

**CULTURAL SEQUENCE ON THE COASTAL  
MARGIN OF SOUTHEAST TEXAS**

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### INTRODUCTION

The complete cultural sequence for occupations of the coastal margin of Southeast Texas cannot be reconstructed because many of the earliest sites are now underwater due to rising sea level. In contrast, there are now data available for an occupation sequence of the inland portion of Southeast Texas from the Early Paleoindian (10,000-8,000 BC) through Historic Indian (AD 1700-1800+) time periods (Patterson 1995a, 1996). Sites that would have existed on the coastal margin during the Early Paleoindian period (10,000-8,000 BC) would now be underwater, far offshore from the current coastline of Southeast Texas. Therefore, this paper is concerned with evidence for the cultural sequence of the coastal margin of this region after the start of the Holocene period at 8,000 BC.

The coastal margin of Southeast Texas is defined here as all areas along the Gulf coast with marine and brackish water environments, as shown in Figure 1. These areas encompass portions of Brazoria, Galveston, Harris, Chambers, Jefferson, and Orange counties. Tidal flow can create brackish water environments in streams up to about 20 km from the Gulf coastline.

A high proportion of data for Indian sites on the coastal margin of this region is around the Galveston Bay System, with much archeological work for projects of the US Army Corps of Engineers. This includes Galveston, Harris, Chambers, and Liberty Counties. Counties on the coastal margin of Southeast Texas with limited publication of archeological sites include Brazoria to the west of Galveston Bay, and Jefferson and Orange to the east of Galveston Bay. Therefore, most of the discussion here is centered on sites around the Galveston Bay System, which includes the central and part of the eastern areas of the coastal margin of this region.

The Galveston Bay System includes West Bay, Galveston Bay, San Jacinto Bay, Trinity Bay, and East Bay. A map of the Galveston Bay System is shown in Figure 2, with locations of earliest shell midden sites now known.

Some present coastal margin sites are sites that were originally inland freshwater sites. A good example is the inundated sites along McFaddin Beach, which have Paleoindian and Archaic components (Turner and Tanner 1994), before present

sea level was reached. Some other examples of this type are site 41HR73 (Duke 1971), sites 41HR45, 172, 173, 233, 618, and 619 (Patterson and Marshall 1989), and site 41GV53 (Patterson et al. 2001).

Discussions are given here for Indian occupations on the coastal margin of Southeast Texas for time periods after 8,000 BC, including the Late Paleoindian, Early Archaic, Middle Archaic, Late Archaic, Early Ceramic, Late Prehistoric, Proto-Historic, and Historic Indian periods. Intervals for each time period shown in Table 1 are the same as used for previous syntheses of the archeology of Southeast Texas (Patterson 1995a:243, 1996:9).

Many of the published radiocarbon dates for Rangia shell at sites in this region do not have C13 age adjustments. For radiocarbon dates used here that do not have C13 corrections, 300 years has been added to the radiocarbon dates, as suggested by Ricklis (1998:440).

#### ENVIRONMENTAL SETTING

Data for the cultural sequence on the coastal margin of Southeast Texas can be interpreted only by consideration of shoreline position in relation to sea level. Sea level reached a minimum during the last glacial maximum about 18,000 years ago (Paine and Morton 1986:9). Subsequent glacial retreat released stored water, causing sea level to rise, with increasing inundation of the shoreline. Marine waters reached the mouth of present-day Galveston Bay by approximately 8,000 BC (Paine and Morton 1986:9). At that time, all previous occupation sites of the coastal margin during the Early Paleoindian period (10,000-8,000 BC) would have been inundated. By 2500 BC, sea level was probably within 5 meters of its present level (Paine and Morton 1986:9). Present day sea level was reached about 1000 BC (Ricklis and Blum 1997:Figure 4).

Indian occupations of Smith Point are discussed here. Smith Point is on a barrier strandplain that formed during the last Pleistocene sea level highstand (Paine and Morton 1986:9). As may be seen in Figure 2, subsequent Late Pleistocene silting around this barrier strandplain formed a land mass that now separates Trinity and East Bays, with Smith point located at the western end of this land mass. Smith Point probably became a coastal margin location shortly after 8,000 BC, when tidal flow caused the adjacent Trinity River channel to become brackish water (Paine and Morton 1986:Figure 2). With continuing rise in sea level, Smith point was later placed in a marine environment.

During much of the Holocene period, Trinity Bay extended farther north. As may be seen in Figure 2, with Holocene period

silting, the delta of the Trinity River has moved over 20 km to the south, to the present head of Trinity Bay. At the present head of Trinity Bay, there is a brackish water environment that supports Rangia shellfish.

Ricklis and Blum (1997) have given an occupation sequence for deeply incised Corpus Christi Bay on the central Texas coast. This sequence includes occupation intervals of 7500-6800 BP, 5900-4200 BP, and after 3000 BP during sea level stillstands, with occupation hiatuses when rapid sea level rise occurred between the occupation intervals. Ricklis (1998:445) has noted that there is an occupation cluster in an interval of 4200-3600 BP on the upper Texas coast (Southeast Texas) that does not correspond to occupation intervals in Corpus Christi Bay. Ricklis states that the temporal incongruence may be explained by differences between the geometry of the deeply incised estuary of Corpus Christi Bay as compared to the broad, shallow estuary of the Galveston Bay System.

The coastal margin of Southeast Texas is a lithic-poor area. Chert is available inland in the lower Colorado and Brazos River basins. Small pieces of chert are available in the San Jacinto River basin. Petrified wood and fine-grain quartzite are available inland in the Trinity River basin. The locations of lithic raw materials affected the characteristics of lithic assemblages at coastal margin sites.

#### POSSIBLE ADAPTIVE PATTERNS

There are several scenarios that can be considered for the cultural sequence on the coastal margin of Southeast Texas. One scenario is that the adaptation to marine and brackish water resources occurred very early, in the Paleoindian period. With rising sea level, Indians then moved to new positions on the coastal margin.

It should be noted that adaptive patterns along the coastal margin need not be uniform. Also, there may have been changes to adaptive patterns with population increases, especially after rapid population increase in the latter part of the Late Archaic period, after about 700 BC (Patterson 1999).

Another scenario is that the earliest use of the coastal margin was by inland Indians, with only seasonal occupation of the coastal margin. After population density increased significantly throughout Southeast Texas, some groups changed to year-round occupation of the coastal margin. Starting in the Early Ceramic period (AD 100-600) there is evidence for a territorial boundary between the inland and coastal margin parts of Southeast Texas (Aten 1983:Chapter 16; Patterson 1993), especially evident in the eastern portion of the coastal

margin of this region. The establishment of a social boundary that isolated the coastal margin may have been reenforced by the movement of people into the coastal margin of Southeast Texas from the adjacent Louisiana coast. Cultural influences on Southeast Texas from Louisiana are discussed below.

#### LATE PALEOINDIAN PERIOD

The Late Paleoindian period (8000-5000 BC) has the earliest indications for occupation of the coastal margin of Southeast Texas. However, data for this period is not detailed enough to describe much about the lifeway of hunter-gathers during this time interval, especially because most sites from this time period are now under water.

As noted above, Smith Point (Figure 2) probably became a coastal margin location during the Late Paleoindian period when tidal flow created brackish water in the adjacent Trinity River channel. As sea level continued to rise, Smith Point became a marine environment, perhaps during the Early Archaic period. The Whitehead collection (Patterson et al. 1999) from Smith Point indicates an occupation sequence from the Late Paleoindian through Historic Indian time periods. Dalton and San Patrice dart points in this collection represent the early part of the Late Paleoindian period. An Early Corner-Notched point is from the latter part of the Late Paleoindian period. A tabulation for the chronological placement of projectile point types in Southeast Texas has been given by Patterson (1995a:Table 3, 1996:Table 4).

Another indication of occupation of the coastal margin of Southeast Texas in the Late Paleoindian period is from core samples taken in the presently submerged Sabine River Valley of offshore Louisiana and Texas (Pearson et al. 1986). There is an uncorrected radiocarbon date of 8055 +/-90 BP (UGa-5450) from a Rangia cuneata shell concentration, which is considered to have a high probability of being of cultural origin. There is a bone concentration within this Rangia deposit, including reptile, amphibian, small mammal, and possibly bird elements (Pearson et al. 1986:xxiii). The bone concentration occurs at an estimated date of about 8500 BP.

The Eagle's Ridge site (41CH252) in Chambers County (Figure 2) has Stratum 3 with a mixture of Late Paleoindian and Early Archaic dart points, including Early Side-Notched, and Angostura from the Late Paleoindian period, and Carrollton and Wells from the Early Archaic period (Ensor 1998). However, these data represent inland occupations before the site became a coastal margin shell midden in the Middle Archaic period. Ensor (1998:Figure 146) has used the term "Keithville" for a variety of types of Early Side-Notched points at the Eagle's

Ridge site. It should be noted that Webb used the Keithville category for only one variety of Early Side-Notched point (Turner and Hester 1993:134). A variety of Early Side-Notched forms have been found in Southeast Texas (Patterson 1997).

In summary, there are limited amounts of data that indicate occupation of the coastal margin of Southeast Texas during the Late Paleoindian time period. Smith Point has a high potential for further research on occupations during this time period.

#### EARLY AND MIDDLE ARCHAIC PERIODS

With rising sea level, various locations around the Galveston Bay System became brackish water environments which permitted the growth of *Rangia* shellfish. Shell midden sites were then started. The earliest radiocarbon dates for shell midden sites in the Galveston Bay area are given in Table 2, with site locations shown in Figure 2. The shell midden at site 41GV53 started in the Early Archaic period (5000-3000 BC). Five other shell middens started in the Middle Archaic period (3000-1500 BC). Smith point also has an occupation component in the Middle Archaic period, represented by Bulverde points in the Whitehead collection (Patterson et al. 1999:2).

Site 41CH57 has Late Prehistoric and Historic components (Ambler 1970), but also has a Middle Archaic radiocarbon date (Aten 1983:Table 14.1). No detailed investigation has been done on the early component of this site, located on the lower Trinity River.

Site 41GV53 on lower Clear Creek in Galveston County has a Paleoindian period occupation sequence when this location had a freshwater environment (Patterson et al. 2001). The large shell midden at this site started in the Early Archaic period when this location became a brackish water environment with rising sea level (Patterson et al. 2001; Hines 1992:Table 4). Site 41GV53 has the earliest radiocarbon date for a shell midden on the coastal margin of Southeast Texas, which is 5340 +/- 80 BP (Patterson et al. 2001). Most shell in this midden is *Rangia Cuneata*, but small amounts of *Rangia flexuosa* and oyster shell indicate at times a somewhat more saline-influenced environment, perhaps due to fluctuations in freshwater flow in Clear Creek. The presence of fish remains as well as shellfish at the lowest levels of this midden indicate adaptation to aquatic food resources that is characteristic of the coastal margin lifeway. Few artifacts were found here in the deepest excavation levels.

Site 41HR124 is a shell midden with an occupation component in the Middle Archaic (Gadus and Howard 1990), located near the

junction of Buffalo Bayou and the San Jacinto River. A high proportion of the shell is Rangia cuneata, but there is some oyster shell, which indicates a more saline-influenced environment. Only 60 pieces of chert debitage were found in this occupation component. Three bone points and one oyster shell tool were found. Four chert dart points were reported from this occupation component, that appear to be Kent points and a preform. Feature 2 represents butchering and cooking of portions of bison and deer. Burned caliche nodules might represent use of an earth oven. Feature 3 is a cluster of caliche nodules, burned clay lumps, and siltstone that might represent an earth oven. Vertebrate faunal remains include fish, turtle, bison, deer, and cotton rat, with a high proportion of fish. The assemblage of materials in the Middle Archaic component of 41HR124 indicates an early adaptation to coastal margin resources, such as a small amount of lithics, bone projectile points, an oyster shell tool, and significant use of fish and shellfish.

Site 41HR61 is a shell midden with occupation components from the Middle Archaic through the Late Prehistoric periods (Ring 1994). This site is located on Hunting Bayou, a tributary of Buffalo Bayou. The earliest chert projectile points are Gary, Kent, and Palmillas (Ring 1994:Table 1). Complete data were not given on the stratigraphic placement of all artifact types. There is a possibility, however, that this site may have had early adaptation to resources of the coastal margin. There are 30 chert dart points, but only 225 pieces of chert debitage, which indicates a low level of lithic manufacturing. Significant amounts of antler and bone tools were used here in place of stone tools. There were 18 bone points and one antler point, as well as several pointed antler tips that may have been used as projectile points or awls. Sandstone abraders and saws may indicate manufacture of antler and bone tools and points. Over 1000 caliche lumps, many burned, indicate use of earth ovens. The midden is mainly Rangia cuneata shell, but small amounts of freshwater and marine shellfish remains indicate some fluctuating salinity.

Site 41HR85 is a shell midden with occupation components from the Middle Archaic through the Late Prehistoric periods. This site is located on the east bank of Mud Lake (now Forest Lake), which is connected to Clear lake. The early level of this site is described as a "sparse early shell midden" (Aten et al. 1976:10). There are not enough artifacts from the early level of this site to say much about adaptations here to coastal margin resources.

After earlier occupation as an inland site, 41CH252 (Eagle's Ridge) became a shell midden on the coastal margin in the Middle Archaic period with rising sea level (Ensor 1998). This site is now on the east bank of Lake Charlotte, but was

originally on the east side of Trinity Bay before Holocene silting formed Lake Charlotte. Data from this site are the most detailed for any Middle Archaic site on the coastal margin of Southeast Texas. The Middle Archaic portion of the shell midden is a mixture of Rangia and oyster shells, indicating a high salinity, with oyster shell comprising 5-10% of the midden.

At Eagle's Ridge, the Middle Archaic is represented by levels 5 and below in Stratum 2 and all levels within Stratum 2c (Ensor 1998:214). Artifact types indicate adaptation to coastal margin resources during the Middle Archaic. Bone tools, bone projectile points, and oyster shell tools were used in this lithic-poor area. A high percentage of fish in faunal remains from the Middle Archaic at this site also indicates adaptation to a coastal margin type of lifeway (Reitz and Keck 1998:A15).

There are burned clay pieces and burned caliche nodules indicating use of earth ovens at this site during only the Middle Archaic period. The use of earth ovens is essentially an inland trait in Southeast Texas (Patterson 1995b) with few shell midden sites on the coastal margin having evidence of use of earth ovens, especially after the introduction of pottery. Earth ovens at Eagle's Ridge indicate closer relationships with inland groups during the Middle Archaic than in later time periods. This is discussed in the section on social boundaries.

Only a few formal unifacial stone tools were found at this site, but there are a significant number of utilized flakes (766 for all time periods). Some of the utilized flakes are probably debitage from projectile point manufacture, but a significant number of flakes seem to have been made from small cobble cores. There is no evidence of import of large size pieces of lithic raw material to this coastal margin site.

Flake size distribution indicates that few projectile points were made at Eagle's Ridge from flake blanks, as is common at inland sites. Table 3 shows flake size distribution for Middle and Late Archaic assemblages at this site, with very small percentages of flakes larger than 12.5 mm. However, flake size distributions (Ensor and White 1998:Table 16) do not include most larger flakes in utilized flake and unifacial tool categories. If utilized flakes and unifacial tools were added to total flakes over 12.5 mm in Table 3, there would be about 10% of flakes larger than 12.5 mm. In contrast, if flake blanks were being used to make dart points, about 30% of flakes would be over 12.5 mm in size, as shown by experiments (Patterson 1990a:Table 1) and inland archeological sites (Patterson 1980:Figure 19; Patterson et al. 1987:Figure 20). It is concluded that many of the dart points at Eagle's Ridge were imported as finished points or preforms, unlike inland sites where most dart points were manufactured from flake blanks. This is an indication of a low level of lithic manufacturing at

this site, as is common for coastal margin sites in a lithic-poor area.

There is also an early radiocarbon date of 5270 +/-70 BP (Aten and Bollich 2004:27) for shell midden site 41JF24 east of the Galveston Bay area in Jefferson County.

In summary, data indicate that a coastal margin type of lifeway was well established during the Middle Archaic period in Southeast Texas and perhaps even earlier.

#### LATE ARCHAIC PERIOD

All of the sites discussed above for the Early and Middle Archaic periods have continued occupations in the Late Archaic period (1500 BC-AD 100). There are also a significant number of additional shell midden sites on the coastal margin during the Late Archaic (Table 4), as shown by the 1998 update of the computer data base for the coastal margin of this region (Patterson 1989). The increased number of sites with Late Archaic components on the coastal margin of Southeast Texas may indicate a more favorable environment for Rangia shell fish growth after stabilization of sea level at about the middle of the Late Archaic period.

All coastal margin sites of the Late Archaic period have the pattern of artifact types that continue into later time periods, which indicates adaptation to coastal margin resources. This includes a low level of lithic manufacturing in this lithic-poor area, and use of bone tools, bone projectile points, and oyster shell tools instead of items made of stone. Significant use of fish also continues into the Late Archaic and later time periods. The coastal margin pattern of adaptation was well established by the Late Archaic period.

Earth ovens with heating elements of caliche and clayballs were no longer used at sites 41HR61 and 41CH252 during the Late Archaic period. Lack of earth ovens at coastal margin sites after the Middle Archaic period indicates continuing further adaptation to a coastal margin subsistence pattern.

#### EARLY CERAMIC PERIOD

Rangia shell midden sites become very numerous on the coastal margin of Southeast Texas during the Early Ceramic period (AD 100-600) with a rapid population increase from the Late Archaic into the Early Ceramic periods (Patterson 1999a). Stabilization of sea level during the Late Archaic period created more stable conditions for the growth of brackish water shellfish.

The use of pottery was introduced into Southeast Texas from Louisiana and spread progressively down the coast and into the inland subregion. Aten (1983:297) estimates that pottery started in the Galveston Bay area about AD 100. Because Aten used radiocarbon dates without C13 corrections, it seems likely that pottery started about 300 years earlier in the Galveston Bay area, at about 200 BC. The use of pottery facilitated processing of shellfish (Patterson 1999b).

Occupation of the coastal margin of Southeast Texas becomes highly visible starting with the Early Ceramic period, which corresponds to Aten's (1983:Figure 14.2) Clear Lake and Mayes Island periods in the Galveston Bay area. The high visibility of occupations is due to many large shell midden sites that are easy to locate. A high proportion of sites discussed by Aten (1983) for the coastal margin of Southeast Texas involves occupations after the introduction of pottery.

In Aten's (1983:Figure 14.1) ceramic sequence in the Early Ceramic period for the Galveston Bay area, pottery types include Goose Creek, Mandeville, Tchefuncte, and O'Neal Plain. Only Goose Creek pottery continued into the next Late Prehistoric period. Only Goose Creek and O'Neal Plain types are found at inland sites during the Early Ceramic period.

The adaptive pattern of the coastal margin reached its full manifestation after the introduction of pottery.

#### LATE PREHISTORIC PERIOD

Population level of the coastal margin of Southeast Texas leveled off somewhat with a decreased growth rate during the Late Prehistoric period (Figure 3), which corresponds to Aten's (1983:Figure 14.2) Turtle Bay, Round Lake, and early Old River periods for the Galveston Bay area. Aten's time periods for the Galveston Bay area need to be adjusted for C13 correction of radiocarbon dates. There is also a question as to whether or not Aten's narrow time periods for the Galveston Bay area are really useful.

During the Late Prehistoric period, Goose Creek pottery continued from the Early Ceramic period, and grog-tempered and bone-tempered pottery started and became significant pottery types. Use of the spear and spearthrower did not continue into the Late Prehistoric on the coastal margin of this region, but did continue at inland sites (Aten 1983:306; Patterson 1980).

Aten (1983:Figure 14.1) shows that during the Late Prehistoric period in the Galveston Bay area, Goose Creek Pottery was almost totally displaced for a short time interval by grog-tempered pottery. This conclusion appears to be an

artifact of the seriation technique rather than a real event. For example, at large site 41GV53 in the Galveston Bay area, Goose Creek pottery was the dominant type throughout the Late Prehistoric period (Patterson et al. 2001).

The start of the Late Prehistoric period is defined here as indicated by the start of standardized bifacial arrow point types. Earlier use of the bow and arrow is discussed in a separate section. During the Late Prehistoric period a mortuary tradition developed in the Galveston Bay area, which is discussed below.

#### PROTO-HISTORIC AND HISTORIC INDIAN PERIODS

The Proto-Historic period (AD 1500-1700) had some visits by Europeans, such as Cabeza de Vaca (Covey 1993), but the general culture continued in the same manner as in the Late Prehistoric period. In the Historic Indian period (AD1700-1800+), there was an increased presence of Europeans on the coastal margin of Southeast Texas which resulted in a sharp decline in population of Indians due to violence and introduction of European diseases. Historic Indian site components in Southeast Texas are identified by European trade goods, some arrow point types, and an occasional radiocarbon date (Patterson 1998b).

The Late Prehistoric cemetery at site 41GV66 (Ricklis 1994) continued into the Proto-Historic and Historic Indian periods. There was little change in burial practices from the Late Prehistoric into the Proto-Historic period, with grave goods such as bird bone whistles, marine shell beads, stone tools and shell ornaments (Ricklis 1994:498). In the latter part of the Proto-Historic period and the Historic Indian period, there are grave goods of European origin, such as glass beads, a brass bell, iron tool fragments, and flat glass. Ricklis (1994:501) notes that European trade goods could have been obtained by down-the-line trade. Some Historic Indian burials have skeletons with non-local features, which may indicate formation of a composite group after rapid population decline in the early eighteenth century. Modest amounts of Rockport pottery at 41GV66 may indicate that Karankawa Indians from the central Texas coast may be represented in a Historic Indian composite group at this site.

#### POPULATION DYNAMICS

The population level of each time period is an important factor in understanding the development of the adaptive pattern of the coastal margin of Southeast Texas. The relative population level for each time period is shown in Figure 3 (Patterson 1999a). The relative population level is the number of site

components of a time period divided by the length in years of a time period times 100. Calculation of the relative population level is based on the assumption that the number of sites in a time period is proportional to population level and length of time period. Data used to calculate the relative population level are given in Table 4 for various time periods and geographic locations on the coastal margin of Southeast Texas. These data are from the 1998 updated data base for this subregion of Southeast Texas (Patterson 1989).

As may be seen in Figure 3, there was a low population level from the Middle Archaic (3000-1500 BC) into the late Archaic (1500 BC-AD 100). There was a rapid increase in population growth rate from the Late Archaic into the Early Ceramic period (AD 100-600), followed by a leveling-off of population growth rate in the Late Prehistoric period (AD 600-1500), and a sharp decline in population in the Proto-Historic and Historic Indian periods (AD 1500-1800+). As discussed below, population level of the coastal margin of Southeast Texas was a factor in development of adaptive patterns, social boundaries, and social complexity of this part of the region.

#### ADAPTIVE PATTERNS

As discussed above, a lifeway adapted to resources of the coastal margin of Southeast Texas seems to have been well established in the Middle Archaic period (3000-1500 BC). In this lithic-poor area, bone and oyster shell tools were often used instead of stone tools. Low quantities of lithic debitage at many coastal margin sites indicate a fairly low level of lithic manufacturing. However, as noted for site 41GV53 (Patterson et al. 2001), the level of lithic manufacturing can be understated when using data from excavations of shell middens with large areas. The dispersed nature of occupation events at large shell middens does not have large concentrations of lithic materials, compared to large quantities of lithic materials found at many inland sites with fairly small areas of occupation.

The complete diets of coastal margin groups cannot be reconstructed because of lack of floral remains. However, there are significant data for faunal remains at shell midden sites due to good bone preservation in alkaline conditions. As noted previously, data on faunal remains from coastal margin sites show much use of both terrestrial and aquatic faunal resources (Patterson 1995:Table 2, 1996:Tables 16,17). There was much use of abundant amounts of fish and shellfish that would have been available on the coastal margin, although shellfish do not have high food value (Byrd 1976).

Subsistence patterns of groups on the coastal margin emphasized

both hunting and fishing. There were probably improvements in hunting and fishing techniques over time that were adopted to help sustain increasing population levels. Improvements in technologies could have included use of the bow and arrow for hunting, and use of nets, spears, weirs, and hooks for fishing. The bow and arrow could also have been used for some types of fishing.

Most large shell middens in this region have large areas with uniform layers of shell. When shellfish were utilized, empty shells were not simply discarded in piles, but rather were used to pave areas for improved living surfaces.

The adaptive pattern of the coastal margin of Southeast Texas reached its full manifestation after the introduction of pottery, which corresponds to a much higher population level. Use of pottery for cooking is indicated by well fired pottery at coastal margin sites (Patterson 1999b). Pottery would have facilitated more efficient processing of shellfish.

Starting in the latter part of the Late Archaic period, there are several indications that coastal margin groups in Southeast Texas became somewhat more sedentary, as population level increased rapidly. A more sedentary lifestyle would have been possible with abundant aquatic food resources. The large sizes of many shell middens probably indicate occupation events for substantial time periods. Much use of pottery, which is difficult to transport, is an indicator of a more sedentary lifestyle. At large shell midden 41GV53 in Galveston County, increasing concentration of fish and mammal bone in upper excavation levels, starting in the Late Archaic, may show longer occupation events (Patterson et al. 2001). Also at site 41GV53, the buildup rate of shell midden depth was almost twice as high after the start of pottery, which indicates more substantial occupation events. These conclusions are consistent with Story's (1985:54) suggestion that growing population on the Texas coastal plain during later Archaic times resulted in smaller and more clearly defined group territories.

In contrast, after rapid population increase from the Late Archaic into the Early Ceramic period, there was a population decrease and increase in mobility for inland groups in the following Late Prehistoric period, as indicated by smaller sites, less use of pottery than in the Early Ceramic period, and generally low artifact quantities (Patterson 1976:185). This may be due to more limited food resources in the inland part of this region than on the coastal margin (Patterson 1976, 1991).

## SOCIAL BOUNDARIES

Aten (1983:310) has observed that the initiation of social boundaries on the coastal margin of Southeast Texas proceeded with increase in population level. With relatively low population levels during much of the Archaic period, social boundaries in Southeast Texas may not have been very rigid. The rapid increase in population level from the Late Archaic into the Early Ceramic period seems to have resulted in a more rigid social boundary between inland and coastal margin groups. As noted above, Story (1985) has suggested that growing population on the Texas coastal plain during later Archaic times resulted in more clearly defined group territories. Ricklis (1998:452) has suggested that a shift to more restricted mobility (more rigid social boundaries) may be indicated by changes in lithic raw material types at the Eagle's Ridge coastal margin site in Chambers County during the Late Archaic period.

The boundary between inland and coastal margin settlement patterns in Southeast Texas appears to have become fairly definite with a high population level in the Early Ceramic period. This social boundary is indicated by differences in faunal subsistence patterns for coastal margin and inland areas, and by differences in artifact assemblages for inland and coastal areas (Patterson 1993). Artifact assemblages at inland sites after the start of pottery are characterized by much lithic debitage, many stone tools, many stone projectile points, modest amounts of pottery, no shell tools, few bone tools, no Rangia shellfish remains, and some sites with earth ovens. In contrast, coastal margin sites are usually Rangia shell middens, with modest amounts of lithic debitage, few stone tools, modest numbers of stone projectile points, many bone tools, oyster shell tools, no fired clayballs for earth ovens, and much pottery.

Grog-tempered pottery started in Southeast Texas in the Late Prehistoric period (Aten 1983:Figure 14.1), including San Jacinto pottery with small to modest amounts of grog temper, and Baytown pottery with abundant grog temper. The use of grog temper is significant at coastal margin sites. Specimens of San Jacinto pottery are found only occasionally at inland sites, and Baytown pottery is confined to the coastal margin of this region.

In the Late Prehistoric period, both the spear and bow and arrow were used in the inland subregion of Southeast Texas (Aten 1983:306; Patterson 1980), but only the bow and arrow was used in the coastal margin subregion (Aten 1983:306).

Geographic distributions of single artifact types are not reliable indicators of social boundaries, because the geographic distribution of artifact types can far exceed any

social boundaries, as Justice (1987) has shown for projectile point types. However, when the characteristics of total artifact assemblages are considered for the inland and coastal margin subregions of Southeast Texas, definite social boundaries seem to be indicated.

There is an indication that social boundaries between inland and coastal margin groups may not have had the same degree of rigidity in various parts of Southeast Texas. Many more stone projectile points have been found at coastal margin sites on the western side of the Galveston Bay System than on the eastern side of the Galveston Bay System (Patterson 2000:Table 1). Considering that the coastal margin of Southeast Texas is a lithic-poor area, more stone projectile points on the western side of the Galveston Bay System may indicate closer relationships of coastal margin groups with their inland counterparts in this area than relationships of coastal margin and inland groups on the eastern side of the Galveston Bay System.

Cemeteries at coastal margin sites in Southeast Texas during the Late Prehistoric period give another indication of territoriality between coastal margin and inland groups. There are no cemeteries at inland sites adjacent to the coastal margin of this region. Late Prehistoric cemeteries in the Galveston Bay area include sites such as 41GV66 (Ricklis 1994), 41HR80 (Aten et al 1976), 41HR581 (Gadus and Howard 1990:155), 41GV1 (Campbell 1957), 41GV5 (Aten 1965), and 41GV53 (Hines 1992). There may be a Late Prehistoric cemetery at Smith Point (Patterson et al. 1999).

#### EARLY USE OF THE BOW AND ARROW

There is significant evidence for early use of the bow and arrow in the inland part of Southeast Texas. Unifacial arrow points start in the Middle Archaic period (3000-1500 BC), much earlier than the start of standardized bifacial arrow point types at around AD 600 (Patterson 1992). The early use of unifacial arrow points is particularly well dated to the Late Archaic (1500 BC-AD 100) at the Bowser site (41FB3) in Fort Bend County (Patterson et al. 1998). There is now some evidence for early use of the bow and arrow on the coastal margin of this region, before the start of standardized bifacial arrow point types, such as Perdiz, Scallorn, Alba, and Catahoula.

The start of the Late Prehistoric period is indicated by the start of standardized bifacial arrow point types, which Aten (1983:306) has set at AD 600 for the Galveston Bay area. This date could be as early as AD 300, because Aten (1983) did not have C13 corrected radiocarbon dates. There is a C13 corrected radiocarbon date of 1690 +/-60 (GX-27963) for a Perdiz arrow point at coastal margin site 41GV53 in Galveston County

(Patterson et al. 2001:4), which gives a calibrated date of AD 390. At coastal margin site 41GV53, data from excavations indicate that gar scale arrow points were being used during the Early Ceramic period before the start of standardized bifacial arrow point types (Patterson et al. 2001:5).

At the Eagle's Ridge site, 41CH252, unifacial microliths occur in the Middle Archaic period (Ensor 1998:Figure 168). Some of these specimens have shapes that would be suitable for use as arrow points. Bifacial microliths occur at this site in the Late Archaic period (Ensor 1998:Figure 169) with shapes that would be suitable for use as arrow points. Bifacial microliths in the Late Archaic period might indicate a stage in the development of bifacial arrow point types.

#### INFLUENCES FROM LOUISIANA

Cultural influences on the coastal margin of Southeast Texas from Southwest Louisiana may be seen from the time of the start of pottery and throughout the Early Ceramic and Late Prehistoric periods in Southeast Texas. The introduction of pottery into Southeast Texas from Louisiana is part of a westward diffusion of pottery from the Atlantic coast (Sassaman 1993). Aten (1983:297) places pottery in the Sabine Lake Area by at least 70 BC, and in the Galveston Bay area by AD 100. These dates could be as much as 300 years earlier, because Aten (1983) did not have C13 corrected radiocarbon dates. Early pottery types that seem to be derived from Louisiana include Tchefuncte, Mandeville, Goose Creek, and O'Neal Plain, all found in the Early Ceramic period. Later, in the Late Prehistoric period, grog-tempered pottery appears to have been introduced to the upper Texas coast from Louisiana.

Ricklis (1994:209) has identified ceramic decoration patterns from sherds at the Mitchell Ridge site on Galveston Island that are basically similar to ceramic decoration patterns from the Lower Mississippi River Valley and adjacent coastal Louisiana. This conclusion can be made only on a general basis, however. The wide variation in ceramic decoration patterns in Southeast Texas (Black 1989; Aten 1983:Figure 12.2; Patterson et al. 2001) includes many local styles.

There is a question as to how much influence on Southeast Texas from coastal Louisiana is from diffusion of ideas and how much influence is from actual movements of social groups. In either case, it would be expected that cultural influences from Louisiana would decrease at farther distance to the west from the Texas-Louisiana border. If movements of people from Louisiana to Texas were involved, resulting differences in social groups might result in more rigid social boundaries between inland and coastal margin groups in the eastern Part of

the coastal margin of Southeast Texas than in the central part of the coastal margin of this region. As discussed above, the geographic distribution of projectile points on the coastal margin of Southeast Texas may indicate more rigid social boundaries between inland and coastal margin groups on the eastern side of the Galveston Bay System than on the western side.

## CONCLUSIONS

This paper has discussed the cultural sequence on the coastal margin of Southeast Texas, from the Early Archaic period (5000-3000 BC) through the end of the Historic Indian period (AD 1800+). Occupation of the coastal margin of this region probably started earlier, but earlier sites have now been inundated by rising sea level in the Holocene period. Sea level stabilized about 1000 BC.

Most prehistoric sites on the coastal margin of Southeast Texas are Rangia shell middens, some with a small proportion of oyster shell. There are only a few pure oyster shell middens. Formation of the earliest Rangia shell middens now known started when rising sea level caused tidal flow to create a brackish water environment at site locations. Rangia shell middens occur along streams with tidal flow up to about 20 km inland from the Gulf shoreline.

It is likely that the coastal margin of Southeast Texas was occupied before the earliest known shell midden site in this region. Early occupants would have moved as rising sea level changed the Gulf shoreline. At low population levels, there would not have been rigid social boundaries between inland and coastal margin groups during most of the Archaic period. Coastal margin groups appear to have been more mobile at that time interval. During the latter part of the Late Archaic period, after about 1000 BC, there was a rapid increase in population growth rate and possibly the start of more rigid social boundaries at higher population levels.

As previously noted (Patterson 1996:Table 19), a high proportion of sites on the coastal margin of Southeast Texas are multi-component sites with long occupation sequences. This shows the continuity of the coastal margin adaptive pattern from the earliest formation of shell midden sites. This is additional evidence that the earliest shell midden sites now above water were probably started by groups already adapted to coastal margin resources who moved as the shoreline changed with rising sea level.

There are several types of evidence that indicate that coastal margin groups in this region became more sedentary at a high

population level in the Early Ceramic period, with longer occupation events at large shell midden sites. Abundant pottery at most shell midden sites indicates less mobility, because pottery is heavy and bulky, not easily transported by mobile hunter-gatherers. The large sizes of many shell middens with Early Ceramic and Late Prehistoric components indicates that long-time occupation events occurred. After the introduction of pottery at large shell midden site 41GV53, the midden depth buildup rate was almost twice the earlier rate before pottery (Patterson et al. 2001:13). Also at site 41GV53, there are increasing concentrations of animal bone in upper excavation levels, starting in the latter part of the Late Archaic period, which may indicate longer occupation events (Patterson et al. 2001:8).

Late Prehistoric cemeteries at sites on the coastal margin in the Galveston Bay area may have resulted from a more sedentary lifestyle, although fairly mobile hunter-gatherers can have formal cemeteries, as shown in the Late Archaic period of inland Southeast Texas (Patterson 2000). The use of cemeteries results from belief systems which may or may not be related to degree of mobility.

Although a more sedentary lifestyle developed for coastal margin groups, these groups were not completely sedentary, as indicated by many small shell midden sites, indicating short-time occupation events. Small shell midden sites, such as 41HR639 (Patterson 1990b), up to 20 km from the Gulf shoreline, show that coastal margin groups ranged somewhat inland for subsistence activities. After the start of pottery, however, there is little evidence to show that coastal margin groups ranged much farther inland than the geographical occurrence of *Rangia* shellfish.

In contrast to the development of a more sedentary lifestyle of coastal margin groups in Southeast Texas, with a high population level, inland groups became more mobile, especially in the Late Prehistoric period (Patterson 1976, 1991). It appears that abundant food resources permitted a more sedentary lifestyle with high population level on the coastal margin, compared to the inland part of this region with a more limited food resource base.

I have previously used a time range of AD 100-600 for the Early Ceramic period in Southeast Texas, based on Aten's (1983:Chapter 15) estimates for the start of pottery and the start of standardized bifacial arrow point types in the Galveston Bay area. This time range still appears to be a good nominal time range for Southeast Texas in general. It should be noted, however, that the time range for the Early Ceramic period in Southeast Texas is somewhat variable because pottery did not start at exactly the same time throughout this region. Aten

(1983) did not have C13 corrected radiocarbon dates for Rangia shell samples from the Galveston Bay area. The time range for the Early Ceramic period in the Galveston Bay area could be as early as 200 BC-AD 300, based on a C13 radiocarbon date correction of 300 years (Ricklis 1998:440). At the Eagle's Ridge site (41CH252), calibrated radiocarbon dates indicate that pottery could have started as early as 240 BC in the Galveston Bay area (Ensor 1998:311).

There is much evidence for early use of the bow and arrow in the inland part of Southeast Texas, using unifacial arrow points before the start of standardized bifacial arrow point types in the Late Prehistoric period (Patterson 1992). There is now also some evidence for early use of the bow and arrow on the coastal margin of this region. At site 41GV53, gar scale arrow points occur in the Early Ceramic period, before bifacial stone arrow points (Patterson et al. 2001:5). At coastal margin site 41CH252, unifacial microliths in the Middle Archaic period and bifacial microliths in the Late Archaic period may indicate early use of the bow and arrow (Ensor 1998:Figures 168,169).

Details of the cultural sequence of the coastal margin of Southeast Texas have become better understood in recent years because more data have become available. Further refinements in the cultural synthesis of this geographic area will depend on the intensity of future research.

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Table 1  
Southeast Texas Time Periods

<u>period</u>	<u>years BP</u>	<u>BC/AD</u>
Early Paleoindian	12000-10000	10000-8000 BC
Late Paleoindian	10000-7000	8000-5000 BC
Early Archaic	7000-5000	5000-3000 BC
Middle Archaic	5000-3500	3000-1500 BC
Late Archaic	3500-1900	1500 BC-AD 100
Early Ceramic	1900-1400	AD 100-600
Late Prehistoric	1400-500	AD 600-1500
Proto-Historic	500-300	AD 1500-1700
Historic Indian	300-200	AD 1700-1800+

Table 2  
Early Shell Midden Dates

<u>site</u>	<u>lab no.</u>	<u>C13 adjusted date, BP</u>	<u>calibrated date, BC intercept</u>	<u>one sigma range</u>
41CH57	TX-1113	3970 +/-90 (A)	2470	2380-2560
41CH252	Beta 72714	4370 +/-50	2920	2870-2970
41CH252	Beta 84035	4300 +/-70	2900	2830-2970
41HR61	O-912	3650 +/-115 (A)	2200	2085-2315
41HR85	TX-969	3970 +/-80 (A)	2470	2390-2550
41HR124	Beta 29975	3960 +/-100	2460	2360-2560
41HR124	Beta 30588	3820 +/-90	2270	2180-2360
41GV53	GX-27753	5340 +/-80	4220	4140-4300
41GV53	Beta 53580	5030 +/-70	3900	3830-3970

(A)- 300 year C13 adjustment, not included in  
original radiocarbon date

calibrated dates from Stuiver and Pearson (1993),  
Pearson and Stuiver (1993)

Table 3  
Eagle's Ridge Flake Size Distributions

flake size, mm	Middle Archaic		Late Archaic		total	
	no.	%	no.	%	no.	%
19-25	2	0.1	0	0.0	2	trace
12.5-19	66	2.3	47	0.9	113	1.4
9.5-12.5	232	8.1	273	5.2	505	6.3
6.3-9.5	1155	40.5	2399	45.9	3554	44.0
under 6.3	1397	47.0	2506	48.0	3903	48.3
	<u>2852</u>		<u>5225</u>		<u>8077</u>	

Table 4

## Coastal Margin Sites of Southeast Texas

<u>period</u>	<u>number of sites</u>			<u>total</u>
	<u>western</u>	<u>central</u>	<u>eastern</u>	
Middle Archaic	0	4	3	7
Late Archaic	1	18	18	37
Early Ceramic	2	25	44	71
Late Prehistoric	11	31	90	132
Historic	2	5	17	24

western: Brazoria County

central: Harris, Galveston Counties

eastern: Chambers, Jefferson, Liberty, Orange  
Counties, with most in Chambers and Liberty

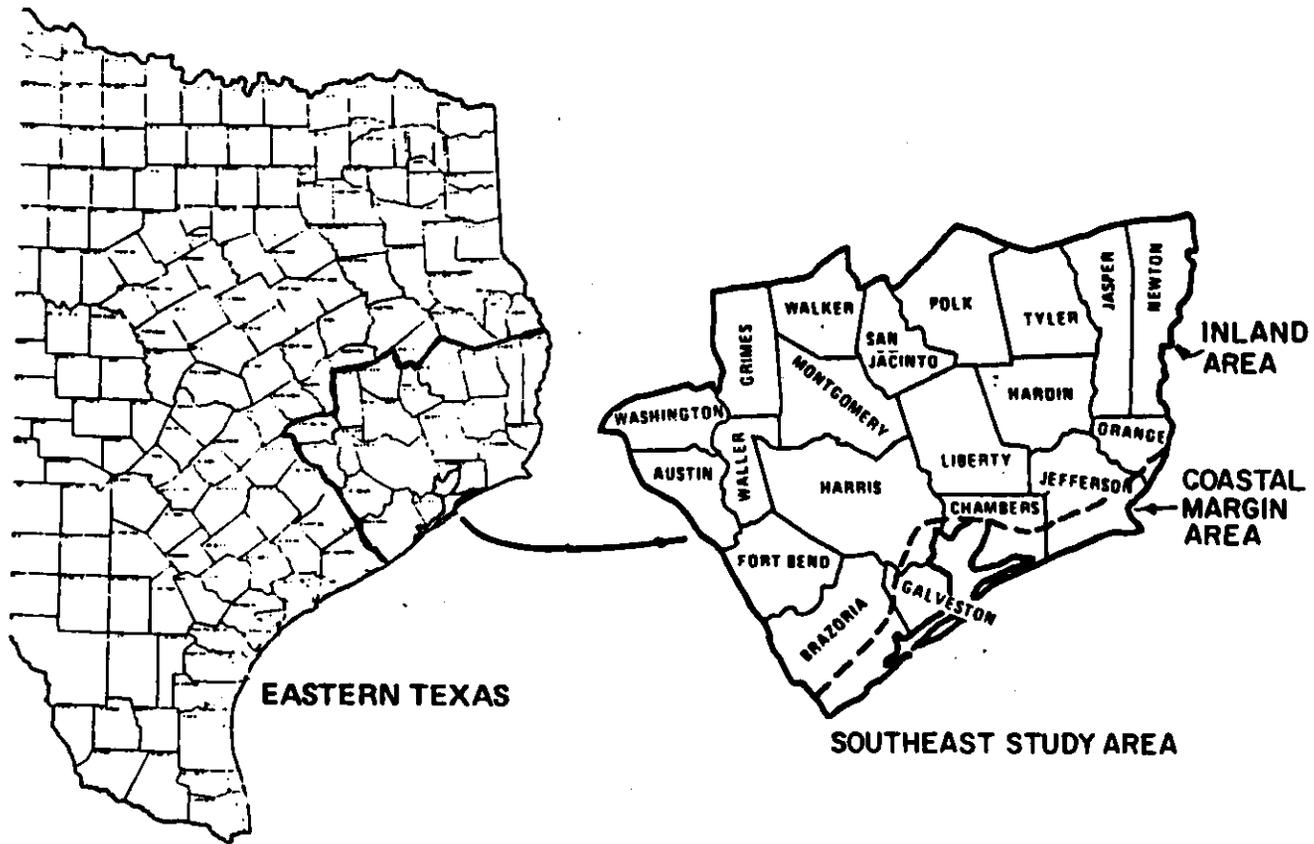


Figure 1: Southeast Texas Study Area

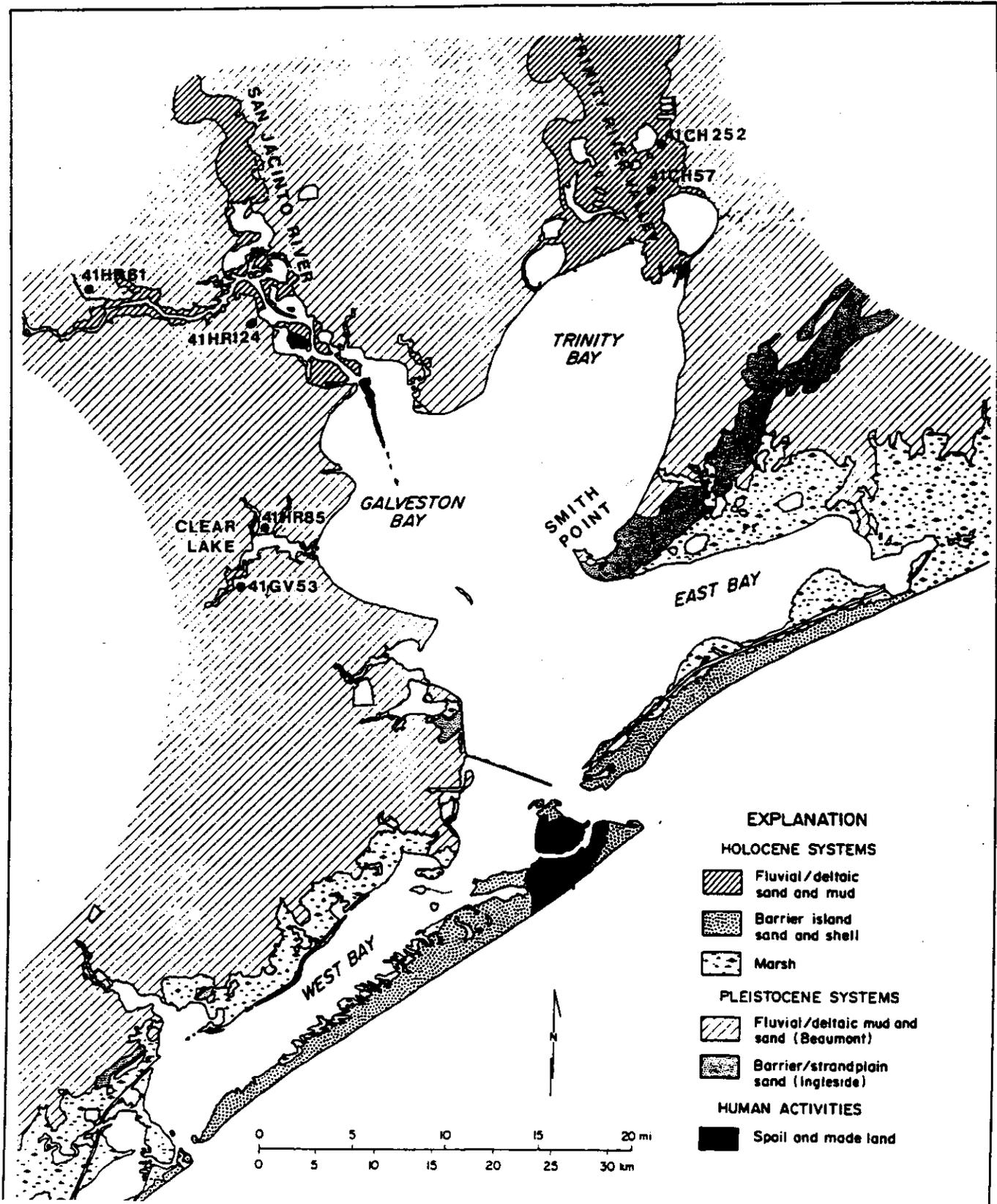


Figure 2: Early Shell Midden Sites at Galveston Bay System (adapted with permission from Paine and Morton 1986:Figure 4)

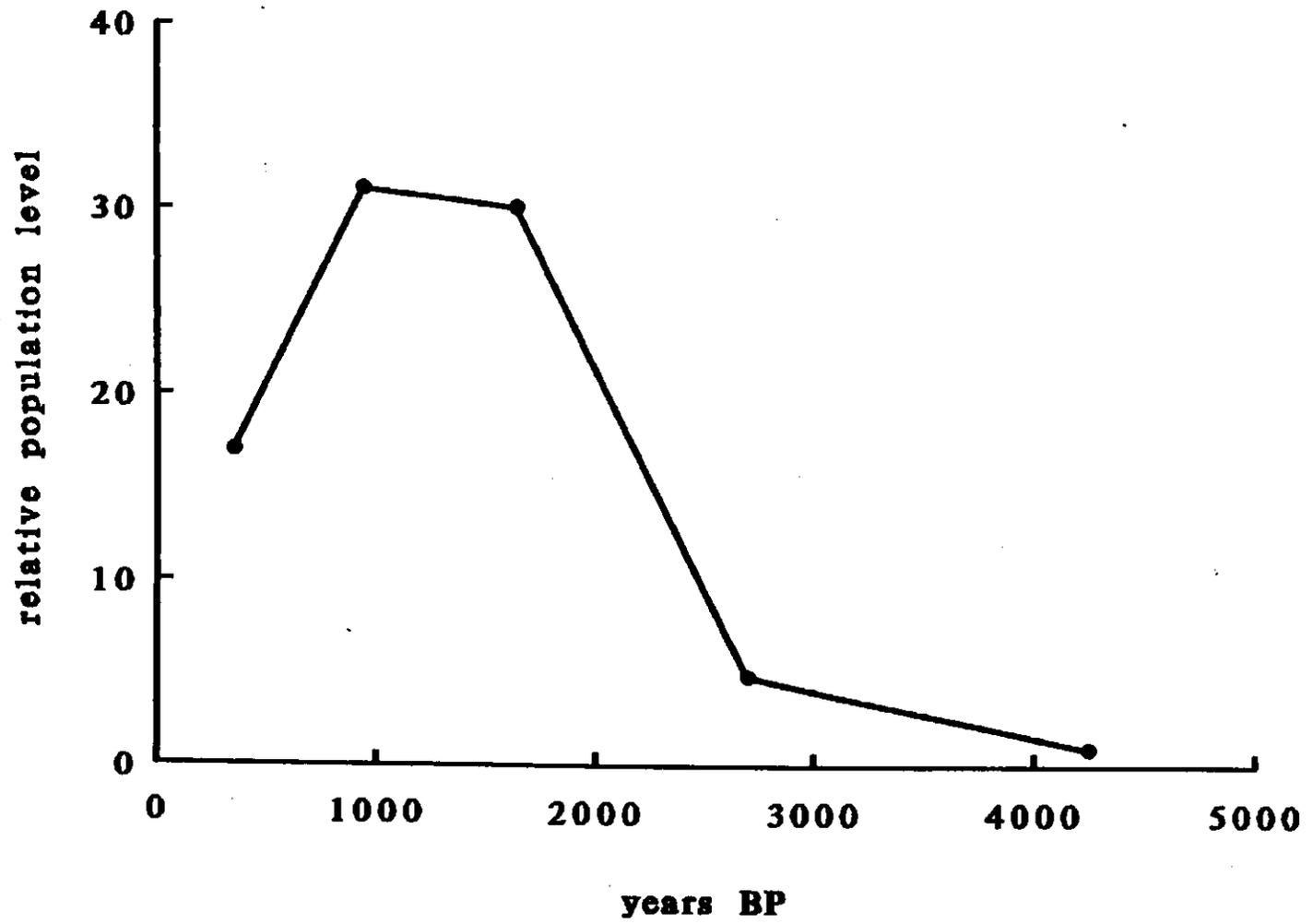


Figure 3: Coastal Margin Relative Population Levels