

Prehispanic Settlement Patterns in the Tuxtla Mountains, Southern Veracruz, Mexico

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Recent surveys in the Tuxtla Mountains of southern Veracruz, Mexico, indicate that the region had a long history of occupation, beginning around 1400 B.C. and lasting until the Spanish Conquest. Settlement patterns during the Formative Period were largely unsegregated, with only nominal development of social complexity toward the end of the period, whereas those during the Classic Period were much more complex, with a well-developed settlement hierarchy, the growth of urban centers, a differentiated craft economy, and major contacts with highland Mesoamerica. Comparisons with surveys of comparable size from other parts of the south Gulf Coast show significant variability in population history, settlement patterns, and development of complex society. The settlement history of the south Gulf Coast was, therefore, not a homogeneous phenomenon, although resemblances in ceramic assemblage content and population history between the Tuxtlas and the Coatzacoalcos River valley suggest a closer relationship than with other areas of the Gulf Coast.

Introduction

In 1991 we initiated two seasons of regional archaeological survey in the Tuxtla Mountains in southern Veracruz, Mexico. Previous archaeological and ethnohistorical work indicated that the Tuxtla region was a source of valuable raw materials such as basalt, cotton, and cacao that were exchanged up and down the Gulf Coast in prehispanic times (e.g., Stark 1978; Williams and Heizer 1965). In addition, prior excavations at Matacapán, a major Classic Period center in the Tuxtla region, produced ample evidence for contacts with central Mexico and of a well-developed craft production industry in ceramics (Arnold et al. 1993; Santley 1989; Santley, Arnold, and Pool 1989; Santley, Ortiz, and Pool 1987; Santley, Yarborough, and Hall 1987; Valenzuela 1945). Most of this past research focused on specific sites in the region. The fieldwork undertaken in 1991, in contrast, addressed the question of the degree to which economic interaction at a regional scale was a major factor affecting the occupational history of the Tuxtla Mountains.

The regional survey was designed to establish the scale of this economic system, document its regional structure,

and identify variation in system configuration across space and through time. Since water transport may have been crucial in moving goods in and out of Matacapán, the survey concentrated on possible transportation corridors that would have linked Matacapán with its hinterland and the surrounding coastal plain. One such route follows the Río Catemaco and connects Matacapán with the lowland riverine system to the south and west. A second route crosses the mountains to the north and east and links Matacapán to the Gulf of Mexico. In order to provide a comparative body of settlement information, we also investigated non-riverine zones in the volcanic uplands and in the slopelands-uplands adjacent to the river systems.

To date, seven seasons of archaeological fieldwork have been completed in the Tuxtla region. This research included excavation and survey at Matacapán (Pool 1990; Santley, Ortiz, and Pool 1987; Santley et al. 1984, 1985), an intensive surface survey at El Salado (Santley, Ortiz, and Kludt 1988), and two seasons of regional survey (Santley 1991; Santley et al. 1992). Presented here are preliminary regional survey results, focusing primarily on data obtained up to and through the 1991 extensive survey. Information

derived from the 1992 survey, a more intensive survey targeted at specific sites and involving controlled collection procedures, is presented mainly to supplement our discussion of craft production activities.

First, we discuss our field methods and data retrieval techniques. These procedures involved a multi-stage research design that employed several levels of surface survey. Next, we summarize general patterns of regional settlement, presenting information on settlement hierarchy development, population history, and craft specialization. Finally, we compare the results of the Tuxtlas survey to settlement data from other Gulf Coast regions. This comparison suggests that the factors affecting southern Gulf Coast occupation were neither singular nor uniform. The Tuxtlas experienced considerable settlement variation through time, but this pattern contrasts with the evidence for system structure and outside contacts displayed by other areas on the Gulf Coast.

Settlement Survey Methods

The Tuxtla Mountains are situated on the Gulf Coast of Mexico, located approximately 150 km SE of the modern city of Veracruz. The Tuxtlas comprise a series of low volcanic cones distributed over an area of almost 4500 sq km (FIG. 1). The volcanic range is of recent geologic origin (Reinhardt 1991) and is separated into eastern and western fields by Laguna Catemaco, Mexico's third-largest freshwater lake. The eastern portion of the Tuxtlas is heavily dissected and sparsely populated, but the western Tuxtlas includes larger expanses of flat and gently sloping terrain, particularly to the west and SW of Laguna Catemaco. The Rio Catemaco originates at the SW corner of the lake and cascades through the western Tuxtlas, ultimately joining a tributary of the Rio Papaloapan to the south. Soils in the western region are very productive and today support a dense population (Killion 1987). The contemporary difference in occupation between the western and eastern Tuxtlas appears to mirror a pattern established as far back as the Formative Period.

The 1991 regional survey was an extension of our research into the nature and extent of the Classic Period occupation in the Tuxtla Mountains. Initial fieldwork began in 1979 at Maticapan, a major urban center located within the upper Rio Catemaco river valley of the western Tuxtlas (Santley 1979; Santley, Ortiz, and Pool 1987). Research at Maticapan included both excavation and survey carried out within approximately 20 sq km along the Rio Catemaco. In order to insure data comparability and overall consistency, the 1991 survey employed a research design very similar to that undertaken at Maticapan.

The regional reconnaissance was conducted in several stages. As noted above, the region surveyed was defined

from the perspective of the hinterland that Maticapan presumably dominated, emphasizing the Rio Catemaco valley and the upland pass that connected Laguna Catemaco to the Gulf of Mexico. The next step involved an extensive pedestrian survey with the objective of collecting coarse-grained information on all sites in the study region (Santley 1991). Our methodology closely resembled that used in the Basin of Mexico (Sanders, Parsons, and Santley 1979) and in the Valley of Oaxaca (Blanton et al. 1982), with certain modifications. Crews of five or six archaeologists, walking approximately 40 m apart, systematically crossed the entire survey area.

In addition to looking for surface artifacts, field workers investigated road cuts, drainages, and other profiles to detect cultural material. Finally, the survey teams made note of "off site" cultural material, recording the location of ephemeral scatters and "isolated occurrences" (i.e., single sherds, figurine fragments, lithics) encountered between areas of higher density occupation (i.e., loci formally defined as sites). These low-density data are currently being analyzed and will not be considered in the following discussion, which concentrates on information collected on the site level.

Once an archaeological site was encountered, the crew determined the limits of occupation by locating areas of significant falloff in surface material density. The field teams recorded information on artifact density, types of material, and tentative site dates. The crews also mapped the location, size, and configuration of all mounded architecture. At each site we made one or more 3 m × 3 m controlled collections and a few general collections (i.e., grab samples from different areas of the site). Analysis of these samples provided additional information on chronology as well as site function, type, and variability through time. The controlled data also allowed an evaluation of the field assessments of material density and occupational history.

Since the early 1980s, survey teams have mapped four areas within the western Tuxtlas. The initial extensive survey included the site of Maticapan and its immediate sustaining area (Santley, Ortiz, and Pool 1987; Santley et al. 1984, 1985). The 1991 survey covered three additional zones: a corridor that paralleled the Rio Grande de Catemaco from Maticapan to Chuniapan de Abajo (the Rio Catemaco Corridor); a second that extended from Laguna Catemaco to the Gulf of Mexico (the Gulf Coast Corridor); and a final area that included the upland region north of Maticapan and San Andres Tuxtla. The corridors and the upland survey joined the original Maticapan survey to provide a zone of continuous spatial coverage.

Including previous work in and around Maticapan and at El Salado (Santley, Ortiz, and Kludt 1988), the surveys

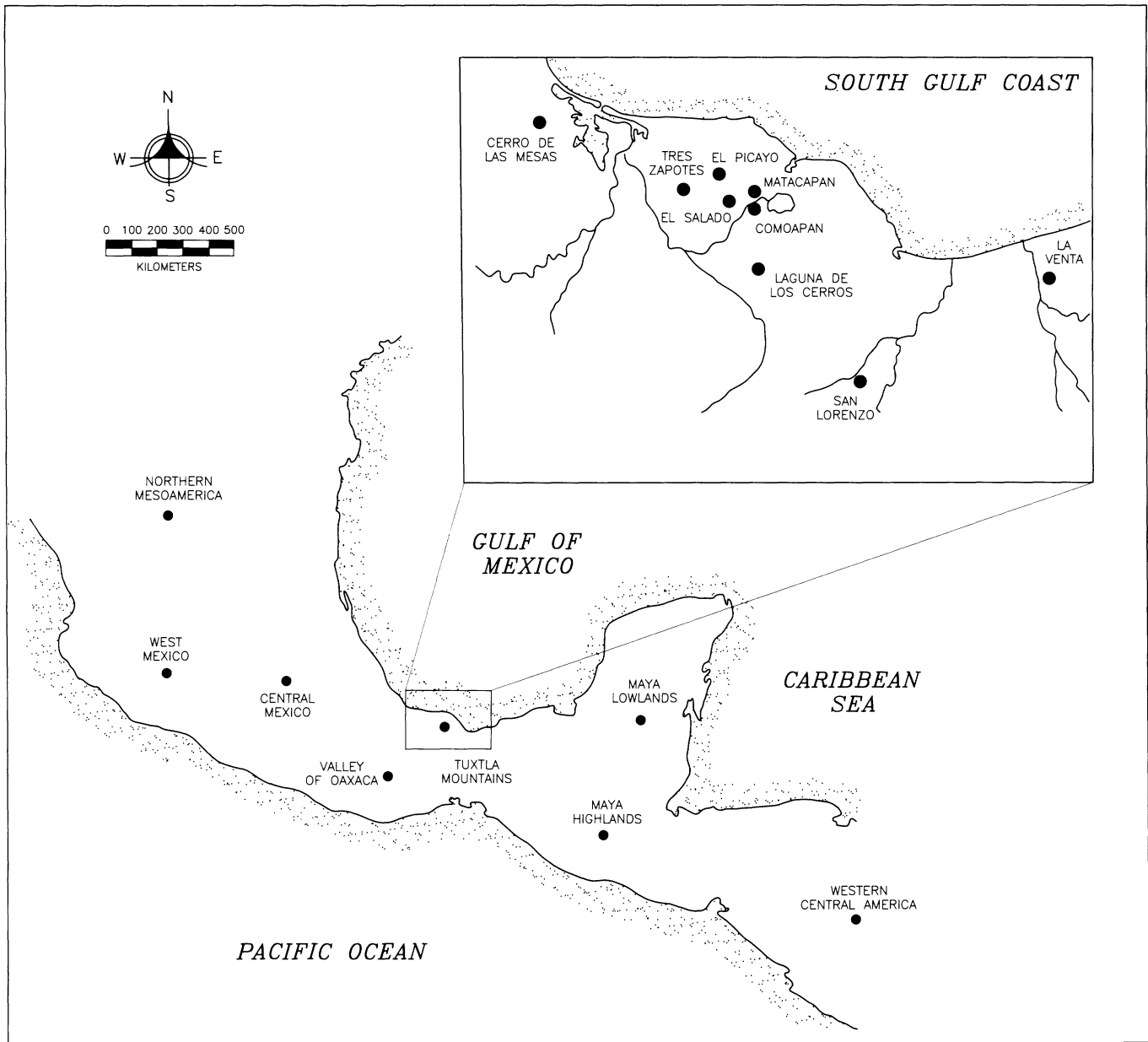


Figure 1. Map of Mesoamerica, showing location of major areas and sites mentioned in the text.

have covered a contiguous area of nearly 400 sq km. Prehispanic occupation occurred at 188 different sites within this area, and these sites produced 577 components (period-specific occupations) that spanned the Formative, Classic, and Postclassic periods. A date was assigned to each sample based on a 10-period time scale (Santley 1994).¹ A few collections were single-component, but

most contained multiple occupations. In addition to the 577 components, 30 sites had Formative components that could not be assigned to a specific period and there were two sites that could not be periodized. Each component

1. To date we have defined 10 periods of occupation based on ceramic assemblage content, changes in lithic technology, calibrated radiocarbon determinations from Maticapan, and cross-dating with other sites on the

south Gulf Coast (Coe and Diehl 1980; Drucker 1943; Ortiz 1975; Ortiz and Santley in press; Reinhardt 1991; Weiant 1943). A pollen profile recently collected from a core placed in Laguna Pompal, a small lake to the east of Laguna Catemaco, suggests that maize was cultivated as early as 3000 B.C. (Goman 1992), but we lack archaeological sites that date to this time period.

from all sites was classified by settlement type and plotted on period-specific maps of the region.²

Although situated within a tropical environment, the survey area has been subject to considerable deforestation due to farming, cattle ranching, and the continued use of wood for fuel (e.g., Arnold 1991: 59–60). This reduction in ground cover has significantly improved surface visibility. In fact, more than 75% of the sites located during survey contained no architecture and were identified solely on the basis of surface material. This situation differs from the pattern noted in the surrounding coastal lowlands, where mounded architecture, mainly representing residential features, dominates the archaeological record (Stark 1991). The general lack of mounds in the Tuxtlas, however, does not mean that only larger surface scatters were detected. Median site size for the survey is 1.4 ha, and over 35% of the sites covered an area less than 1 ha. These figures compare favorably with statistics reported from lowland areas to the west of the Tuxtlas (Stark 1991: 46).

Following the extensive reconnaissance, intensive surveys were conducted at specific sites in 1982, 1983, 1984, 1986, 1987, and 1992. Altogether 19 sites were subjected to intensive survey based on the results of the general reconnaissance. During the intensive survey, sets of transects were laid across each site at 40–75 m intervals and surface collections obtained at 13 m intervals along each transect (Santley, Arnold, and Pool 1989; Santley, Ortiz, and Pool 1987; Santley, Ortiz, and Kludt 1988; Santley et al. 1992). The provenience of all surface collection squares was tied to a primary datum point at each site, and all artifacts from each square were collected for analysis after the surface vegetation had been removed. While only about 500 surface samples were collected during the extensive phase of field research, more than 12,100 controlled collections were obtained during the intensive survey. These latter surveys furnished detailed information on

2. Site type was based on population, defined as a function of area and density of surface occupation, and amount and variety of mounded architecture. Area refers to the area in hectares covered by deposits of a specific occupation density, which varied on an ordinal scale from light (5–10 persons/ha) to light-to-moderate (11–25 persons/ha), moderate (26–50 persons/ha), and moderate-to-heavy or greater (51–100 persons/ha.), based on the conversions discussed in Sanders, Parsons, and Santley (1979). Placement in ranks in the settlement hierarchy was based on multimodality in site frequency incorporating the following population ranges: 5000–35,000 persons (large centers), 900–3000 persons (small centers), 451–700 persons (large villages), 91–450 persons (small villages), and 1–90 persons (hamlets). Centers always had complexes of public buildings at them, with mounds often arranged around central plazas. Large centers generally contained more than 100 mounds, many of which were quite substantial in size. In addition, a variety of architecture forms were present at large centers: temple mounds; large quadrangular and rectilinear platforms, ball courts, and other types of buildings.

site configuration, chronology, and intra-site spatial variation which provided an additional check on site type and periodization, the results of which have been incorporated on the maps of regional settlement presented below. In general, data from the two surveys compare favorably, although the intensive surveys expanded the range of occupation and site function at certain sites.

Settlement History of the Survey Region

Prehispanic occupation in the Tuxtlas spanned the time from 1400 B.C. until around A.C. 1500. Despite our use of a 10-period time scale, the range in chronometric dates assigned to each period varies greatly. This situation exists due to our differential ability to distinguish period-specific ceramic diagnostics in surface samples. Many such diagnostics are painted, but the surface materials are sometimes eroded and weathered. Secondly, some diagnostics are quite rare, even in excavated contexts. Finally, the number of previous stratigraphic excavations in deposits dating from each period varies considerably.

Formative Period Settlement

Our earliest evidence for occupation in the Tuxtla Mountains dates to the Early Formative Period (1400–1000 B.C.) (Santley 1991, 1992; Santley et al. 1992). Altogether, there were 24 Early Formative sites: 3 small villages and 21 hamlets (FIG. 2). The settlements formed two groups. The major settlement cluster, containing 21 sites, was situated in the upland Rio Catemaco valley. The second cluster was located about 10 km downstream to the sw, in the vicinity of modern-day Chuniapan de Abajo. Although maximum population may have amounted to 1700 persons, average density was only approximately 4 persons per sq km.

The Early Formative settlement hierarchy was weakly developed, with only two levels, small villages and hamlets, present. Surface collections from villages and hamlets produced similar ceramic assemblages, which were dominated by *tecomates* decorated with rocker-stamping or finger/reed punctate incisions.³ No mounded architecture could be definitely assigned to the period, and evidence for craft production was quite limited, although part-time salt manufacture may have occurred at El Salado (Santley, Ortiz, and Kludt 1988). Early Formative society in the Tuxtlas, therefore, was apparently organized primarily on

3. *Tecomates* are globular, restricted orifice vessels without a collar. Their size varies considerably, from very small to quite large vessels, suggesting individual versus group use. Use probably involved the steaming of tamales, although other foodstuffs were probably prepared in them as well.

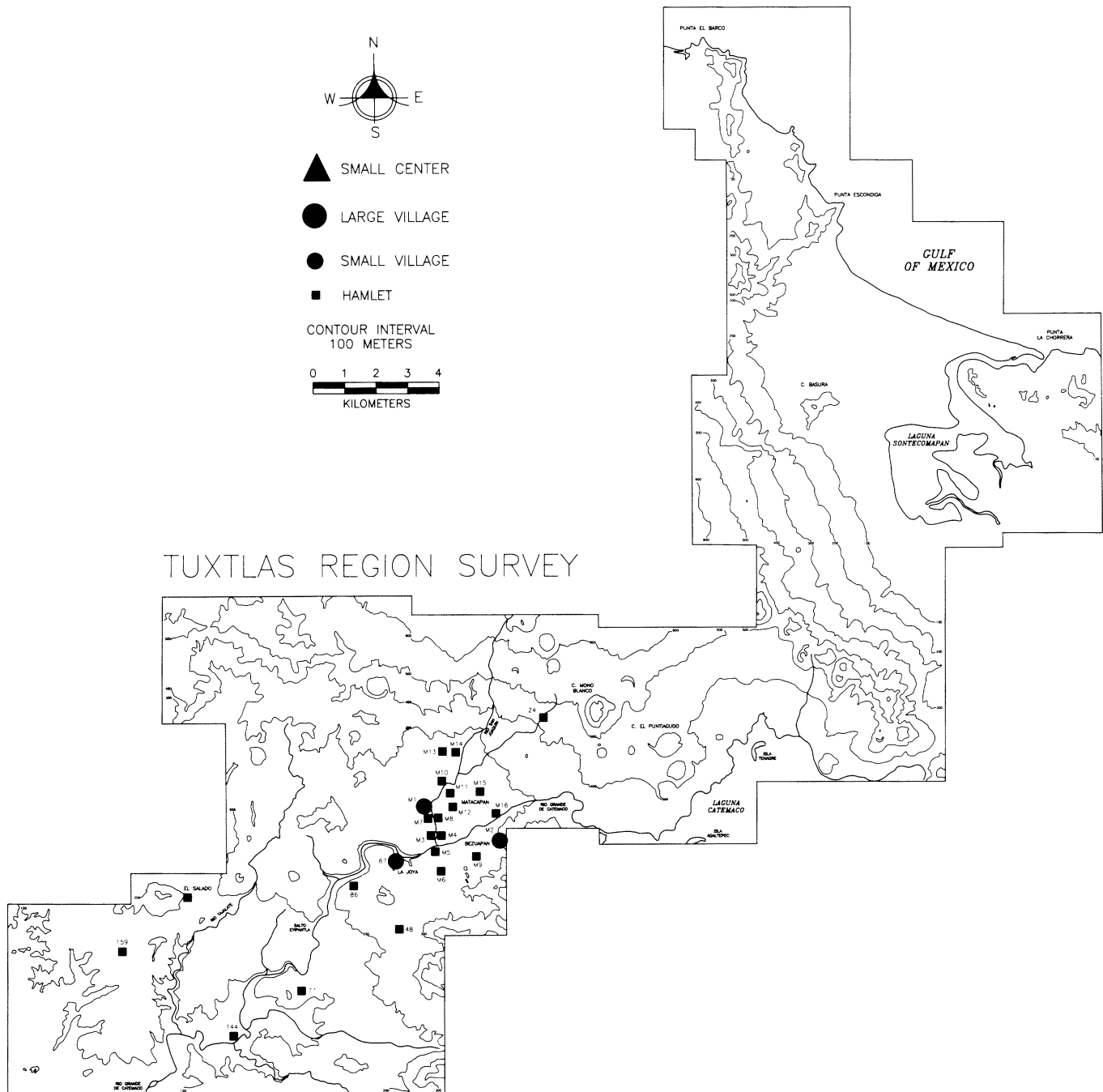


Figure 2. Early Formative settlement pattern.

an egalitarian basis, with settlement concentrated within the upland Rio Catemaco valley.

The Middle Formative Period (1000–400 B.C.) was a time of population growth, nominal settlement-hierarchy development, and changes in settlement pattern. The number of sites almost doubled, with evidence of occupation present at 42 sites. Two of these communities were large villages, six were small villages, and the rest were

small hamlets (FIG. 3). These settlements formed three groups, which may have constituted separate or independent polities. The first included La Joya (site 67) and a cluster of small hamlets, the second was composed of a series of small villages and hamlets situated along the lower reaches of the Rio Catemaco and Rio Tajalate, and the third comprised Teotepec (site 141) and two hamlets located NW of Laguna Catemaco.

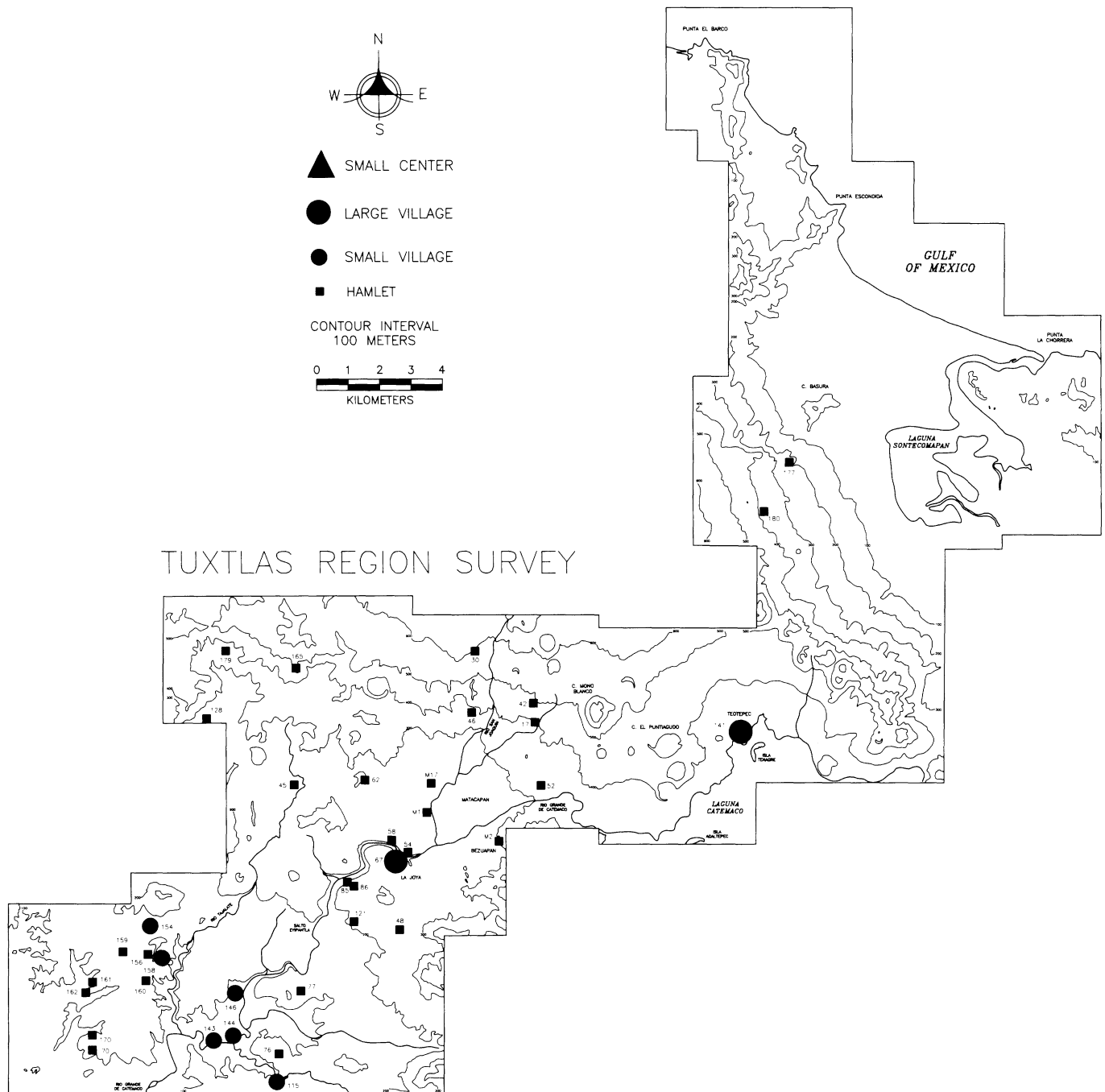


Figure 3. Middle Formative settlement pattern.

A profound shift in the location of settlements also characterized this period. The upper Rio Catemaco valley, the main focus of Early Formative occupation, was almost completely abandoned at this time, with most Middle Formative settlements now located along the middle and lower reaches of the Rio Catemaco and its tributary streams. Excavations at Maticapan indicated that, toward the end of the Early Formative, a volcanic eruption im-

pacted the western Tuxtlas. This event deposited up to 1 m of ash fall within the upper Rio Catemaco valley (Reinhardt 1991; Santley et al. 1984, 1985). The shift in settlement pattern during the Middle Formative was probably a response to this volcanic episode.

Middle Formative occupation at the two large villages, La Joya and Teotepic, was grouped around large, open areas empty of refuse, indicative of central plazas. Al-

though collections from mounded architecture at both sites included Classic period material, the architectural configuration within central Teotepac was very similar in layout to Formative period mound groupings at La Venta (Gonzalez Lauck 1988) and the possible Preclassic Chivo Plaza group at Cerro de las Mesas (Stark and Heller 1991a: 16). This particular layout may be a reoccurring pattern in Formative period construction along the south Gulf Coast (Adams 1991: 54–55).

Total maximum population rose to nearly 3200 persons or 8 persons per sq km during the Middle Formative, an 88% increase over the Early Formative estimate. Most of this increase occurred at the larger communities. Nonetheless, evidence for a well-established socioeconomic hierarchy is equivocal. Tecomates continued to dominate the ceramic assemblages from all sites, and much of this pottery was undecorated. At the same time, decorated ceramic types were somewhat more common at La Joya and Teotepac than at other Middle Formative sites. La Joya also produced most of the obsidian recovered from Middle Formative contexts, but total densities still remained quite low, indicating production and consumption in household contexts. Pending excavation, it is difficult to evaluate the possibility of greater social differentiation at these two sites. Although the scale of Middle Formative occupation suggests some increased complexity, we prefer to err on the side of caution and characterize the overall pattern as a difference of degree and not of kind, compared to Early Formative antecedents.

The Late Formative (400 B.C.–A.C. 100) produced minimal shifts in site number and regional population but a significant change in settlement hierarchy development. In total, 43 sites dated to the Late Formative (FIG. 4). The major locus of regional settlement remained downstream between the modern communities of Eyipantla and Chuniapan de Abajo, although five sites, all hamlets, were situated in the uplands NW of the upper Rio Catemaco valley.

The total maximum Late Formative population is estimated at just over 3200 persons, a slight increase over the Middle Formative maximum. Most of this occupation lived in small villages and hamlets, but Chuniapan de Abajo (site 108), a small center, appears to have been more nucleated than either villages or hamlets. This site covered 45 ha, an area nearly twice the size of the largest Late Formative village. Chuniapan de Abajo also contained 16.7% of the total regional population and produced some of the highest surface-refuse densities retrieved during the survey. Finally, the site contained the earliest ball court encountered on survey. The appearance of this small regional center suggests the development of a differentiated

sociopolitical system that included at least one tier above the village/hamlet level.

The general pattern of Formative settlement, therefore, involved a small founding population, most likely organized on an egalitarian basis and centered in the upper Rio Catemaco valley. During the Middle Formative there was growth in site number and population and three distinct areas of occupation formed in the survey region. Unfortunately, the available evidence for emerging social complexity is still somewhat ambiguous, although it does appear that we are not dealing with Middle Formative centers comparable in scale to those described elsewhere in Mesoamerica. A small regional center developed at Chuniapan de Abajo in Late Formative times. This center was more nucleated than other sites; however, in many respects it still closely resembled earlier large villages. In general, the data suggest that complex society in the survey area was a weakly developed phenomenon until the succeeding Classic Period.

Classic Period Settlement

The Classic Period was a time of initial settlement retraction followed by renewed growth in regional population. The Classic Period is divided into three periods: Early, Middle, and Late. Each of these in turn is divided into two periods consisting of an early and late component.

Occupation in the region plummeted dramatically during the early part of the Early Classic (A.C. 100–300) (FIG. 5). Only 10 sites, covering a total area of 57 ha, dated to this period. These settlements occurred in two groups: the main settlement cluster, located along the lower reaches of the Rio Catemaco and its tributary streams, and a second area of three hamlets dispersed in the uplands above the 400 m elevation mark.

The southern group included one regional center, two small villages, and four hamlets. Maximum population is estimated at slightly over 1200 persons, a 62.2% drop in comparison to Late Formative occupation. The extreme decline in site number and regional population is difficult to explain. It is likely that we are dealing with emigration out of the survey region to other portions of the Tuxtlas or to the adjacent Gulf Coast plain (see discussion below). One cause for this exodus may have been another episode of volcanic activity. Unfortunately, we lack data from stratigraphic contexts to confirm this possibility. Endemic Early Classic raiding and conflict along the Gulf Coast, implicated in texts from the La Mojarra stela and the Tuxtlas statuette (Justeson and Kaufman 1993), also may have been a factor. Yet another cause may have been long-term declines in soil fertility, which reduced agricultural potential and forced populations out of the region.

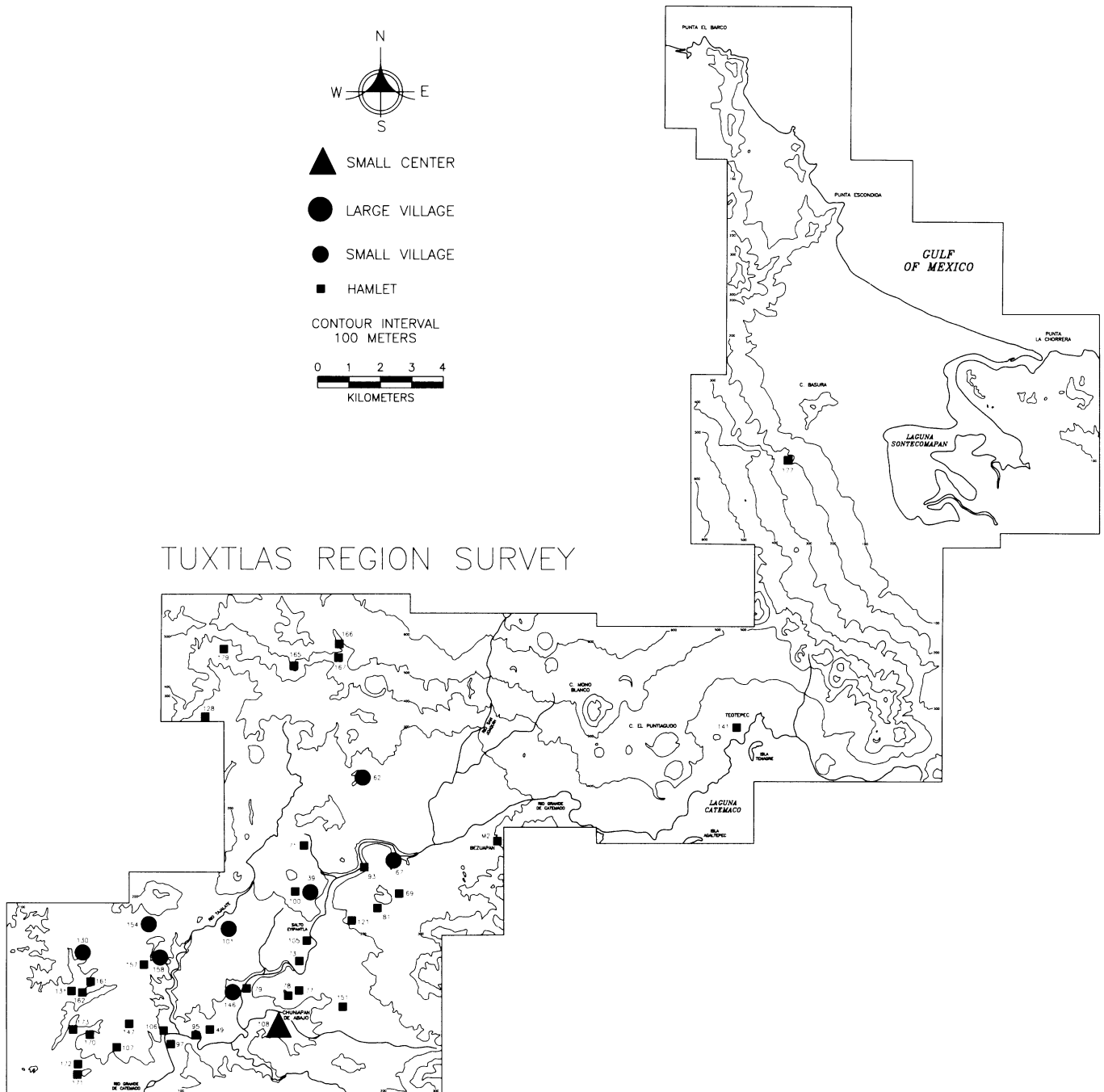


Figure 4. Late Formative settlement pattern.

The late Early Classic (A.C. 300–450) witnessed a change in settlement focus and some population increase (FIG. 6). For the first time since the Early Formative, a major occupation was established in the upper Rio Catemaco valley at Matacapán, which became the population center of the survey region. Matacapán covered 50 ha during the late Early Classic, and the majority of this occupation

occurred to the west of the site’s Main Plaza. Excavations of deposits from the period produced central Mexican-style artifacts, including *candeleros*,⁴ cylindrical tripod

4. Candeleros are small quadrangular and subquadrangular artifacts with two cylindrical chambers placed on the ventral surface. Although use probably varied, most were likely small, personal incense burners.

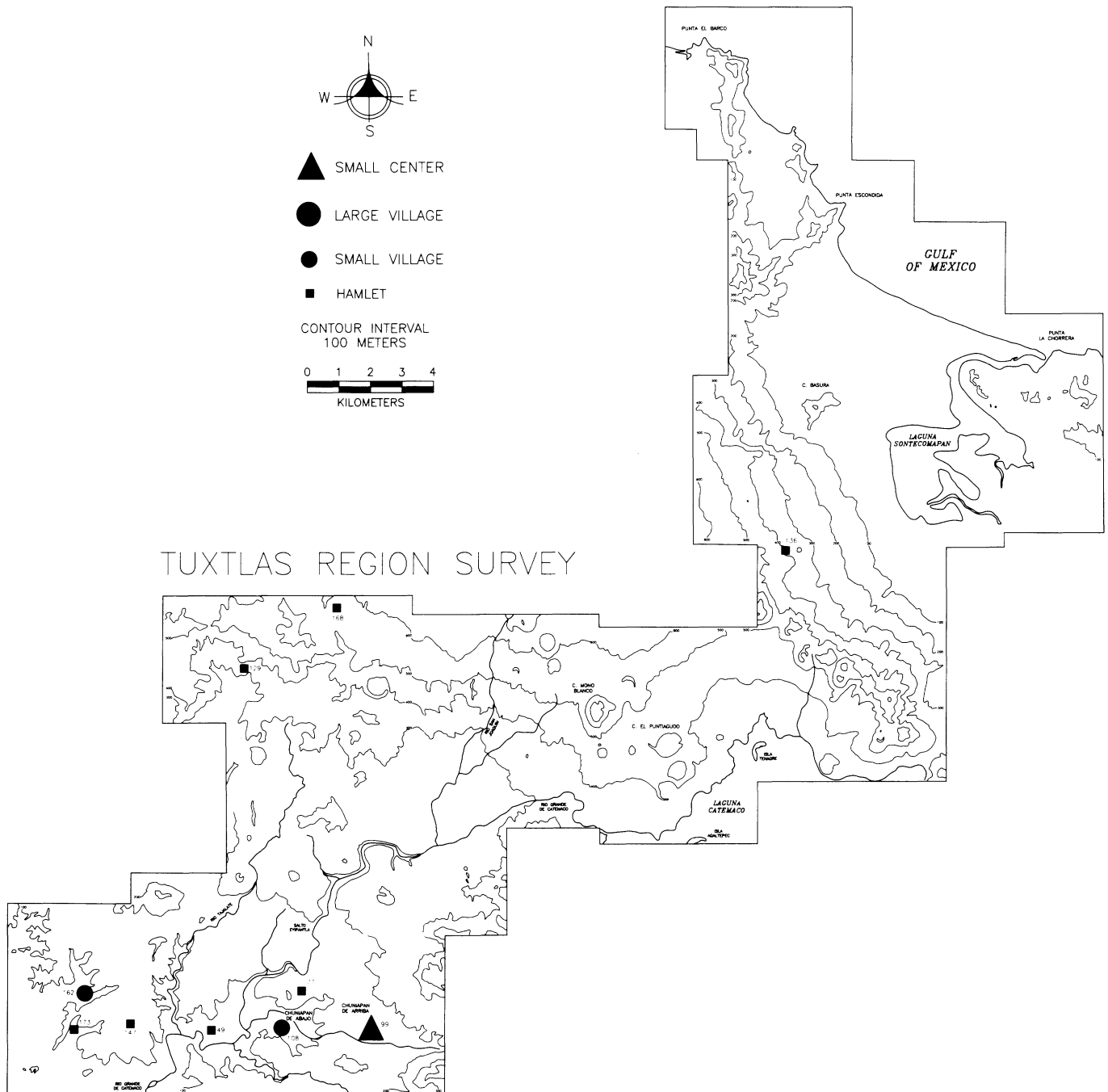


Figure 5. Early Early Classic settlement pattern.

bowls, incense burners, and figurines (Pool 1992; Santley 1989; Santley, Ortiz, and Pool 1987; Santley, Yarborough, and Hall 1987). Much of this influence was probably from Teotihuacan, the largest center in central Mexico at the time. Only 15 other sites dated to the period, and all were small hamlets with light occupation. Total regional population increased 36.7% to nearly 1700 persons, but the

region was still sparsely occupied. Three-quarters of this occupation resided at Matapan.

Site number and regional population grew markedly in the early Middle Classic (A.C. 450–550). The total number of sites rose to 107, three of which were large centers; five small centers; one a large village; 25 small villages; and 73 hamlets (FIG. 7). Total population is estimated to have been

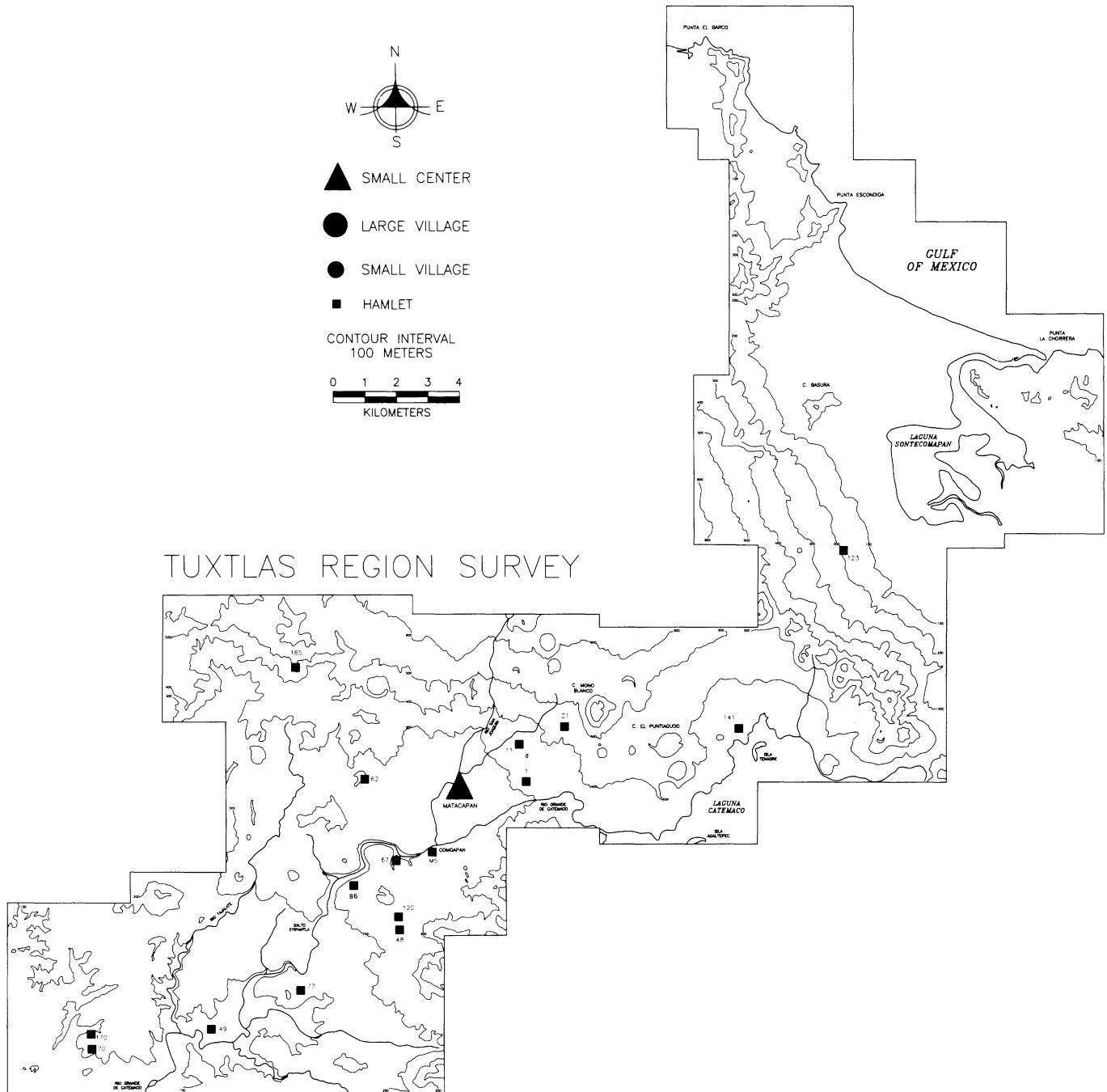


Figure 6. Late Early Classic settlement pattern.

just over 53,000 persons, a 3200% increase over the previous period. Much of this growth occurred at Matacapan, which now had a population estimated at around 35,000.

For the first time the survey region contained a well-developed settlement hierarchy. Although low-level hierarchical development was characteristic during earlier periods, by early Middle Classic times it became more

elaborate. Three sites, Matacapan, Ranchoapan (site 45), and Teotepec (site 141), now were large centers; however, we suspect that Matacapan was the seat of power in the region. High-density occupation at Matacapan covered 700 ha, and a large number of villages and hamlets surrounded the site. Matacapan therefore was probably the major focus of population attraction and probably the

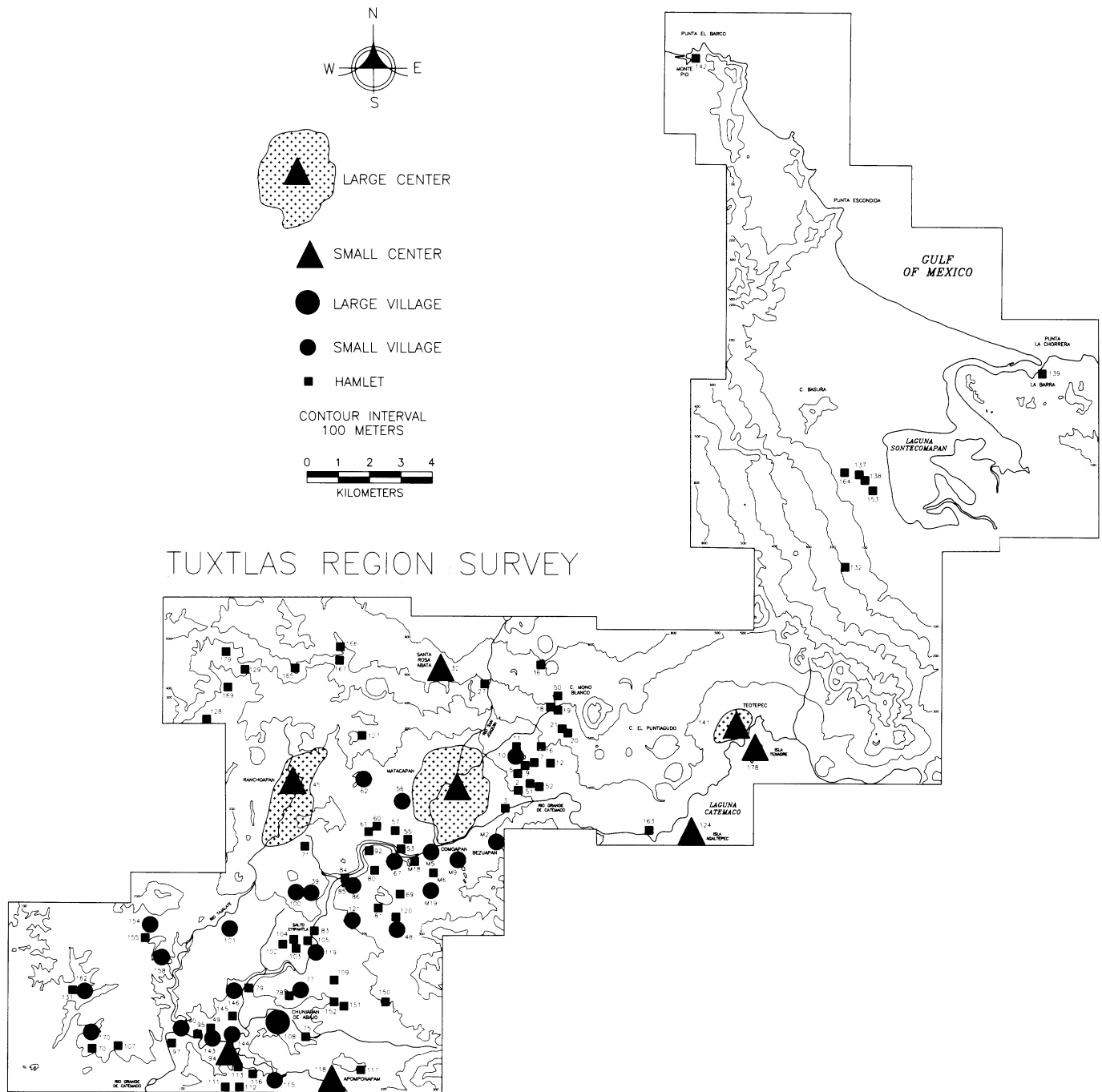


Figure 7. Early Middle Classic settlement pattern.

survey region's principal central place politically. It was also the center of regional ceramic manufacture (Arnold et al. 1993; Santley, Arnold, and Pool 1989).

Most rural sites were located either around Maticapan or along the lower reaches of the Rio Catemaco, Rio Tajalate, and their tributaries. Except for Isla Agaltepec (site 124) and Isla Tenagre (site 178)—two ceremonial

centers in Laguna Catemaco—small centers were generally situated far from the large centers. A substantial occupation in the Gulf Coast Corridor also occurred for the first time. Several of these sites, in particular Monte Pio (site 142) and La Barra (site 139), may have functioned as ports that facilitated water-borne exchange up and down the Gulf Coast.

Central Mexican-style materials continued to occur at Matacapan, but cylindrical tripod vases and candeleros also appeared at 11 other settlements throughout the survey region. Two of these sites were centers, six were villages, and three were hamlets. The presence of these artifacts at small rural sites indicates that the appropriation of central Mexican stylistic traits extended well into the countryside.

During the early Middle Classic there was significant growth in craft production, particularly in ceramics but also in obsidian working. Early Middle Classic ceramic production was concentrated around Matacapan (Arnold and Santley 1993; Pool and Santley 1992; Santley, Arnold, and Pool 1989). Matacapan's ceramic industry was differentiated, with several kinds of production entities present. The larger of these production areas emphasized a limited number of ceramic wares, but most appear to have produced the full suite of wares and vessel forms in use at the time.

Pottery production at rural sites was less intensive than at Matacapan (Santley 1994). Besides Matacapan and Ranchoapan, evidence for ceramic manufacture was recovered from 25 sites. Most of these settlements were hamlets or small villages. Production residues were often mixed with domestic refuse or associated with residential mounds. Rural pottery making involved the full array of domestic wares and vessel forms. This pattern would be expected if production were oriented toward local clientele.

Obsidian working occurred throughout the survey region during the early Middle Classic, with most of this material apparently coming from the Zaragoza source situated in eastern Puebla (Michael Glascock, personal communication, 1994). Most obsidian working during the Middle and Late Classic periods involved the production of prismatic blades from partially prepared cores, a trend that began in Late Formative times (Santley 1989). Excavated assemblages from Matacapan and Bezuapan indicate that obsidian working was a part of the household's normal domestic routine (Santley, Ortiz, and Pool 1987). Some obsidian production, however, was specialized.

The Middle Classic obsidian production industry was centered at Ranchoapan, the second largest site in the survey region and located about 5.5 km west of Matacapan. The production area at Ranchoapan consisted mainly of a single, dense concentration of debris, covering nearly 7 ha and situated in the northern part of the site. Most of this material consisted of prismatic blades, but blade-core reduction debitage and a few flake tools were also recovered. Obsidian densities were almost double those in Matacapan's production areas and more than three times the density at all other sites in the region combined. Obsidian tools were also produced at Matacapan, however. Most of the assemblage again was prismatic blades, but

flake tools were also fairly common. Obsidian production areas were distributed throughout the site, but the densest scatters of material occurred around the Main Plaza. At both Ranchoapan and Matacapan obsidian was mixed with other domestic trash (ceramics, figurines, and ground stone), suggesting that production took place in household contexts, probably on a part-time basis.

Evidence of obsidian production and use was recorded at 16 other sites in Matacapan's hinterland. Most of this production was considerably less intensive compared to Ranchoapan and Matacapan, and the areas devoted to specialized manufacture were generally less than 0.5 ha. Areas where obsidian was common also contained substantial quantities of ceramics, mostly associated with domestic activities. The household appears to have been the primary unit of production, and obsidian working likely provided only some of the family's income. In contrast to obsidian production areas at Ranchoapan and Matacapan, the assemblages from rural sites were dominated by a larger proportion of flake tools and bifaces, and evidence of their manufacture.

The pattern of late Middle Classic settlement (A.C. 550–650) was essentially the same as that for the early Middle Classic (FIG. 8). Although the total number of sites occupied rose to 122, maximum population remained about the same at 53,000 persons. Three of these settlements were large centers, 5 were small centers, 1 was a large village, 25 were small villages, and the rest were hamlets. Most of this population continued to be concentrated at Matacapan or in its immediate vicinity. The ceramic production system centered at Matacapan grew slightly in scale and internal differentiation (Arnold et al. 1993; Santley, Arnold, and Pool 1989), and the overall proportion of sites that manufactured pottery remained relatively constant. Besides Matacapan, 30 sites provided evidence for ceramic production, and most rural production remained small-scale. In contrast, the number of sites involved in the production of blades and bifaces in the countryside dropped to 14, although Ranchoapan was still the center of obsidian working.

Occupation in the Gulf Coast Corridor reached a peak during the late Middle Classic. The main zone of occupation at Teotepec covered nearly 80 ha and contained more than 100 mounds. Monte Pio and La Barra, now small villages, also reached maximum size. La Barra had seven mounds and five were recorded at Monte Pio, although additional mounds may have existed in the past (Kneebone 1990: table 4.1). Architecture at both sites included large platforms that covered 1700–2150 sq m. The total amount of mounded architecture was much greater than normally encountered at small villages in the survey region.

The early Late Classic (A.C. 650–800) was a time of

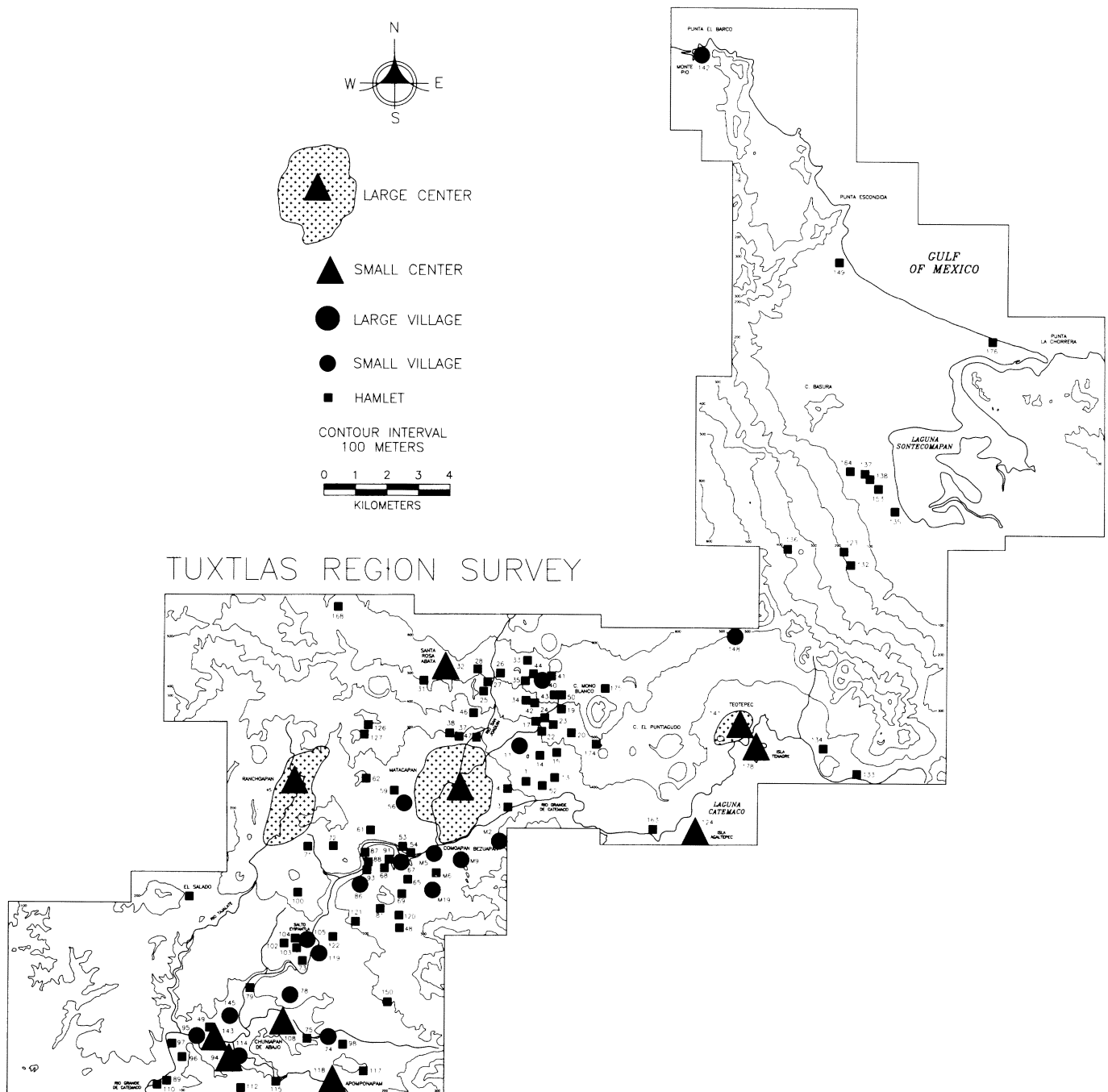


Figure 9. Early Late Classic settlement pattern.

were still present at Maticapan, but they were much less common relative to the total number of ceramics.

In contrast to the general trend of population decline, there was an increase in the intensity of pottery making at Maticapan. Many of the site's larger-scale industries reached maximum size in the early Late Classic (Arnold et al. 1993; Ortiz and Santley in press), while the smaller-

scale production entities were increasingly nucleated (Arnold and Santley 1993). Pottery was produced at 26 other sites in the survey region. Sites with evidence for obsidian processing increased to 23 (including Maticapan), with Ranchoapan still the major production center.

The general pattern of decline in site number and regional population continued during the late Late Classic

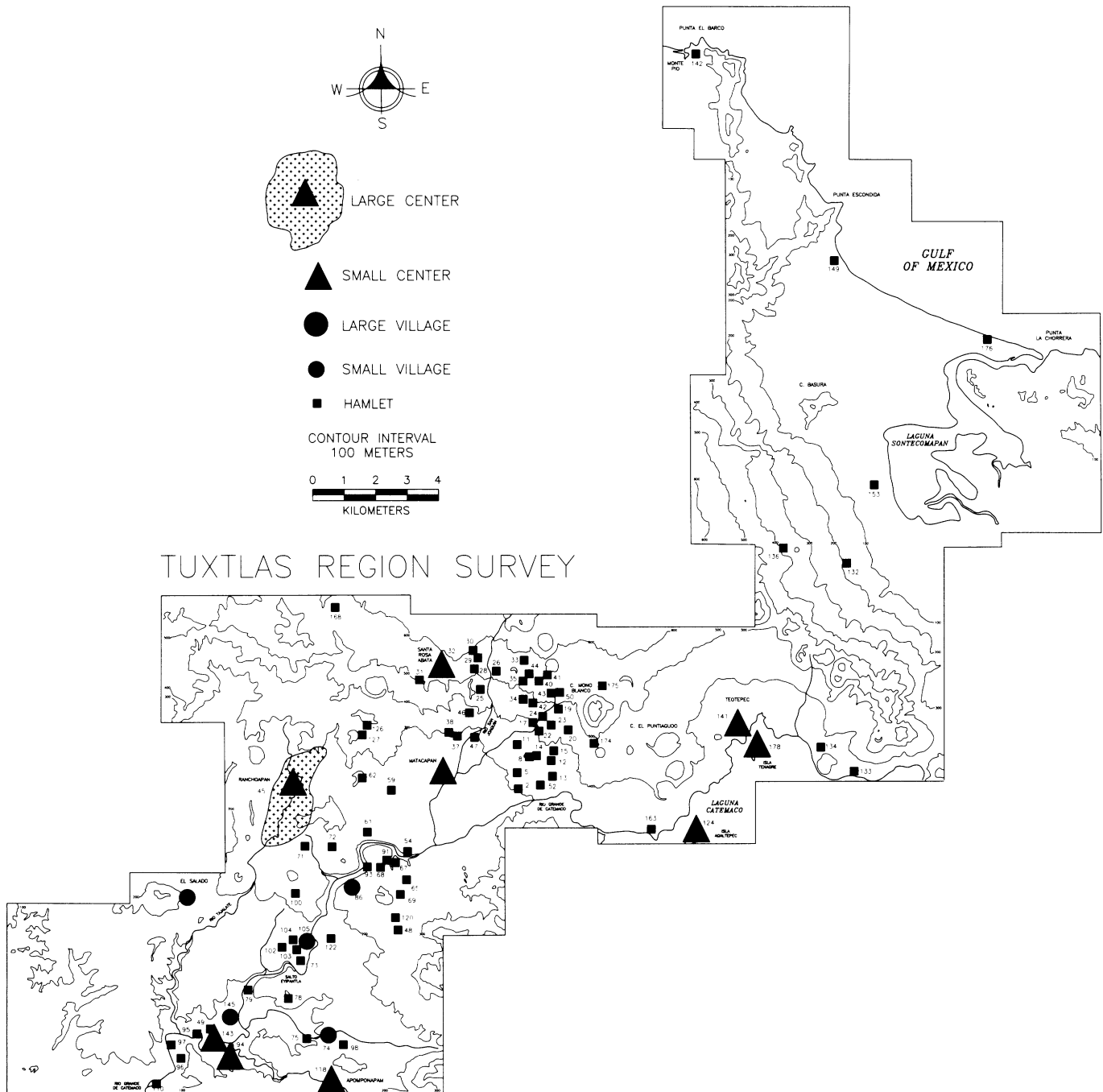


Figure 10. Late Late Classic settlement pattern.

(A.C. 800–1000). Altogether, 93 sites were occupied, but total regional population dropped to approximately 16,000 persons (FIG. 10). Much of this loss was due to the virtual abandonment of Maticapan, which now had a maximum estimated population of only 1250 persons. The number of small villages also decreased significantly (from 17 to 5), but there was only a slight drop in total hamlets.

Occupation in the hinterland, therefore, was very rural compared to earlier periods. Nearly 85% of the population of the region, however, resided in centers. Ranchoapan was the largest settlement in the survey area, but it was not significantly larger than other centers. Moreover, eight centers occurred in three groups: one included Teotepec and sites on the islands in Laguna Catemaco; a second at

Table 1. Middle and Late Classic sites with craft production.

Period	Total No. of sites	Ceramic production		Obsidian production	
		No.	%	No.	%
Early Middle Classic	107	27	25.2	18	16.8
Late Middle Classic	122	30	24.6	16	13.1
Early Late Classic	116	27	23.3	23	19.8
Late Late Classic	93	15	16.1	19	20.4

Ranchoapan and Maticapan; and a third located along the lower reaches of the Rio Catemaco. These groups were situated relatively equidistant from one another, suggesting division of the region into three political units of comparable stature.

Ceramic production in the countryside dropped off, and 14 sites provided evidence for pottery making. The late Late Classic represented the first significant decrease in pottery making since the early Middle Classic. In contrast, the relative number of sites with evidence for obsidian production actually increased throughout the Late Classic (TABLE 1). This increasing trend in obsidian working may have been related to a shift in the region's production orientation. During the Middle Classic, Maticapan's larger-scale pottery-making industries were directed toward a spatially extensive market that included the Tuxtlas and possibly regions beyond; however, this production emphasis was closely tied to the history of occupation at the site, which lost significant population in late Late Classic times. In contrast, textile production and exchange may have become increasingly important along the Gulf Coast toward the end of the Classic period. If obsidian working at Maticapan was somehow related to cotton cultivation and/or weaving, then there may have been a major increase in textile manufacture throughout the survey region in the Late Classic (e.g., Arnold et al. 1993: 187).

Postclassic Period Settlement

Only four settlements, Catemaco (site 163), Isla Agaltepec (site 124), Isla Tenagre (site 178), and Site 94, produced surface material that apparently dated to the Postclassic Period (A.C. 1000–1500). All of these sites were small centers, with a total population of slightly over 1100 persons, a 93.1% decline relative to the late Late Classic (FIG. 11). Many of the ceramic forms were quite different from earlier categories, and new variants of previously extant groups developed. Also, certain samples from the site produced quantities of Tuxtlas Polychrome, a common hallmark of the Late Classic in the region (Ortiz 1975; Stark and Hall 1993: fig. 4). Ethnohistorical data

indicate that a major center was also situated at San Andres Tuxtla at the time of the Spanish Conquest (Stark 1978).

The lack of Postclassic material raises a number of important issues. For one, our ability to recognize diagnostics from the period may be inadequate, given that Postclassic components have rarely been excavated in the Tuxtlas. Furthermore, the transition in material culture between the Late Classic and Early Postclassic may not be significant, a situation similar to that considered for the Mixtequilla region to the west of the Tuxtlas (Stark and Heller 1991a). At the same time, it is noteworthy that our survey did not generate evidence for the intrusive highland-Mexican material culture noted for the Middle and Late Postclassic in the Mixtequilla (Curet, Stark, and Vasquez Z. 1994; Stark et al. 1992: 225). The four centers encountered during the survey imply the presence of a rural support population; thus, total population in the survey region may have been more substantial than we have indicated.

The drop in Postclassic occupation may, however, be real, the ultimate result of processes begun earlier. For example, the general drop in population from early Late Classic to Postclassic times may have been due to progressive declines in soil fertility, which forced populations out of the region. Maximum population density in the Classic Period was about 132.5 persons per sq km, a value comparable to levels recently suggested for other tropical forest areas of Mesoamerica (Rice and Culbert 1990). Although the fertility of soils on flatlands in the Tuxtlas is renewed by the deposition of soil from the surrounding slopes, it ultimately declines when plots are cultivated a number of years in a row (Killion 1987). Consequently, a collapse phenomenon similar to that which ravaged the Lowland Maya may have impacted agrarian populations in the Tuxtlas region. Another possibility would be a renewed episode of volcanism, with the area devastated by another set of ash falls. If populations were forced out of the region again, either by over-exploitation or by volcanic activity, it may be that the area was not significantly reoccupied until slightly before the Spanish Conquest: hence our inability to find many Postclassic sites.

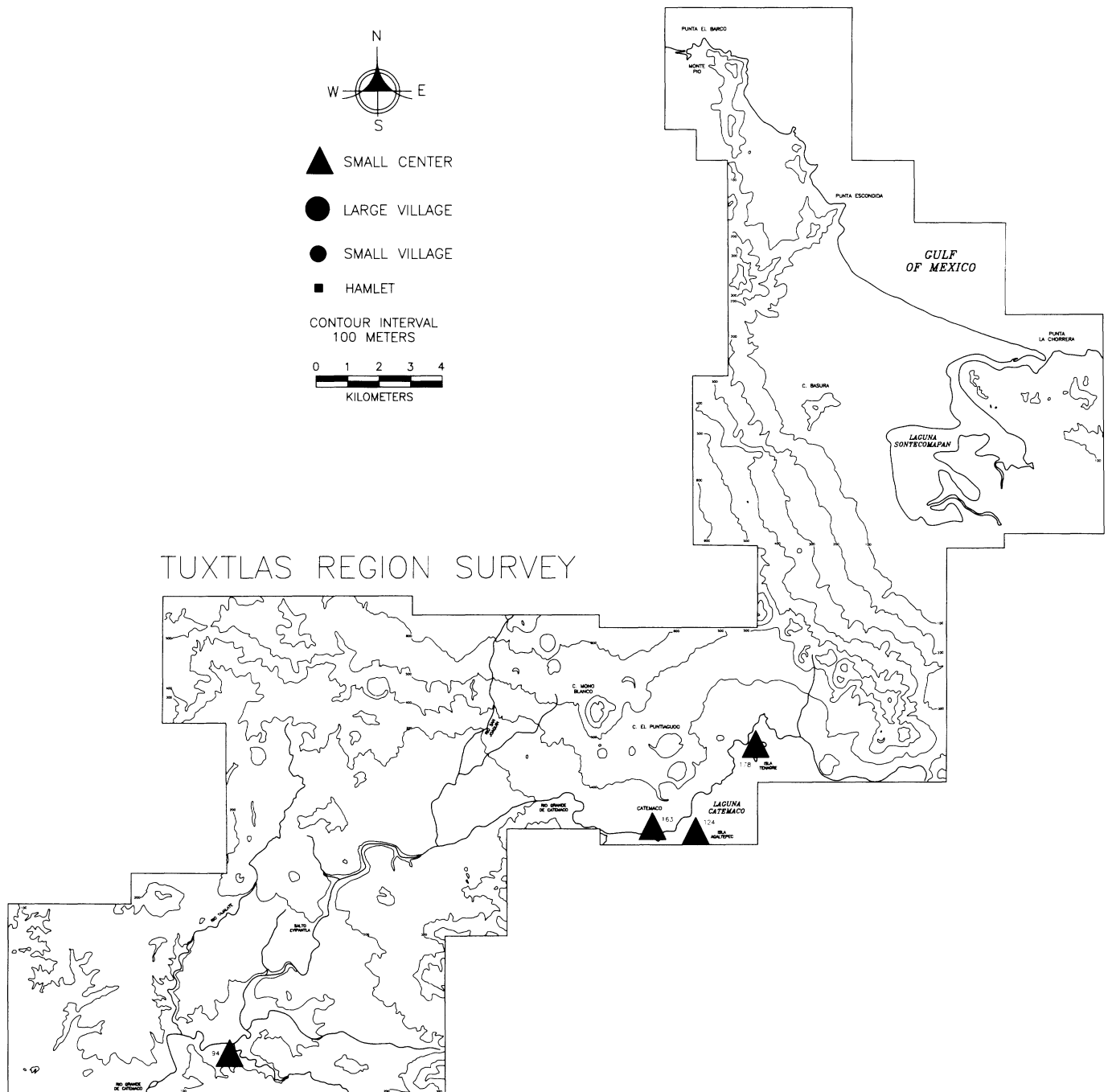


Figure 11. Postclassic settlement pattern.

Patterning in Settlement Developments

The information summarized above indicates that the Tuxtlas had a long history of occupation, beginning in the Early Formative and continuing until the Spanish Conquest. Two cycles of demographic growth and decay characterize the population history. The first began in the Early

Formative Period and continued through the Late Formative, after which population levels decreased markedly. Population levels increased in late Early Classic times and reached a peak in the Middle Classic Period, but fell once more in the Late Classic and ultimately dropped to an all-time low by the Postclassic. Population density was high throughout the Classic sequence, particularly in Mid-

dle and early Late Classic times. Our maximum estimates for this time span range from 58 to 132 persons per sq km, with most occupants residing in the 200 sq km area around Matacapán and the region to the sw. Formative densities were much lower, from 4.3 to around 8 persons per sq km. These values compare favorably with maxima recently reported for the same time periods from other parts of Mesoamerica such as the Valley of Oaxaca (Blanton et al. 1982), the Maya Lowlands (Rice and Culbert 1990), and the Basin of Mexico (Sanders, Parsons, and Santley 1979).

Throughout the sequence most sites were located near Matacapán or within the Rio Catemaco Corridor. Except for the area around Teotepéc, the Gulf Coast Corridor was never a major focus for settlement. This patterning appears to correlate with agricultural productivity. Today the most productive agricultural lands are situated in the upper Rio Catemaco valley or along the lower reaches of the Rio Catemaco and its tributaries. Soils in these areas are very deep and require minimal fertilization. On the other hand, the least productive agricultural zone is located across the pass to the north of Laguna Catemaco leading to the Gulf of Mexico. Soils in this area are relatively shallow, often with outcrops of basalt on the surface. Modern occupation is light in this area, and archaeological evidence suggests that there were few settlements in the past during any time period.

Settlement hierarchy development also shows an interesting pattern. During the Formative Period the site hierarchy was weakly developed; there were few sites and most were small villages and hamlets. Compared with lowland coastal areas to the east, the Tuxtlas may have formed a “cultural backwater,” exhibiting only limited complexity throughout the Formative Period. A three-tiered settlement hierarchy did emerge during Late Formative times, but the major center, Chuniapan de Abajo, was not significantly large nor did it contain substantial civic-ceremonial architecture.

In contrast, a major settlement hierarchy developed during the Classic Period. A very large center was established at Matacapán in Middle Classic times, with other principal settlements founded at Ranchoapan and Teotepéc. A number of small centers were also established in the region, indicating a five-tiered site hierarchy involving a primate center (Matacapán), several large secondary centers (Ranchoapan and Teotepéc), small centers, villages, and hamlets. This hierarchy continued throughout Classic times, although Matacapán was largely abandoned toward the end of the period, with Ranchoapan assuming the central-place role.

There were also major changes in the degree of urbanization in the region. For our purposes urbanization refers to the relative amount of population living in centers and

the degree of their social and economic differentiation, as measured by the amount, type, and scale of major mounded architecture. Hamlets were the most common settlement type throughout the sequence; however, centers accounted for an increasingly larger share of all occupation through time. In the Late Formative only 16.7% of the region’s population lived in centers, but in the early and late Early Classic that figure rose to 55.3% and 75.2% respectively. The Middle Classic and Late Classic saw a further increase in the region’s degree of urbanization; now from 85% to 88.7% of the population of the region resided in centers, with most of it in large centers such as Matacapán. In Middle and Late Classic times Matacapán was the largest center in the region, but in the late Late Classic Ranchoapan took over many of its top-ranking central-place functions. Although the survey revealed few Postclassic sites, all were centers.

These changes in urbanization also coincided with the appearance of a differentiated craft economy. Ceramics and obsidian production typically occurred at different sites. During the early Middle Classic, for example, 61.1% of all obsidian production sites also produced ceramics, but by late Late Classic times the frequency of commonality had dropped to 35%. For ceramic production sites with evidence of obsidian working, the respective figures fell from 32.4% to 22%. Craft production, therefore, appears to have become increasingly dispersed through time, with two distinct production-distribution systems emerging toward the end of the Classic Period. Most specialized craft production occurred in centers at the beginning of the Classic Period, whereas during later periods hamlets comprised a significantly larger share of all production nodes (from 33% to 60% of all specialty sites).

Finally, the Tuxtlas surveys produced ample evidence for contacts with central Mexico, which were likely from Teotihuacan, by far the largest center in Mesoamerica. The duration of these contacts was much more protracted than elsewhere in Mesoamerica, beginning around A.C. 300 and lasting until perhaps as late as A.C. 800. These traits included artifacts (tripod vases, *floweros* [flaring rim vessels], *candeleros*, incense burners, *braceros* [portable stoves], anthropomorphic figurines, and Thin Orange pottery) and architecture (*talud-tablero* temple platforms and large multi-roomed domestic structures).⁵ Santley originally argued that these assemblages indicated the presence of a

5. The talud-tablero platform is a form of architecture involving a talud, an outwardly sloping batter at the base of the platform, atop which was placed a rectangular panel, the tablero. The ratio of talud-to-tablero height at Matacapán is approximately 1:1: a value that is very similar to that from platforms from the Mound A-B complex at Kaminaljuyu in Guatemala, but different from platforms at Teotihuacan, which generally have taludes that are less tall than their accompanying tableros.

Teotihuacan enclave at Matacapan (Santley 1989; Santley, Yarborough, and Hall 1987). Later, Pool (1992: 53) pointed out that the incidence of tripod vases and candeleros at Matacapan varied through time, reaching a peak in the early Middle Classic and then later falling off, which presumably reflected "...both the waning prestige of the Central Mexican metropolis and the increasing integration of Matacapan and its rulers into a regional economy." Our survey data show that these assemblages were also present at sites in Matacapan's hinterland, especially at lesser-ranking centers and villages, and that there was significant variation in their spatial distribution through time. During the early Middle Classic, this material reached its maximum extent throughout the survey region and its frequency peaked at Matacapan. Toward the end of the Classic, however, the Teotihuacan-style assemblage was confined mainly to Matacapan and settlements in its immediate vicinity.

Comparisons with Other Gulf Coast Regions

Our conclusions regarding the settlement distributions are preliminary. Nonetheless, the patterning is sufficiently robust to permit comparisons with other areas along the Gulf Coast. Although comparative databases are not plentiful, some recent studies provide an interesting counterpoint to the Tuxtla patterns. These data indicate a surprising degree of variation in the scale and configuration of settlement through time. This conclusion leads us to suspect that the south Gulf Coast should not be treated as a single cultural area in reconstructions of precolumbian history.

The following discussion draws on studies of regional settlement on the South Gulf Coast. The first involves a regional study carried out in the lower Cotaxtla Basin of central Veracruz (Daneels 1991; Daneels and Pastrana 1988). The second is a settlement survey conducted in the Mixtequilla area, situated in southern Veracruz between the Cotaxtla Basin and the Tuxtla Mountains (Stark 1991; Stark et al. 1992). The third survey was carried out around San Lorenzo, located in the Coatzacoalcos River Basin to the east of the Tuxtla (Stacey Symonds, personal communication, 1994). Due to different chronological terminology employed in the various survey projects, the following discussion emphasizes chronometric dates rather than period nomenclature.⁶

6. It should be pointed out that the surveys undertaken by Stark, Daneels, and Symonds are not directly comparable to our reconnaissances in the Tuxtla. The La Mixtequilla survey involved only a surface reconnaissance of a 40 sq km area extending out from the main center at Cerro de las Mesas, whereas those from other areas covered a region nearly 10 times the size. Inspection of Stark's maps of mounded architecture indicates an almost continuous distribution of buildings through-

Over the course of the last 10 years, Daneels (1991; Daneels and Pastrana 1988) has undertaken archaeological excavation and survey in the Cotaxtla Basin, located along the southern border of central Veracruz. This area covers approximately 1100 sq km and includes six ecological zones. Initial fieldwork involved extensive pedestrian survey, with survey transects spaced approximately 400 m apart. This extensive regional study identified 242 sites; following this survey, Daneels returned to 132 sites within a 470 sq km area for more intensive study.

Evidence for surface occupation prior to 900 B.C. was almost nonexistent, although previous excavations indicated a minimal presence dating to this time. The period between 900–500 B.C. witnessed a slight increase in occupation, with surface material recovered from a small number of sites. Site frequencies remained relatively stable between 500 and 100 B.C., but an increase in sherd densities suggested a more nucleated occupation.

The period from 100 B.C. to A.C. 100 was a time of significant settlement growth. Sites were distributed throughout all environmental zones, although alluvial terraces were the favored locations. Larger-scale architecture and ball courts appeared during this period. Coupled with the artifactual evidence, the Formative Period settlement data reflected a growing occupation and evidence of a developing social hierarchy.

The incidence of settlements continued to increase through the Classic Period, with 100 sites occupied between A.C. 100 and 500. Obsidian may have derived primarily from the Zaragoza-Oyameles source (Annick Daneels, personal communication, 1994; Stark et al. 1992; cf. Daneels and Pastrana 1988), a pattern that compares

out the area surveyed, with concentrations of occupation during different time periods. From a comparative standpoint, therefore, the data from La Mixtequilla survey come from an amplified site survey more similar to the original intensive survey that Santley undertook at Matacapan rather than the general survey of the Tuxtla or the other regional reconnaissances compared here. Stark's data are consequently more fine-grained than the results presented here, but they are less intensive overall, given the fact that the second stage of the Tuxtla surveys involved large numbers of controlled collections at specific sites. Daneels' survey, in contrast, focused almost entirely on finding centers, with transects placed every 400 m between the major sites. The Cotaxtla survey thus may have missed many villages and hamlets because its general design was less intensive than both the La Mixtequilla and Tuxtla surveys. Symonds initiated an extensive survey quite similar to that employed in the Tuxtla. Since segments of their survey area focused on lands adjacent to major rivers, alluviation of bottom lands may have obscured many smaller sites (Roberto Lunagomez, personal communication, 1992). If, however, most of the population in their region resided in centers, as was the case in the Tuxtla in Classic times, then their assessment of demographic history is probably correct. On the other hand, if most of the population lived in smaller communities on the alluvial plain, their results should be treated with caution.

favorably with the evidence from the Tuxtlas (Santley 1991) and La Mixtequilla (Stark et al. 1992). Interaction with highland Mexico is also implicated; ceramics similar to those recovered from the Cotaxtla Basin sites were reportedly found in Early and Late Tlamimilolpa (A.C. 200–450) deposits at Teotihuacan (Annick Daneels, personal communication, 1994). After A.C. 600 occupation in the Cotaxtla Basin dropped approximately 50%, and on-site material densities also decreased. New ceramic types appeared in the survey region, including a fine orange pottery and an ash-tempered domestic ware.

The pattern of settlement after A.C. 900 suggests a significant break with the previous Classic Period. The ceramics recovered from the survey indicate increasing contact with highland areas (possibly Puebla-Tlaxcala), and mounded architecture included twin pyramids. The total number of sites was about the same as during the Late Classic, but three new centers were founded and sites generally clustered along the lower Cotaxtla River. These changes may have resulted from the immigration of highland groups along the river course, displacing some of the previous occupants of the region (Annick Daneels, personal communication, 1994).

Settlement patterns to the east of the Cotaxtla Basin provide a second comparative data base from the south Gulf Coast. Barbara Stark and associates (Stark 1991; Stark and Heller 1991b; Stark and Hall 1993) have completed a settlement study of approximately 40 sq km in the coastal area known as La Mixtequilla. This area consists of elevated alluvial soils juxtaposed with estuarine swampland and includes well-known sites such as Cerro de las Mesas and El Zapotal. Their methodology included a pedestrian survey that employed transects set 20 m apart.

The earliest occupation in La Mixtequilla dates to at least 900 B.C.; population increased through the Formative Period, and Cerro de las Mesas became an important political center between 600 B.C. and A.C. 300 (Stark and Heller 1991a: 22). Population grew during the succeeding Classic Period, and several new settlements developed in the eastern Mixtequilla (Stark and Hall 1993: 254). Architecture, sculpture, and long-count dates from Cerro de las Mesas indicate the site's continued prominence through the 6th century A.C. (Miller 1991; Stark et al. 1992: 225). Neutron activation analysis demonstrates that the majority of obsidian was derived from the Zaragoza-Oyameles source, with only a very small portion consisting of green obsidian from Pachuca during the Classic Period (Stark et al. 1992: 229).

Unlike the pattern in the Cotaxtla Basin, the period between A.C. 700 and 900 in La Mixtequilla was not characterized by a noticeable decrease or a significant

disruption in settlement pattern (Stark et al. 1992: 225). Rather, this period is one of "unusual elaboration of local ritual and 'fancy' ceramic items" (Stark et al. 1992: 225; also Stark and Hall 1993: 255). Considerable construction also occurred at nearby El Zapotal at this time (Stark and Heller 1991a: 23).

Sometime around A.C. 1200 there was a dramatic change in the material culture and settlement organization in La Mixtequilla (Curet, Stark, and Vasquez Z. 1994; Stark et al. 1992: 225). This change included a significant increase in the amount of prismatic obsidian blades in the assemblages from the Pico de Orizaba and Pachuca sources. Many of these blades also have ground platforms (Stark and Heller 1991a: 19; Stark et al. 1992: 226). In contrast, platform grinding is a characteristic of blade core reduction that occurred much earlier in the Tuxtlas and at rural sites around Teotihuacan (Santley, Kerley, and Barrett in press; Santley, Kerley, and Kneebone 1986). Comparable, but less intensive changes also marked the Late Postclassic, including the introduction of Aztec-style pottery. These changes were likely the result of Aztec intrusion in Cotaxtla and their economic interests in La Mixtequilla (Curet, Stark, and Vasquez Z. 1994; Stark 1978; Stark et al. 1992: 225).

The Coatzacoalcos River valley situated to the east of the Tuxtlas is a third region where settlement pattern research recently has been conducted. Archaeologists have pointed to the area of settlement studies as a particular lacuna in our understanding of the Formative Period Gulf Olmec (Sharer 1989: 6). Thus, as part of the San Lorenzo Regional Archaeological Project (Guillen 1992), Stacey Symonds (personal communication, 1994) carried out a regional survey over an area of approximately 400 sq km, including the San Lorenzo plateau. The survey region was divided into four primary geographic areas, and survey teams traversed the area within each of these zones at 20 m intervals. This reconnaissance recorded a total of 271 sites dating from the Formative through the Postclassic periods.

The pattern of regional settlement dating between 1200 and 300 B.C. included a site cluster to the ESE of San Lorenzo, another to the NW of the site, and a line of sites to the south that followed a possible ancient river course. Architectural features reported consisted primarily of modified terraces, as opposed to mounds. San Lorenzo was the dominant site during the earlier part of this period, although a number of second- and third-order sites were also present. Finally, much of the area to the NNW of San Lorenzo yielded evidence for special purpose, possibly seasonal, utilization of the lowland flood plain. Although possible subperiods are difficult to identify from the survey data, excavations at San Lorenzo (Coe and Diehl 1980)

suggest that Formative Period occupational intensity reached a peak prior to 800 B.C.

A dramatic decline in settlement number characterized the period between A.C. 1 and 900, which probably represents a continuation of a pattern established in the latter half of the 1st millennium B.C. The small number of sites recorded may be a function of the relatively undeveloped Classic Period ceramic chronology; however, even given that constraint, it appears clear that the area suffered a significant depopulation during the Classic. In addition, very few Formative sites in the survey area were occupied during the Classic Period, and no site assumed the role of regional center. Most sites were small settlements, hamlets, and villages in our site classification, located on elevated land.

Between A.C. 900 and 1200, the Classic-Postclassic transition, there was a marked increase in occupation, eclipsing the population of the earlier Formative and Classic periods. A new regional center was founded at Ahuatepec, located on the eastern side of the survey region. Furthermore, the convex rank-size distribution of settlements from the period suggests that regional control may have been distributed among a number of smaller centers. Artifacts from sites dating to this time period indicate that ties to the Tuxtlas and to central Veracruz may have also become more important at this time. On the other hand, evidence for occupation postdating A.C. 1200 is scarce. Again, settlement survey is hampered by a lack of well-defined ceramic diagnostics that date to this period.

The four surveys conducted to date on the south Gulf Coast indicate variability in settlement patterns. Despite this variation, however, there are general trends. One includes the Cotaxtla and La Mixtequilla regions, while the second links the Tuxtlas with the Coatzacoalcos area.

Occupation predating 900 B.C. is not well represented in either the Cotaxtla or La Mixtequilla regions. Current data indicate that population levels increased steadily from the Formative through the Middle Classic Period. After around A.C. 600 occupation in the Cotaxtla region decreased significantly, but at the same time parts of La Mixtequilla experienced new construction and aspects of the material culture became increasingly elaborate. This latter process could be related to increasing competition for status positions (see e.g., Stark et al. 1992: 225) or simply to population redistribution, with groups from Cotaxtla moving into La Mixtequilla. After approximately A.C. 1200, there was increased interaction between both the Cotaxtla Basin and La Mixtequilla and highland Mexico. The bulk of the evidence points to contact with the Puebla-Tlaxcala region for the Middle Postclassic and with the Triple Alliance (i.e., Tenochtitlan, Texcoco, and Tlaco-

pan) towards the end of the Postclassic (Curet, Stark, and Vasquez Z. 1994; Annick Daneels, personal communication, 1994).

The evidence from the Tuxtlas and Rio Coatzacoalcos surveys indicate a somewhat different picture. Early Formative occupation was comparatively more common near Maticapan and around San Lorenzo. Occupation in the Tuxtlas grew slightly between 1000 and 400 B.C., whereas settlement in the Coatzacoalcos Basin apparently declined during the same period. The first half of the Classic Period saw a dramatic increase in occupation in the Tuxtlas, while the area around San Lorenzo was virtually abandoned. After A.C. 650 in the Tuxtlas population levels declined, a pattern that continued into the Postclassic. At about the same time the Coatzacoalcos River valley experienced renewed growth in site number and population. This occupation involved an increase in the amount of mounded architecture constructed and a material culture suggesting increased interaction with south Gulf Coast groups to the west. Finally, although Conquest-period occupation is documented from both areas (e.g., Scholes and Warren 1965; Stark 1978), neither region produced much evidence for contacts with central Mexico.

This patterning suggests that there were ties between the Tuxtlas and the Coatzacoalcos River valley throughout the archaeological sequence. Much of the Formative Period pottery recovered from the Tuxtlas is comparable to ceramics from San Lorenzo, indicating interaction between the two areas. The major difference between the two regions concerns the degree of sociopolitical complexity. For example, monumental sculpture is common at San Lorenzo, but it is not in the Tuxtlas survey region. Indeed, no monumental sculpture has been reported for any sites we have surveyed to date, although local informants report recovering basalt "baby heads" from Maticapan.

The drop in population in the Coatzacoalcos River valley at the beginning of the Classic coincides with the period of population buildup in and around Maticapan, while the loss of occupation in the Tuxtlas in Late Classic times occurs approximately when population levels rise in the Coatzacoalcos region. This suggests that some of the growth that we observe in the Tuxtlas during the Middle Classic involved immigration from regions like the Coatzacoalcos River valley, with emigration to areas SE of the Tuxtlas later occurring in Late Classic and Early Postclassic times. In fact, the ceramics that Coe and Diehl (1980) describe as Late Classic from San Lorenzo are very similar to Middle Classic materials from Maticapan. Fine Orange is present in copious amounts at both sites, and similar vessel forms are represented in the two assemblages.

The lack of evidence of contacts with central Mexico in

Late Postclassic times is probably attributable to the fact that the Tuxtlas and Coatzacoalcos regions either were not conquered by the Triple Alliance or had been only very recently incorporated into the Aztec Empire before the Spanish Conquest. Although it is true that the Aztecs never established an enclave in the Tuxtlas, one was founded at Tochtepec in SE Oaxaca (Chapman 1957). It is therefore clear that major polities in the Basin of Mexico had great interest in initiating and maintaining contacts with the south Gulf Coast. Unfortunately, the reasons for this difference in enclave location are uncertain at present.

We recognize the preliminary nature of the results from the surveys discussed here. At the very least, the data suggest considerable variation in system scale and configuration through time. Even given these preliminary findings, however, it is certain that no one part of the south Gulf Coast is entirely representative of developments that occurred throughout the region in prehispanic times. In addition, there is no evidence that the south Gulf Coast ever constituted a “mega-state” during the Classic Period. Thus, we agree with the observation of Stark et al. (1992: 225) that several distinct polities likely coexisted during the Classic Period on the south Gulf Coast. These polities undoubtedly varied greatly in size, but none apparently were comparable in scale and internal complexity to those headed by Teotihuacan, Tula, and Tenochtitlan in Central Mexico. Indeed, we would go a step further and extend this characterization to the earlier Formative and later Postclassic periods.

It is also important to realize that many of the changes in settlement pattern and system organization were probably not only the product of political and economic forces external to the south Gulf Coast. Although central Mexican and Lowland Maya interests certainly affected the south Gulf Coast, politico-economic dynamics within and between local systems probably played at least as large a role.

Concluding Remarks

The Tuxtla Mountains have a long history of prehispanic occupation. The archaeological record begins in Early Formative times and lasts until the Spanish Conquest. Most settlements in the Early Formative Period were situated in the vicinity of Maticapan, whereas most sites throughout the remainder of the Formative were located farther downstream in the lower Rio Catemaco valley. The Classic Period settlement pattern involved a substantial occupation in both areas, while the corridor from Laguna Catemaco to the Gulf of Mexico never had substantial settlement at any time during the archaeological sequence. This difference in settlement focus was probably due to the

differential agricultural productivity of the two areas. The Gulf Coast Corridor is the least productive agricultural zone today, and our evidence suggests that it also was in the past. At the same time, the shift in settlement pattern from the upper to the lower Rio Catemaco valley from Early to Middle Formative times was probably due to a series of volcanic events, which covered the area around Maticapan with significant amounts of ash, thereby facilitating the downward movement of water in the soil profile, greatly reducing agricultural productivity there.

Another series of volcanic events from the same series of cones near Maticapan also took place in the Classic Period. These ash falls had minimal impact on settlement patterning in the region. This difference was due to two factors. First, the ash deposits from Classic Period contexts at Maticapan are much thinner than those in the Formative Period deposits, suggesting that the later eruptions were less severe. Second, it was during the Classic Period when the state had finally emerged as the primary political structure in the area. Because state-level systems generally dominate fairly large areas, Maticapan probably had the capacity of harnessing labor and energy on a much larger scale in comparison to the Formative Period, thus mitigating the effects of the volcanic hazard on the local level.

Two cycles of population growth and decay are present in the Tuxtlas. The first took place in the Early Formative and continued through the Late Formative Period, after which population levels declined substantially. The second began in the Early Classic, peaked in the Middle Classic, and endured into the Postclassic. It also involved a much larger occupation compared to the Formative. The first cycle was probably the result of indigenous growth. Population levels then were not all that substantial, especially given the fact that there is evidence of agricultural populations in the region as early as the third millennium B.C. and growth from period to period after 1400 B.C. was slight.

The second cycle began with the establishment of a central Mexican presence at Maticapan in late Early Classic times, which later was extended throughout a large part of the region. The extreme rate of increase from the late Early Classic to the early Middle Classic suggests immigration from areas outside of the Tuxtlas, with a region such as the Coatzacoalcos River valley being a likely candidate for the source of some of this population. Some of it may have also been derived from Teotihuacan, although we lack conclusive information on this point at present. This major period of demographic growth is associated with a significant expansion in Maticapan’s craft industries, especially ceramics production. The later decline, in contrast, may be due to progressive decreases in agricultural production in the region’s most productive zones after centuries of very

intensive land use, combined perhaps with yet another series of ash falls. On the other hand, the withdrawal of central Mexican interests in the Tuxtlas during the Late Classic probably had little impact on this decline, although the collapse of Maticapan's major craft industries and those in its hinterland also may have been a factor.

Recent settlement surveys conducted in the Tuxtlas have expanded our knowledge of the archaeological record in the region. These surveys involved a general reconnaissance of a 400 sq km part of the region, plus more intensive surveys at 19 specific sites. The results reported here pertain mainly to the extensive survey, which has provided information on general patterns of prehispanic settlement and their archaeological characteristics. The degree to which our findings are entirely representative of patterning throughout the region still remains to be seen since a general reconnaissance of all of the Tuxtlas has yet to be conducted, and our analyses of the intensive surveys are still in progress. Continuing research in the region should greatly help to resolve this problem.

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