Erlandson and Bartoy 1995), but the evidence is not definitive (Johnson 2011). As their settlements were abandoned and Chumash people either died of European diseases or moved to one of the Spanish missions, traditional Chumash lifeways also began to disappear. However, knowledge of aspects of traditional culture was retained in the memories of Chumash people who lived at the missions, or whose parents or grandparents were at the missions, and it was passed on to ethnographers in the late 1800s and early 1900s. Chumash people living today still retain some of these memories and are taking advantage of the knowledge recorded by ethnographers to re-establish some of their traditional practices as well as their language.

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