

THE EMERGENCE AND DEVELOPMENT OF
CHIEFLY SOCIETIES IN THE RÍO PARITA VALLEY, PANAMA

by

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University of Pittsburgh, 2004

Having contributed to early definitions of chiefdoms, the pre-Columbian societies that developed in the Central Region of Panama during the last millennium before Spanish contact in A.D. 1515 have been considered by many specialists in cultural evolution to be archetypes of ranked societies. This investigation was designed to examine the emergence of chiefly societies and evaluate current models used for interpreting the development of social complexity in Panama. It was necessary, first, to determine when social ranking emerged and then to explore how specific sociopolitical and economic factors influenced the development and operation of pre-Columbian chiefly societies up to the time of European contact. The strategy adopted in this study focused on a regional settlement survey, documenting 1700 years of social change in a 104 km² area of the Río Parita Valley of central Panama.

At no time during the pre-Columbian occupation in the valley did population levels come even close to carrying capacity, so demographic stress on subsistence resources, or leading to conflict, does not appear to have been an important factor in chiefly emergence. Although the presence of warfare could not be substantiated from the survey data, status rivalry and warfare is mentioned with some regularity in the ethnohistoric accounts and was most likely present during the pre-Columbian period. The location of the main chiefly center 14 km from the coast in low fertility land does not support the idea that controlling subsistence production was crucial to elite power. On the other hand, ethnohistoric accounts describe chiefly larders full of subsistence goods, suggesting that mobilizing these goods was important to the development of social ranking. By A.D. 550, the standardization of craft goods and their wide distribution throughout the Central Region implies the existence of macro-regional exchange networks. Settlement changes in the Río Parita Valley at the same time suggest that local, regional, and macro-regional exchange was most likely involved in the emergence of chiefly societies; however, the lack of long-distance trade goods found in the Río Parita and other valleys in the Central Region does not indicate that long-distance trading was a foundation of elite power.

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PREFACE

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1. THEORETICAL BACKGROUND

It is all very well to theorize blandly about “chiefdoms incorporating different microenvironments,” about “cross-mountain trade in luxury items,” and about “inter-community belligerence.” Here and there we can dig out data to justify our points of view, but to do so we frequently have to resort to the archetypal cemetery sites like Sitio Conte, which have been ignored over the last decade as we have concentrated almost exclusively on subsistence materials. The next phase of research should be based on the valley-wide survey, well designed from the statistical point of view, well supported by environmental monitoring programs, and by identifying and sampling the whole range of available sites, not just shell mounds, shelters, and midden deposits with bones. (Cooke 1984a:301)

Having contributed to early definitions of chiefdoms (Steward and Faron 1959:224-231), the pre-Columbian societies that developed in the Central Region of Panama during the last millennium before Spanish contact in A.D. 1515 have been considered by many specialists in cultural evolution to be archetypes of ranked societies. In fact, characterizations of Panamanian chiefdoms have exerted considerable influence over specialists’ interpretations of chiefdoms within the Neotropics (Creamer and Haas 1985; Drennan 1991; Earle 1987, 1997; Helms 1979; Linares 1977; Marcus and Flannery 1996:100; Redmond 1994a, 1994b; Roosevelt 1979) and in other areas of the Americas (Blitz 1993:15, 19; Emerson 1997:4; Pauketat 1997:45; Welch 1991:12, 14). Two groups of data currently provide most of the information about the nature of Panamanian chiefdoms: [1] descriptions recorded in early sixteenth-century Spanish documents, which include both eye-witness accounts of the soldiers who subjugated the chiefdoms, such as Pascual de Andagoya and Gaspar de Espinosa (Andagoya 1865, 1994; Anghiera 1912; Espinosa 1994a, 1994b; Jopling 1994; Oviedo 1853, 1944, 1995), and [2] mortuary remains, i.e., human skeletons and associated mortuary arts, particularly those excavated in the 1930s and 1940s at the Sitio Conte site (Briggs 1989; Hearne and Sharer 1992; Lothrop 1937, 1942; Mason 1941, 1942).

Both groups of data attest to the existence of strong wealth disparities: it is clear that a few adult males were extremely opulent, that there was a middle tier of important people, and that the rest of the population was considerably poorer (“commoners”). At the apex of the social hierarchy were paramount chiefs (*quevis*), followed by lesser chiefs (*sacos*) and warriors (*cabras*); it is also clear that war captives (*pacos*) were enslaved and formed the lowest of the social classes (Helms 1979:12-14; Linares 1977:76-77; Lothrop 1937:22; Sauer 1966:239). Although Lothrop thought that the Sitio Conte cemetery represented the last 200 years of pre-Columbian occupation, recent archaeological research indicates that it, in fact, is more likely to date between A.D. 750 and 950 (Cooke, et al. 2000:172). The few groups of mortuary remains that pre-date Sitio Conte, and some that are contemporary with them, are thought not to

be indicative of strong wealth differentials but rather social portioning based on age and occupation (Briggs 1989; Cooke, et al. 2003a; Díaz 1999; Ichon 1980).

Some archaeological surveys have used the size distribution of sites across specific sectors of Panama as proxies for social ranking (Cooke and Ranere 1984, 1992a; Hansell 1988; Ichon 1980; Linares and Sheets 1980; Linares, et al. 1975; Weiland 1984). These surveys have associated an increasing demographic nucleation in some fertile valleys as a response to population growth and the intensification of agriculture (Linares 1977:70). This investigation focuses on the Río Parita Valley where a similar population clustering occurred. It is not known, however, which processes led to the development of large nucleated villages in this valley, or to the emergence of a socially ranked chiefdom by Spanish contact. Thus, the goals of this project are to improve our knowledge about the emergence and development of chiefdoms prior to the sixteenth-century and the nature of the archaeological record at the time of contact.

CHIEFLY SOCIETIES IN PANAMA

Initial Spanish interest in indigenous Panama was fueled by fabulous tales of wealth; the lust for gold and gaining favor of the royal court led to impressive, yet destructive, military campaigns. The brutality of the conquistadores was so appalling that the chronicler Oviedo wrote “there is not space or time to express wholly that which the Spanish did to devastate the Indians and rob them and destroy their lands” (1944:III:143; translated in Roosevelt 1979:91). The ethnohistoric record for Panama describes pre-Columbian societies as being quite diverse—ranging from small settlements with little disparity in wealth to loosely integrated macro-regional polities (Andagoya 1865, 1994; Balboa 1994, Espinosa 1873, 1994a, 1994b; Las Casas 1986; Oviedo 1853, 1944, 1995). The Spanish described societies from central Panama as politically and economically well organized with hereditary leaders that had a preoccupation for internecine conflict and the acquisition of gold. These chiefdoms put up a fierce resistance to the invading Spanish. In A.D. 1515, the conquistador Badajoz was ambushed and trounced by Chiefs Parita and Escoria, who were defeated, in turn, by Espinosa in A.D. 1516-1517 (Sauer 1966:261). In less than 20 years after Columbus had made landfall on the Atlantic coast of Panama, the Spanish had conquered the chiefdoms around the Parita Bay from their newly established base of operations at Natá (Sauer 1966:120-146; Figure 1.1).

The wealth and power wielded by some chiefs is confirmed by ethnohistoric descriptions of sociopolitical hierarchy and elaborate burials. Descriptions of social ranks (elites, commoners, and slaves) and sociopolitical relations between leaders involving dominance, alliance, and tribute have been used to

support the existence of highly complex societies in central Panama (Helms 1979:59-60). Individual rank and wealth is best documented by Espinosa's (1994b:63-64) account of Chief Parita's funeral, which has been described by several authorities (Cooke and Bray 1985; Cooke, et al. 2003a; Lothrop 1937:46). Upon sacrilegiously removing the burial shroud, the conquistadores beheld the body covered in gold armor, dress, and ornaments, which they took away with other caches of gold totaling over 400 pounds (Lothrop 1937:8). Many of these descriptions have been instrumental in attracting archaeological attention to Panama and have provided a critical source of analogy for its interpretation.

The quantity of gold, precious stones, textiles, tools, weapons, ornaments, jewelry, and elaborate ceramic vessels in the Sitio Conte graves (A.D. 750-950 [Cooke, et al. 2000, 2003a]; Figure 1.1) have made them the most renowned in Panama, if not Central America (Hearne 1992:3; Linares 1977:34). Lothrop (1937:115, 133, 159) cautiously suggested that metal helmets, greaves, and plaques, which he excavated at the site, were indicative of high status. More recently, Briggs' (1989:137) cluster analysis of the Sitio Conte graves demonstrated that there were 26 types of mortuary objects that could be identified as sumptuary or costume goods, including those suggested by Lothrop. The similarities between Chief Parita's funeral dress (Espinosa 1994b:63-64; Lothrop 1937:46) and the mortuary objects recovered from Sitio Conte have been used as support for projecting the evidence of contact period "chiefdoms" back in time 1000 years (Cooke 1984a; Cooke, et al. 2000:168; Linares 1977:72; Roosevelt 1979). In fact, Drennan (1995:323) posits that "Central Panama provides one of the firmest points of connection between the archaeological record and an ethnohistorical record very strongly emphasizing the wealth and ostentation of 16th century chiefs as well as endemic warfare between neighboring chiefdoms or even chiefly factions within a single polity."

Inferences about the level of complexity attained by prehispanic societies from the Central Region have varied from describing them as loosely integrated ranked societies (Cooke and Ranere 1992a:296-297; Linares 1977:76; Steward and Faron 1959: 225), having an intermediate position of stratification (Helms 1979:20 based on Sahlins' [1958] Groups IIa, IIb) with some degree of paramountcy (Creamer and Haas 1985: 746; Helms 1994:59; Redmond 1994b:39), and incipient states (Roosevelt 1979:71, note 9; see Webster 1997 for a similar debate for the Classic Maya). Clearly, rank and status were advertised in the Central Region through the differential use of sumptuary goods and regalia, different types of rituals, and restricted access to labor and resources. Although it appears from Spanish accounts that three social classes existed (elites, commoners, and slaves), Sauer (1966:239) claims that the Spanish were translating Native Panamanian social organization into their own terms.

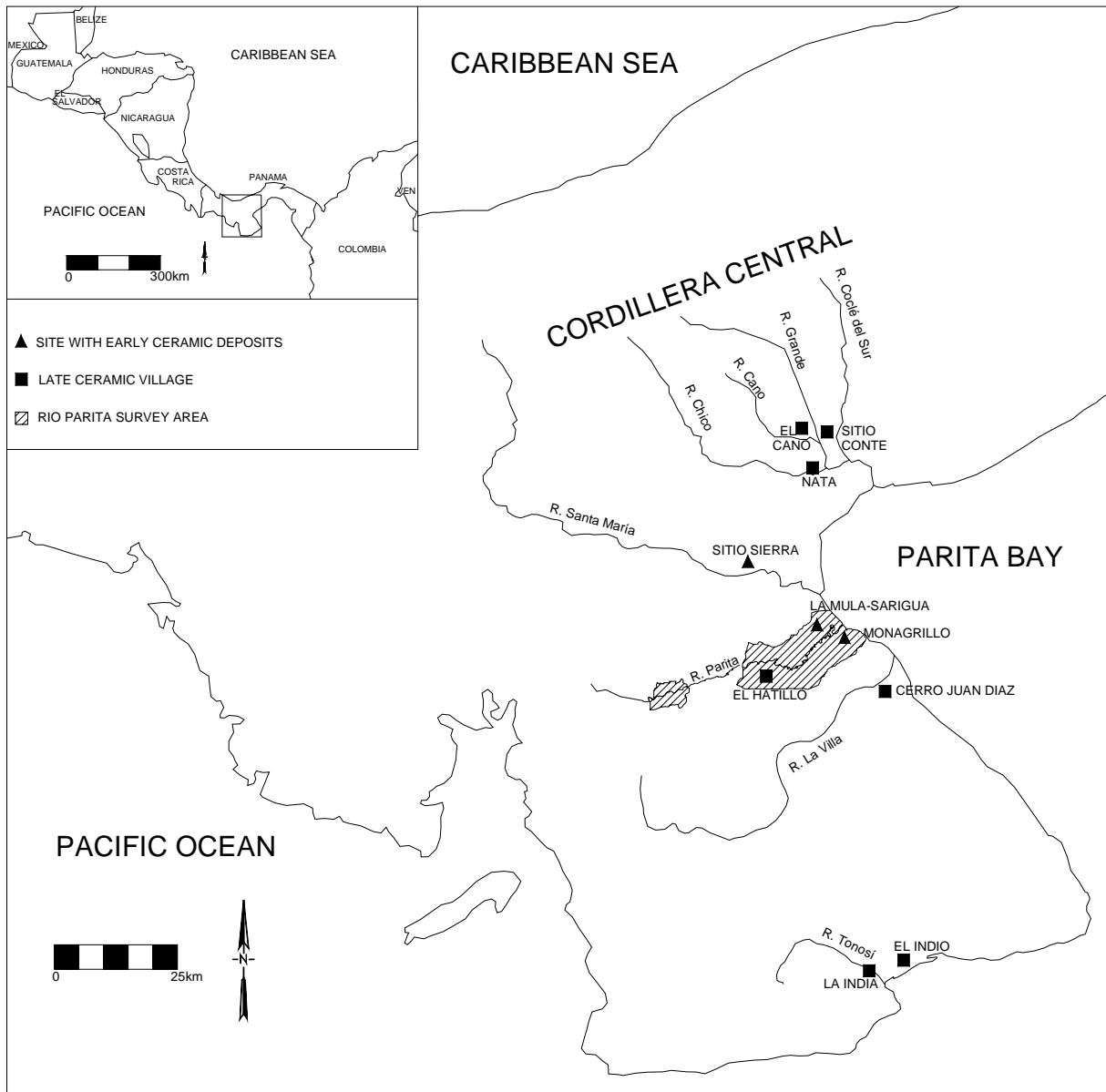


Figure 1.1. Central Region of Panama with the archaeological sites mentioned in the text (After Lange and Stone 1984:Figure. 1.1 and Linares 1977:Figure 3).

Linares (1977:31) describes societies from the Central Region as “typical ranked-societies, neither completely egalitarian nor markedly stratified,” as there appears to have been much fluidity within these social groupings and it is not clear to what extent individuals were ascribed to them. For example, though prowess and loyalty in battle, commoners could improve their social situation by achieving the lesser elite rank of *cabra* (Andagoya 1994:30; Helms 1979:32). Slaves appear not to have been born slaves, but were captured on the battlefield and put to work or executed (Linares 1977:74).

There is no indication of what would be considered wealthy children from the Central Region suggesting that wealth was not inherited; status, on the other hand, appears to have been ascribed (Cooke, et al. 2003a:136). This situation accords with the “classic” definitions of chiefdoms and ranked societies. Service (1962:159) noted that rank in chiefdoms was based on social and political conditions, not economic. Likewise, Fried (1967:109-110) assigns sumptuary goods of a ranked society a social role based on status and rank, not to be treated as wealth. The absence of “wealthy” infant burials most likely reflects the degree of politicking and achievement that is necessary for many elites in obtaining and maintaining their position (Drennan 1991:280). The acquisition of wealth, however, appears to be most associated with status for elite males. Lothrop (1937) and Briggs (1989) demonstrated that there was a gradient of artifact ranks in the Sitio Conte burials, which supports the ethnohistoric accounts describing male social ranking (Espinosa 1994b:63-64; Lothrop 1937:46; Cooke, et al. 2003a:136).

In summary, even though there is disagreement as to the exact level of social complexity attained by these societies, most scholars agree that some individuals were able to amass much wealth and power in a society divided by social ranks where slaves represented the lowest position. Linares (1977:75) states that the degree of flexibility of this system explains the “great emphasis on fighting and property.”

MODELS OF CHIEFLY DEVELOPMENT IN PANAMA

Recent models for the development of Panamanian chiefdoms involve different sociopolitical, economic, and ideological factors. One of the goals of this investigation is to examine, evaluate, and to contribute to these models in an attempt to better understand the development of chiefly societies. Interpretations for the rise of chiefdoms in Panama are difficult to separate into discrete models, as there are many parallel viewpoints. Although there is disagreement concerning what factors should be emphasized in the emergence and development of ranked societies, it was possible to organize these ideas into three models, based on differing interpretations and use of archaeological and ethnohistorical information.

The ethnohistorian Helms (1979, 1992, 1994) argues that long-distance contacts for the acquisition of esoteric knowledge were critical for establishing political power, as opposed to economic gain. Archaeologists (Cooke 1984a; Cooke and Ranere 1984, 1992a; Cooke and Sánchez 1997, 2000; Hansell 1987, 1988; Linares 1977) claim that control and exchange of local resources was a main factor in securing sociopolitical authority. A third model, focusing on warfare as the key in the development of chiefdoms from autonomous societies, derives from a comparison of tribal and chiefly societies in South America and Panama (Carneiro 1970, 1981, 1990, 1998; Redmond 1994a, 1994b; Steward and Faron 1959).

The Control of Esoteric Knowledge Model

Helms argued that Panamanian elites who acquired “esoteric” knowledge mainly through long-distance exchange in prestige items with societies from modern Colombia, participating in regional elite exchanges within the Central Region of Panama, and conducting external warfare, had an edge in maneuvering into positions of political power (Helms 1979:31-34). It was this edge that allowed aspiring elites to obtain and maintain their high status by employing “a combination of various interpersonal associations, including consanguineal and affinal bonds, rewards for valorous military service, and defeat and incorporation of rivals” in order to forge ties with sub-chiefs in connecting a “hierarchy of command and political responsibility” (Helms 1994:55). Her model accords well with the concept of wealth finance and the network strategy (at least in Blanton, et al.’s [1996:4] and Earle’s [1987:296] analysis of ideological control) and parallels Frankenstein and Rowlands’ (1978:76-77) prestige goods economy model, but rather than being strictly about items of wealth, long-distance goods provided a means for chiefs to profess wisdom and to sanctify their power (Helms 1979:176).

Helms (1979) envisions the acquisition of esoteric knowledge to be a hands-on affair for pre-Columbian elites who would travel to foreign lands returning with powerful information and objects. This model is linked directly to the Kuna, a modern day indigenous group in Panama, who augment their prestige through travel and education from afar (Helms 1979). Not all scholars, however, agree with Helms. Langebaek (1991a) attributes the Kuna’s desire for foreign knowledge to historical contact with European nations and, thus, he questions using the Kuna as an analogy for ethnohistoric and prehistoric societies. He does correctly note, however, that this does not disprove that long distance trade and obtaining esoteric knowledge were important in the development of an ancient chiefly elite. Cooke (1984b), however, notes that in recent times, Kuna treks made to acquire special ritual or medicinal knowledge focused on other Kuna communities situated on the opposite side of the mountains, rather than on people with different languages and customs.

The connection between ethnohistoric and prehistoric chiefdoms and the Kuna is not a new endeavor. Although Lothrop (1937), based on a sensible analogy at the time, was the first to postulate a connection between Sitio Conte and ethnohistoric chiefdoms, it was Steward and Faron (1959:224-231) who were convinced that the Kuna were the modern descendants of the prehistoric inhabitants of the Central Region. Linares (1977:78) pointed out that this is an indemonstrable proposition because the majority of ethnohistoric chiefdoms were quickly dismembered by the Spanish and there is scant information in the contact-period documents about language or other ethnically sensitive facets of life. Several chroniclers indicate that particular territories (e.g., Chirú, Natá, Escoria, Esquegua, and Parita) had their own form of speech at contact, but it is impossible to determine degrees of historical relatedness among them. For this reason, although some scholars have proposed some sectors of the pre-Hispanic Central Region population are the direct descendants of the “Guaymí” of Veraguas, Chiriquí, and Bocas del Toro, who speak two recently diverged, but mutually intelligible languages (Cooke and Ranere 1992a; Linares 1977:78, 1980b:11-12); others have questioned these associations (Johnson 1948; Young 1971:45).

The Control of Local Resources Model

Archaeologists working in Panama (Cooke 1984a; Cooke and Ranere 1984, 1992a; Cooke and Sánchez 1997, 2000; Cooke, et al. 2003a; Hansell 1987, 1988; Linares 1977) place far less emphasis on long-distance trade in explaining the appearance of ranked chiefly societies in Panama than does Helms. They suggest that, based on inequalities in access to and use of locally or regionally available resources, the development of local resource control was the primary cause of early social inequalities in the Central Region of Panama and the acquisition of long-distance prestige goods is relegated to a secondary role. Towards the end of the first millennium B.C., population growth and environmental degradation led to increasing constraints on available resources, which, with the appearance of increasingly productive crops and new technology (metates, polished axes—for clearing the gallery forests; Ranere 1992:34), would have provided opportunities for differential access to these resources and, in turn, status and wealth (Cooke and Ranere 1992a:273-275, 297).

Limited and scarce resources include gold ores (Cooke and Ranere 1992a:297; Cooke, et al. 2003a), lithic raw materials (Hansell 1988:220), and arable land (Linares 1977:70). Although these resources are quite dissimilar, their differential distribution across the landscape would have made them easily controllable. For example, La Mula-Sarigua, the earliest nucleated settlement in Panama (~200 B.C.), is situated near prime agricultural land, estuarine and marine resources, and a large chert outcrop (Figure 1.1). Hansell (1988:130) claims that this “may well have provided its large population with access to and control of a variety of spatially restricted resources.” Cooke and Ranere (1992a:292), however, think it

was more likely that the exchange of coastal and inland resources was organized along kinship lines rather than controlled by a few individuals.

Although proponents of this model relegate long-distance exchange to a lesser role in the development of chiefly societies, they do acknowledge that local, regional, and macro-regional exchange between elites and commoners possibly created unequal sociopolitical relationships in the Central Region. Based on ethnohistoric descriptions of central places serving as markets for local and regional exchange (Espinosa 1994a:49) and ethnographic descriptions of indigenous ritual ceremonies (the *balsería*; Torres de Araúz n.d.; Young 1971, 1976), Cooke and Ranere (1992a:282-284-285; Cooke, et al. 2003b:10), Hansell (1988:247-253), Linares (1977:71-73), and Sánchez (Cooke and Sánchez 2004:I:36-37, II:30-31) suggest that exchange and feasting allowed sociopolitical opportunities for corporate groups. The *balsería* is a ritual exchange ceremony practiced by the modern Native Panamanian Ngöbé (a Guaymí group), but was recorded as early as the seventeenth century by Fray Adrian de Ufeldre (1682; Torres de Araúz n.d.:5; Young 1971:204, 1976, 1980a). It involved three days of ritualized warfare between two communities where combatants would throw balsa wood sticks at each other. Throughout the “games”, much feasting and drinking of chicha occurred, following which, the fourth, and last, day was reserved for the exchange of crafts and goods (Torres de Araúz n.d.). In order to organize a *balsería*, it was necessary for the host group to mobilize much labor and resources (Young 1971:208, Table 22, 1976:44).

Archaeologically, there is data to suggest that local and regional exchange in subsistence resources and utilitarian artifacts had a long history in the Central Region, going back at least to 5,000 B.C. (Cooke 2004; Cooke and Ranere 1992a). As trade and exchange increased in volume, it is possible that local and regional exchange networks emerged focusing on specific settlements as described for Natá (Espinosa 1994a:49) and Veragua on the Atlantic coast (Lothrop 1950:4). Oviedo (1944:VIII:23) noted that when the Cueva-speaking peoples of eastern Panama were not fighting, they were involved in trading and feasting. Periodic ritual and exchange ceremonies (similar to the *balsería*) might have served to further the political aspirations of certain corporate groups (Cooke and Ranere 1992a:282, 297; Cooke and Sánchez 2004:I:36-37, II:30-31; Cooke, et al. 2003a, 2003b; Hansell 1988:251).

The interplay of local and regional exchange and control of subsistence production, important to the Control of Local Resources Model, is similar to models proposed for other areas of the Americas. For example, by controlling the regional trade and manufacture of greenstone axes, Moundville elites were indirectly involved in the local subsistence economy, as these stone axes were used for clearing agricultural land in the Black Warrior River Valley (Welch 1996). Cooke and Ranere (1984:12) have suggested a similar proposal for central and western Panama. Archaeologists have found quarries of black igneous stone in Chiriquí and in the Central Region where there is evidence for intensive manufacture of axe-blanks (preforms), which in their final form were used for clearing forests, hollowing out canoes, and

other wood working activities (Cooke, et al. 2003a:114-115; Griggs 2000; Ranere 1980a:122; Sheets, et al. 1980:405). This suggests control of this raw material could have been important in controlling subsistence and other activities.

The general idea of this model is that external stresses created an unstable social and economic environment that led to increased local and regional exchange and resulted in sociopolitical posturing by certain corporate groups (Cooke and Ranere 1992a:287). This was a long indigenous process occurring in an area that was, more or less, culturally stable for 2,000 to 7,000 years (Cooke and Ranere 1992a:247; Ranere and Cooke 1996). This model would fit in with descriptions of staple finance (D'Altroy and Earle 1985) and the corporate strategy (Blanton, et al. 1996) in regard to elite involvement with agricultural production, but it does not fit with Blanton, et al.'s (1996:2) model of power being shared across different sectors of society. Based on ethnohistoric accounts and the Sitio Conte burials, scholars agree that Panamanian chiefdoms were individually centered with intense status rivalry (Cooke 1993; Drennan 1991; Helms 1979, 1994; Linares 1977; Redmond 1994b; Roosevelt 1979).

The Warfare Model

Indigenous groups from the Northern Andes and Central America have been described by many scholars as warlike (Carneiro 1981, 1990; Lothrop 1937; Oberg 1955; Redmond 1994a, 1994b); an idea that was the basis for Steward and Faron's (1959:202) designation of "militaristic chiefdoms" for South America. Through her analysis of Neotropical tribes and chiefdoms, Redmond (1994a, 1994b) emphasizes the role conflict and demographic change had as catalysts for the emergence of hereditary leadership (see also Carneiro 1970, 1981, 1990, 1998; Steward and Faron 1959); control of esoteric knowledge and the control and exchange of agricultural products and local resources were secondary. The ability to wage war and defend from it, build alliances, and participate in regional exchange networks was a primary avenue for aspiring leaders to acquire material wealth and prestige (Redmond 1994b:118; Steward and Faron 1959:202). Environmental and social circumscription, resulting from population growth, would have produced increased tensions, and the need for leadership in warfare became more frequent and permanent, and, over time, temporary leadership was transformed into a chiefly office (Redmond 1994b:129). According to the Warfare Model, the emergence of warfare and the development of social complexity was a combination of external stress (conflict) and internal sociopolitical politicking (see Spencer 1993).

Helms argues that control of esoteric knowledge was the key factor in the development of chiefdoms and that long-distance trade and warfare were the means to that end, whereas, for Redmond (1994b), elite exchange and ritual sanctification were outcomes of securing political positions of leadership in war (Carneiro 1990:209). The Warfare Model conforms to the characteristics of Blanton, et al.'s (1996)

network strategy, but Redmond (1994b) sees warfare as the main cause of sociopolitical change and not as a result of individually centered exchange relations as suggested by Blanton, et al. (1996:4).

EMERGENCE OF SOCIAL RANKING

The emergence of chiefly societies in Panama has been supported by the existence of large sites that might have been chiefly residences (Breece 1997; Cooke 1993; Cooke, et al. 2000) and the settlement hierarchies these imply (Cooke 1984a; Cooke, et al. 2000; Hansell 1988; Linares 1977; Linares and Sheets 1980; Linares, et al. 1975; Weiland 1984), large structures and public space for ritual and storage activities (Carvajal, et al. 2004; Cooke and Sánchez 1997; Cooke, et al. 1998; Desjardins 2000; Ladd 1964; Linares, et al. 1975; Verrill 1927), and mortuary data (Briggs 1989; Bull 1965; Cooke, et al. 2000; Lothrop 1937; Mason 1941, 1942). In addressing the nature of social ranking, burials, displaying differential distribution of scarce or luxury items, have provided the most tangible evidence for wealth and status.

Based on the excavations at Sitio Conte, most scholars working in Panama consider A.D. 700 as the critical date for the emergence of ranking in the Central Region (Briggs 1989; Cooke 1984a; Cooke and Ranere 1992a; Cooke, et al. 2000, 2003a; Linares 1977); however, there is less consensus on the nature of earlier societies. If it is our intention to address the emergence of hereditary inequality, then, we must draw our attention to the phases preceding A.D. 700. Determining when chiefly societies emerged in the Río Parita Valley focused on site size, settlement hierarchies, site functions, site location in relation to resource areas, and burial data obtained previously by professional and amateur archaeologists in the survey area.

This investigation focuses on the effect that five factors, each playing an important but differing role in the three major models, had in the development of Panamanian chiefdoms: demography, warfare, long-distance exchange, local exchange and craft production, and control of subsistence resources. Assessing their roles and relative importance to social change in this prehistoric sequence provides a direct route toward the empirical evaluation of the three models. In order to understand how these factors influenced the emergence and development of chiefly societies, it is necessary to determine their presence, timing and intensity. If a factor played an important role there must be, not only evidence of its operation, but also that evidence must precede the changes in social organization thought to result from it.

Demography

Population growth, leading to social circumscription, is an initial component of both the Control of Local Resources and Warfare models, but in discussing the Control of Esoteric Knowledge Model, Helms (1994:57) disavows the existence of population pressure and its role as a catalyst for the development of social complexity. For Redmond, the increased frequency of warfare is contingent on population growth and environmental and social circumscription. Population growth resulted in decreased resource availability, increased conflict between groups, and an increased need for military leadership. In the Control of Local Resources Model, population growth coupled with environmental degradation may have resulted in constraints on available resources and allowed for opportunities to establish differential access to these resources (e.g., arable land and lithic, coastal, and estuarine resources) (Cooke and Ranere 1992a:297). Helms (1994:57), on the other hand, does not think that competition between polities involved access to subsistence resources or was caused by population pressure, as there is little mention in the ethnohistoric accounts suggesting that elites were involved in controlling the subsistence economy.

During the first millennium B.C. in the Central Region of Panama, the absolute number of archaeological sites diminishes while population gravitates towards the colluvial bottomlands where some large sites had developed during the period of manufacture of the La Mula pottery, i.e., SA-27 near Santiago, Sitio Sierra, la Mula-Sarigua, Cerro Juan Díaz, and Búcaro (Cooke 1979, 1984a, 1998a:101; Cooke and Ranere 1992a; Hansell 1988; Ichon 1980; Weiland 1984). It should be noted, however, that coastal sites were present before 200 B.C. (e.g., Cerro Mangote, Zapotal, Monagrillo), although not as large, and it is not clear if the emergence of these large nucleated villages was a result of upland migration or the result of productive subsistence resources and new technology allowing substantial local growth (Cooke 2004). Determining absolute demographic estimates for prehistoric Panama (Cooke 1979, 1998a; Cooke, et al. 2003b; Dahlin 1980; Linares and Sheets 1980) has been a difficult task as ethnohistoric accounts are vague or contradictory (Espinosa 1864:488, 1873:41-42; Oviedo 1944:VIII:9), indigenous population was decimated during Spanish contact (Castillero Calvo 1967, 1995; Cooke, et al. 2003b; Sauer 1966:283-289), and domestic structures are a rare find archaeologically (but see Cooke 1979; Isaza 1993; Spang and Rosenthal 1980). Investigations in Panama (Cooke and Ranere 1992a; Hansell 1988; Ichon 1980; Isaza 2004; Linares 1977; Linares, et al. 1975; Ranere and Cooke 1996; Weiland 1984), however, have demonstrated convincingly that the trend of demographic nucleation was a process that started early, increased dramatically around A.D. 500, and continued up until the sixteenth century where ethnohistoric accounts suggest large populations centered in river valleys and adjacent floodplains (Espinosa 1994a:48, 53, 1994b:65, 68).

Warfare

With the vivid ethnohistoric descriptions of internecine conflict, it is not surprising that warfare, although incorporated differently, is an important component of all three models. Helms (1994) regards warfare as a vehicle for status and prestige rivalry; the motivation for warfare was not to acquire new lands to be placed under cultivation, but to further the political aspirations of individuals by acquiring slaves, war booty and access to trade routes (Helms 1994:57). This claim is based on the redundancy of resources between different river valleys (Helms 1979:33-34). On the other hand, the Control of Local Resources Model characterizes warfare as an outcome of population pressure and, subsequently, differential access to limited resources. Linares (1977:31) proposed that in the relatively dry environment of the Central Region of Panama, survival depended on controlling, defending, and acquiring agricultural lands. Likewise, Redmond (1994a, 1994b) suggests that population growth would have increased social tensions resulting in open conflict. The main difference between these two models is that with differential access to resources, the Control of Local Resources Model places equal emphasis on co-operation between communities in the form of exchange and trade (Cooke 2004; Cooke and Ranere 1992a), whereas Redmond focuses strictly on conflict.

Archaeological evidence for prehistoric warfare has not been easy to come by, as the ethnohistoric accounts would suggest. Ichon (1980) identified several Río Tonosí Valley settlements on the tops of hills suggesting their location focused on defense. Sculpture from western Panama and El Caño depict what have been argued to be slaves or decapitated victims (Linares 1977, Linares, et al. 1975; Cooke, et al. 2000, 2003a). Likewise, many gold figurines represent twin-warriors with trophy head necklaces and weapons (i.e., atlats). The striking similarities between the weapons, dress, and mortuary rank described for Sitio Conte and sixteenth-century burials suggest that the ethnohistorically recorded style of warfare can be pushed back in time to A.D. 700 (Briggs 1989; Cooke 1984a; Cooke, et al. 2000, 2003b; Drennan 1991; Ichon 1980; Linares 1977). The emergence of chiefdoms, however, occurred much earlier, thus, in order to determine the role warfare played in the development of social ranking, earlier phases need to be examined (see Redmond 1994b:130-131).

Long-Distance Exchange

Long-distance exchange is of critical importance to the Control of Esoteric Knowledge Model, since the goods acquired from long journeys were connected to foreign religious, ideological, technical, and geographic knowledge. Despite the loss of autonomy, Helms (1979:77) suggests that lesser chiefs in “marginalized” areas would have made alliances with the more “central” chiefdoms to partake in the acquisition of these trade goods and, consequently, esoteric knowledge. In support of her argument,

Helms (1979:60) notes Chief Parita's territory was adjacent to an important long-distance trade route that enabled him to gain the support of nearby chiefs who were farther removed from this line of communication. In the Warfare Model, the acquisition of esoteric knowledge through long-distance interaction was a way to increase a chief's authority and prestige, yet only once social ranking had been established and not before (Redmond 1994b:123).

Following Sauer (1966:276-277), Helms (1979) proposes that many of the Panamanian gold objects found in archaeological contexts and those described by ethnohistoric accounts were manufactured in Colombia and directly brought to the Central Region of Panama. In contrast to this claim, other scholars (Cooke 1984a; Cooke and Ranere 1992a:285; Cooke and Sánchez 1997; Cooke, et al. 2000, 2003a; Linares 1977:71) assert that the stylistic similarities between chronologically dated ceramics and metal artifacts, sources of Panamanian gold ore, and some evidence of manufacture all reflect local production, rather than long-distance acquisitions.

The Control of Local Resources Model assigns long-distance exchange only a minor influence on establishing differential social status. Even though cross-cordilleran exchange is demonstrated by carved manatee bone at He-4 and Sitio Conte (Bull 1968; Cooke, et al. 2003a:114; Ladd 1964:270; Lothrop 1937:170; Mitchell and Acker 1961:Plate XI:k) and ethnohistorically with gold ores being exchanged for finished textiles (Oviedo 1944:VII:7), most of Sitio Conte's prestige goods, thought to have been long-distance imports, are actually from the immediate environs of the site (Cooke and Ranere 1992a:285). Additionally, this exchange occurred between people in culturally homogenous zone (Cooke 1984b; Cooke, et al. 2003a:138), and not between culturally distinct peoples as suggested by Helms (1979).

Local Exchange and Craft Production

Both the Control of Esoteric Knowledge and the Warfare Models consider exchange of prestige goods between local elites as an important mechanism for alliance building, whereas exchange in utilitarian goods was less regulated and not critical to the development of status and wealth. Economic interdependence, thus, is not a necessary condition for political and military integration in the Warfare Model as trade between autonomous settlements is seen more in sociopolitical than in economic terms (Redmond 1994b:121). In contrast, the Control of Local Resources Model asserts a more direct association between political leadership and economic exchange and specialization.

Standardization of lithics and ceramic wares has been a primary source of evidence for economic specialization and of regional exchange networks. Hansell (1988:245) places the emergence of specialization, at least part-time, at the end of the first millennium B.C. It may have been the result of participating in a regional exchange network in which chipped-stone tools, dried and salted fish, and possibly salt, were traded from the coastal village of La Mula-Sarigua to inland sites for polished axes,

manos and metates (Hansell 1988:248-250). Likewise, increased standardization and geographic range of artifact styles during the Cubitá ceramic phase (A.D. 550-700) are used to support the claim that socioeconomic interaction throughout the Central Region of Panama had intensified—implying that control of local resources, specialization, and exchange in a regional network contributed to the emergence of chiefly societies (Cooke and Sánchez 1997, 2000; Cooke, et al. 2000; Sánchez and Cooke 1997; cf. Drennan 1991:282-284). Archaeologists have speculated about craft specialization in the Central Region (Cooke 1984a; Cooke and Ranere 1992a; Cooke and Sánchez 1997, 2000; Hansell 1988; Mayo 2004; Ranere and Cooke 1996), yet there is little evidence to suggest whether it was part of the domestic economy, a village specialization, or if it involved independent artisans.

Sixteenth century accounts of Natá state that it served as an exchange center, where coastal inhabitants would trade fish and crabs for maize (Espinosa 1994a:49; Linares 1977:73) and cotton mantles were traded across the cordillera for gold ores (Oviedo 1944:VII:7). Oviedo (1944:VIII:23 In Linares 1977:73) remarked that the main items traded at Natá were salt, maize, salted fish, spun and unspun cotton, blankets, hammocks, and gold. Based on Espinosa's descriptions of extensive salt production facilities, abundant fisheries, and hunting grounds in Natá's territory, Linares (1977:73) proposes that Chief Natá "controlled or had access to several micro-environments yielding products," which would be exploited by traders who then would exchange these products at Natá—a redistributive center (Espinosa 1994a:49). Trading outside of the chiefly territory might have been regulated through the chief himself (Linares 1977:73). Thus, individuals or groups located at important exchange nodes could have profited from local or regional trade, possibly regularized through hosting ritual and exchange ceremonies; as hosting *balsería* "games" is a traditional path to leadership in modern Guaymí society (Young 1971:204-212, 1976:51, 1980a:227).

Control of Subsistence Resources

Helms does not see elites as being heavily involved in the organization of subsistence activities as production and distribution of basic subsistence goods was a concern of individual domestic groups, or *cabras* "the lowest and least permanent of elites" (1994:56). Regular tribute collection is not mentioned in ethnohistoric accounts, but commoners were required to perform corvée labor and war captives provided free labor on the chief's personal lands (Helms 1994:57). Although it is not definitively known whether chiefs controlled commoner farmlands, chiefs would award warriors (*cabras*) land in exchange for loyal military service (Redmond 1994b), suggesting that control of agricultural land was an important avenue for sociopolitical maneuvering. Demographic expansion and the control of agricultural land and estuaries is a main underlying dynamic of the Control of Local Resources Model. By controlling different

ecological zones, chiefs located at redistribution centers could have controlled the trade of important subsistence resources (i.e., maize, game, dried and salted fish, salt).

The major change in human settlement, at the end of the first millennium B.C., was the emergence and proliferation of agricultural villages within the river valleys of the Central Region (Cooke 1998a:101; Hansell 1988:248; Linares 1977:10, 31; Piperno and Pearsall 1998). The introduction of stone axes at this time may have made it possible to clear the nutrient-rich, but forested, river valleys for more productive agriculture (Cooke and Ranere 1984:12). In the first millennium A.D., the genetic and ecological development of maize and its diversification could have made this staple crop more productive; however, it is not known how it affected, or was affected by, demographic concentration in the alluvial bottoms (Cooke 1998a:101). It does appear that population was increasing and continued with agricultural intensification, which resulted in a decrease in available resources and created opportunities for social or corporate groups to control and limit access to these resources (Cooke and Ranere 1992a).

SUMMARY

In summary, then, the Control of Local Resources Model would be supported by evidence for control of agricultural and estuarine lands, local exchange and craft production, and population nucleation in the alluvium before or at the same time as the emergence of chiefdoms and, afterwards, strong population growth with a continued reliance on intensified maize agriculture (Cooke and Ranere 1984:16). Although direct identification of the control of esoteric knowledge is extremely difficult in a regional settlement survey (or, for that matter, excavation), the material manifestations of long-distance exchange and warfare before or at the time of emergence of chiefly societies are the primary factors in evidence that would support this model. The identification of elite involvement in agricultural production, however, would argue against the model presented by Helms (1979, 1992, 1994). Strong population growth and evidence of warfare before or contemporaneous with the emergence of chiefly societies would support the Warfare Model. Although warfare is the prime variable, the co-presence of long-distance and local exchange in prestige goods would also support this model.

In reality, the development of chiefly societies is much more complex than the simplistic contrasts between these models as have been presented here. Some of the mechanisms from different models, of course, could have been complementary. For example, Helms (1979:34) suggests that chiefdoms situated far from long-distance trade routes could have used ritual exchange ceremonies (*balsería*) to obtain scarce goods, and esoteric knowledge, from elites who were tied into long-distance trade networks. Helms, thus,

suggests a similar process to the emergence of social ranking as in the Control of Local Resources Model, but focused on the exchange of long-distance, rather than local goods. It is entirely possible that specific factors important to different models could turn out to be influential in the rise of chiefdoms and, thus, the models would need to be revised.

Investigations into the development of Panamanian chiefdoms have focused on ethnohistoric documentation (Cooke 1993; Helms 1979, 1992, 1994; Roosevelt 1979; Sauer 1966), a few spectacular archaeological finds, such as the necropolis of Sitio Conte (Hearne and Sharer 1992; Lothrop 1937; Mason 1942), and on more systematic archaeological inquiries (Briggs 1989; Carvajal 1998; Cooke and Ranere 1984, 1992a; Cooke, et al. 1998, 2000, 2003a, 2003b; Díaz 1999; Hansell 1988; Ichon 1980; Isaza 2004; Linares 1977; Linares, et al. 1975; Linares and Ranere 1980; Mayo 2004; Sánchez 1995). In addressing the emergence of chiefly societies and the nature of the sixteenth-century archaeological record, it is necessary, first, to determine when social ranking emerged and then to explore how specific sociopolitical, economic, and environmental factors influenced the development and operation of pre-Columbian chiefly societies up to the time of European contact. The strategy adopted in this study focused on a regional settlement survey, documenting 1700 years of social change in a 104 km² area of the Río Parita Valley of central Panama (Figure 1.1).

2. METHODOLOGY

It is our contention that the surficial distribution of artifacts constitutes an appropriate source of archaeological data independent of subsurface remains. As long as surface distributions contain patterned information that is analytically separable from postdepositional pattering, they are useful data. (Dunnell and Dancey 1983:270, original emphasis)

Chiefdoms must be seen as regional societies and should be studied within a regional framework (Drennan 1995:309; CICARP 2003:98). Thus, in order to address how the political economy of pre-Columbian Panama emerged and developed, investigations of long temporal sequences at the regional scale are necessary. Yet the majority of research has been site-specific excavations, and few archaeological inquiries in Panama have examined the development of chiefly societies at a regional level (Cooke and Ranere 1984:4). Notable exceptions, however, include Linares and Ranere's (1980) regional survey and excavations in western Panama, Cooke's (1972) survey of the Natá area, Cooke and Ranere's (1984, 1992a; Weiland 1984) survey of the Río Santa María drainage in the Central Region of Panama, Drolet's (1980) investigations along the Atlantic coast, Ichon's (1980) examination of the Río Tonosí Valley, and recent work done in the western canal watershed (Griggs 2000; Griggs, et al. 2003). The current study was designed specifically to address sociocultural evolution at the regional level and the Río Parita drainage system is ideal for examining models of chiefly development since there are both archaeological and ethnohistorical data pertaining to this area.

The term Central Region, as used in Panama, was defined by the distribution of ceramic and lithic artifacts sharing a similar style and technology with the eastern boundary determined by Cueva linguistic affiliation at A.D. 1520 (Cooke and Ranere 1992a:248). This spatial unit, however, does not equate to a "region" as it was proposed by Willey and Phillips (1958:19-20), but rather an archaeological "subarea" (1958:20-21). In this investigation, "region" is defined as a spatial unit that is larger than an individual community and, thus, containing many communities whose inhabitants participated in regularized sociopolitical and economic relationships, which might correspond to an individual polity. The use of "Central Region," on the other hand, refers to a larger spatial unit that includes many regions that shared similar artifact styles, iconography, and technology, which was integrated sociopolitically and economically, but with less frequent interaction as communities within a single region. That being said, a region can, but does not have to equate to past sociopolitical unit; the usefulness of the region is to examine settlement patterns on a scale above that of the community (or site) (Johnson 1977).

Archaeological information in the Río Parita Valley comes from purposive regional survey and site-specific excavations and survey (Cooke and Ranere 1984; Hansell 1988; Ladd 1964; Weiland 1984; Willey and McGimsey 1954), which has produced one of the longest temporal sequences for Panama. Prior archaeological investigation has detected sites dating to the Paleoindian (La Mula-West at 11,200-10,000 B.P. [Cooke and Ranere 1992a:253; Ranere and Cooke 1996:53, Table 3.1, 2003:229-230]) and Archaic Periods (La Mula-Central at 10,000-7,000 B.P. [Ranere and Cooke 1996:53, Table 3.1]), the earliest pottery in Panama (Monagrillo, He-12, and He-18 at 2900-1200 B.C. [Cooke 1995; Cooke and Ranere 1992a; Isaza 1993; Ranere and Cooke 1996:53, Table 3.1; Willey and McGimsey 1954]), the earliest nucleated settlement in Panama (La Mula-Sarigua at 200 B.C.-AD 250 [Cooke 1995:177, Table 14.1; Hansell 1987, 1988; Isaza 1993; Ranere and Cooke 1996:75]), and a large chiefly center (He-4 [Bull 1965; Cooke 1993; Cooke, et al. 2000, 2003a, 2003b; Ladd 1964]) that was likely occupied up to the sixteenth-century A.D. and described in ethnohistorical accounts (Espinosa 1994b:63-65; Figure 2.1). Despite much archaeological investigation, however, no systematic survey of this particular valley had been conducted, and many of the interpretations of societal development could not be fully evaluated.

The Río Parita Valley, additionally, is well known from descriptions of the indigenous societies encountered by the Spanish. Early sixteenth-century documents identify five “chiefdoms” around the Parita Bay and provide some detail about the territories each one occupied. Spanish accounts note that “regional chiefs” (*caciques, principales, señores*) in central Panama controlled “territories” (*provincias*), some of which extended from the coast to the uplands centered along major rivers (Cooke 1993:114; Espinosa 1994b:65-67; Helms 1994:57). Chief Natá’s territory did in fact reach the cordillera; however, the upland areas adjacent to Chief Parita and Escoria territory were controlled by other chiefs (*Usagaña* and *Quema* [Cooke 1993; Helms 1979:59-60]). Ethnohistory suggests that each chiefly territory had a “main town” (*bohío*) where the “regional chief” (*quevi*) would reside, separated 6 to 8 leagues (28-38 km) apart, but with his entourages would move from settlement to settlement within his chiefdom (Helms 1979:53).

One particularly influential chief, named Parita or Antatará, controlled two river valleys in the sixteenth century, the Parita and La Villa, and seems to have exerted considerable influence over neighboring chiefdoms (Cooke 1993; Espinosa 1994b:65-67; Helms 1979:59-60; Sauer 1966:261). Within this area, two large archaeological sites have been identified, each measuring approximately 50-100 ha in total size (Cooke, et al. 2003b:23). Cooke and Sánchez (Cooke 1993; Cooke and Sánchez 1997:61) have suggested that the sites of Cerro Juan Díaz, on the Río La Villa, and He-4, on the Río Parita, may have been the “new” and “old” villages (*bohíos*) of Chief Parita (Figures 1.1, 2.1). Both of these sites contain surface and sub-surface features that suggest ritual and special economic activities (e.g., high-status burials, mounds, and evidence of craft production). In addition, Spanish references to the

Río Parita *bohío* as the “Asiento Viejo” (Espinosa 1994b:65; Lothrop 1937:6, 10; Sauer 1966:261) have led Helms (1979:59) to interpret the Río Parita Valley as the core of Chief Parita’s territory and the southern territory (Río La Villa) as a later acquisition.

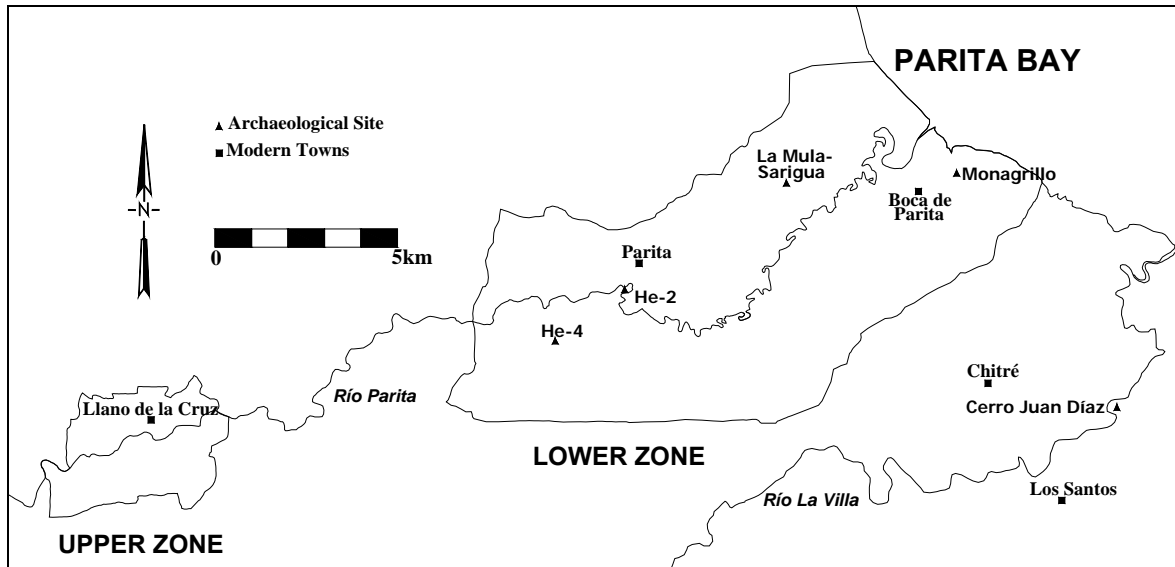


Figure 2.1. Río Parita survey boundaries, modern towns, and archaeological sites.

Recently, Ilean Isaza (Boston University) undertook a pedestrian survey of the Lower Río La Villa addressing specifically the relationship of Cerro Juan Díaz to the immediately surrounding countryside (~40 km²) (Figure 2.1; Isaza 2004). I surveyed the Río Parita drainage, to provide information about the development of pre-Columbian chiefdoms and the relationship between archaeological and ethnohistorical interpretations of the area. The boundaries of the survey area (Figure 2.1) were drawn to include known archaeological sites near the Río Parita and to respond to ethnohistoric accounts of Chief Parita’s territory (Espinosa 1994b:65-66; Lothrop 1937:6, 10; Sauer 1966:261). Additionally, a survey segment (labeled the “Upper Zone” in Figure 2.1), lacking any previous archaeological or ethnohistorical account, was incorporated into this investigation to study environmental and cultural variation in the region. The results from the Río Parita settlement survey complement previous and ongoing regional analyses in Panama with a full-coverage systematic regional survey of 104 km² (Figures 1.1, 2.1).

ENVIRONMENTAL SETTING

River systems in central Panama provided pathways for transportation, nutrient-rich flood plains, estuaries, and large populations of terrestrial game, fish, and shellfish (Carvajal 1998; Cooke and Tapia 1994a, 1994b; Cooke and Ranere 1989, 1999; Espinosa 1994b:65, 68; Linares 1977). Under pristine Holocene conditions, the potential vegetation of this area would be tropical dry forest. After several thousand years of pre-Columbian activities and five-hundred years of livestock raising and extensive agriculture with European tools, the environment is now characterized by forest patches, savannas, and pasture (Sauer 1966:283-289). Today the region is seasonally distinguished by precipitation, but with little change in temperature. The beginning and intensity of the rains along the Parita Bay are very unpredictable year to year, but the majority of rain falls during May to November/early December and it is common to have little precipitation until September. The dry season months, therefore, are the most difficult for agriculture as precipitation is low or non-existent, and many of the streams that feed the rivers are dry or have no flow. Temperature shows little variation throughout the year with an annual average of 27 °C resulting in high evapotranspiration (CATAPAN 1970:II:Appendix 9F; IRHE 1990). The Atlantic coast of Panama, on the other hand, receives almost twice as much precipitation as the Pacific and has fewer restrictions to practicing agriculture (Linares 1977:10; Linares 1980a:67; cf. Stark and Voorhies 1978:1).

The Río Parita has a total drainage area of 575 km² and flows roughly 70 km from a region of piedmont to a coastal plain (Figures 1.1, 2.2; CATAPAN 1970:II:Appendix 9E; Linares 1977:11). A relatively small watershed when compared to the adjacent Río La Villa (1251 km²), and Río Santa María (3315 km²) (CATAPAN 1970:II:Appendix 9E; IRHE 1990), the Río Parita was the locale of concentrated prehistoric occupation. Within the Río Parita watershed, there is a mean annual precipitation of 1683 mm with only 45 mm in the dry season (January to April; CATAPAN 1970:II:Appendix 9E; IRHE 1990). As the rains intensify during the wet season, a rapid transformation occurs—ground vegetation coats the landscape green and the Río Parita, normally no wider than 10 m, swells, overflowing its banks to a width in some areas of up to several kilometers.

The basement geology of the survey zone consists of Tertiary age volcanic rock with numerous locations of intense fractures filled with quartz, chalcedony, and jasper that provided raw material for prehistoric inhabitants (Clary, et al. 1984: 57; Cooke and Ranere 1984). Based on physical processes of erosion and deposition, the survey area was divided into four physiographic zones to facilitate analysis of settlement locations (Figure 2.2). Where the Río Parita meanders into the Parita Bay, mangrove swamps (Figure 2.3) offer a sharp contrast to the barren coastal plain (salt flats). The mangrove-estuary zone (7.3% of the total survey zone; Figure 2.2), characterized by continuous inundation, offers limited

residential opportunities, but a wide variety of resources including large mangrove trees (*Rhizophora* sp.) as wood for construction and fires, estuarine and coastal shellfish and fish, as well as numerous small animals and birds. Since 3,000 B.C., the coastline has been in a stage of progradation, advancing on average 1 m per year (Clary, et al. 1984:65-66) for the Río Santa María delta and upwards of 0.5 m/year towards the southern edge of the Parita Bay (Richard Cooke, personal communication).

The salt flats are aptly named as there is little change in elevation apart from the occasional inselberg (e.g., Cerro El Tigre) and the soil is encrusted with salt deposits (Figure 2.4). The salt flats (10.6% of the total survey zone; Figure 2.2), located on either side of the mangrove-estuary zone, are a desolate area with little vegetation apart from a scrub/thorn brush towards its landward boundary. The present day extent of the salt flats in the survey zone is a recent development evolving about 750 B.C. (Clary, et al. 1984:65, 67; Cooke and Ranere 1984:6; Hansell 1988:27), where fluvial, alluvial, and aeolian processes have created a very active erosional/depositional surface responsible for its overall expansion (Clary, et al. 1984:59-60). Much of the salt flats area, that is not within the protected Parque Sarigua, has been converted into large shrimp hatcheries or salt evaporation pools, further adding to the physical transformation of the zone.



Figure 2.2. Systematic surface collection in the Salt Flats zone within the site boundaries of La Mula-Sarigua (photo by Dean Wheeler).

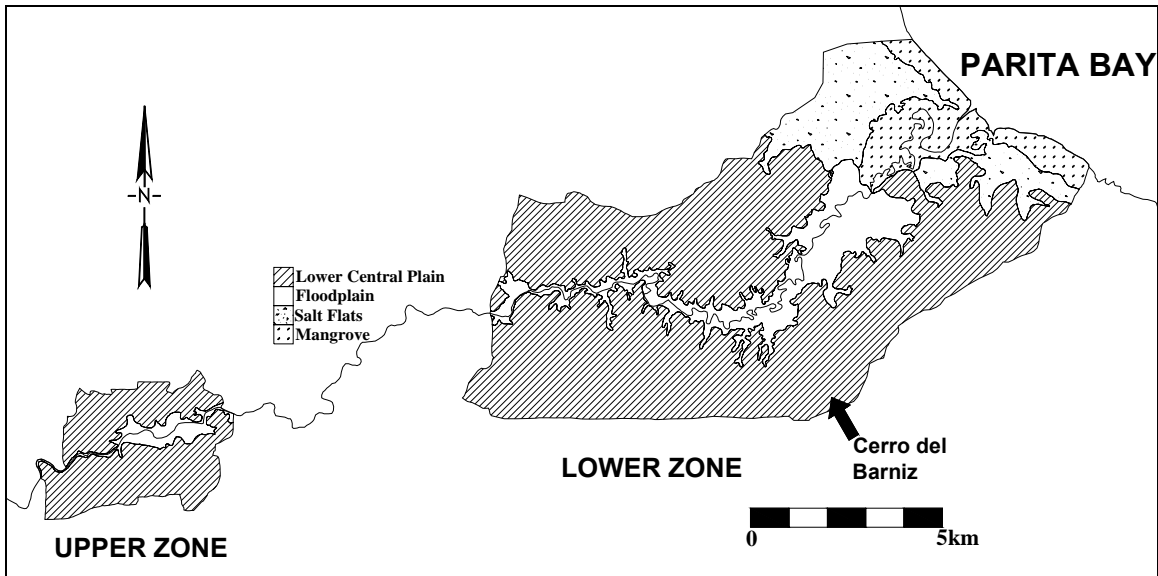


Figure 2.3. Physiographic zones of the Río Parita survey area (after CATAPAN 1970:II).



Figure 2.4. Mangrove-estuary zone during low tide.



Figure 2.5. Río Parita at the beginning of the rainy season.



Figure 2.6. Surveying a plowed field in the Lower Central Plain zone (Photo by Dean Wheeler).

The Río Parita channel (Figure 2.5) incises non-lithified sediments (sand, silt, and clay) as do other rivers that empty into the Parita Bay (Figure 1.1; Clary, et al. 1984:58). With wet season flooding and deposition, the alluvium provides the most fertile soils in the survey area and the Río Parita and its main tributaries are the only dependable source of fresh water during the dry season. Therefore, the floodplain zone (12.4% of the total survey zone; Figure 2.2) provides two essential factors for agriculture—fertile soils and a predictable water source—and as expected, is where the majority of previously recorded sites are located.

The majority of the survey area falls into an ecological zone labeled the Lower Central Plain (69.8% of the total survey zone; CATAPAN 1970:I:309; Figure 2.2) characterized by rolling hills and pastureland (Figure 2.6). Nowadays the zone is used for raising cattle, as agriculture is limited by rainfall, and access to irrigation is determined by proximity to the Río Parita system. Today, it is possible to irrigate using water pumps; however, in prehispanic times, there is no evidence for irrigation (Cooke 1998a:68-69). Pot irrigation could have been practiced, but it would have been very labor intensive, as the river level drops well below the riverbank during the dry season. The lower floodplain of most rivers in the Central Region is heavily inundated during the rainy season and its fertility can be diminished by higher levels of salinity. Thus, the upper floodplains of the Parita Bay's rivers are the most conducive for agriculture. In some areas of the Río Parita Valley's Lower Central Plain, the gentle slopes are interrupted by large hills that were difficult areas for prehistoric settlement (and present day survey); the highest elevation of the survey area is found in the Lower Central Plain reaching 130 m asl on top of Cerro del Barniz (Figure 2.2).

FIELD METHODS

Field methods for the Proyecto Arqueológico Río Parita (PARP) were based on previous regional surveys, recent methodological approaches, and a pilot project conducted in 2000. Although Willey (1953) is usually credited as the progenitor of regional settlement study, the majority of the methods used today in traditional settlement survey were pioneered by Sanders, Parson, and Santley (1979), and the regional studies that influenced the methodology of this project (Blanton, et al. 1982; Drennan 2000; Drennan (ed) 1985; Drennan, et al. 2003a, 2003b; Kowalewski, et al. 1989) were based directly on the work done in the Basin of Mexico. Additionally, methodological refinements developed for survey projects in Colombia (Drennan 2000) and China (Drennan, et al. 2003a, 2003b) were adopted for the Río Parita survey, providing the basis for the quantitative analyses discussed below.

Reconnaissance of the proposed survey area in 2000 greatly facilitated implementing the methodology during the actual fieldwork. The main goals of this pilot study were to ascertain potential artifact densities, assess surface visibility, and determine the feasibility of conducting a systematic regional survey. Most of the survey area consists of pasture or cultivated lands, and the surface during the dry season is highly visible with sparse or no vegetation (Figures 2.6, 2.7). Even well into the 2002 wet season, the surface cover was sparse and surface artifacts easily visible; surface collecting was thus a rapid and effective means of recovering samples. Rather than assessing artifact densities qualitatively (Sanders, Parsons, and Santley 1979:20-30), systematic and general surface collections were used to make more accurate estimates for the Río Parita survey (Drennan, et al. 2003a:23; see Banning 2002:208).

Altogether, the 104 km² were covered using systematic full-coverage survey of the entire zone, allowing for a confident assessment of past occupation (Fish and Kowalewski 1990; Sanders, Parson, and Santley 1979; cf. Banning 2002:167). Full-coverage survey, rather than probabilistic sampling, was proposed to provide detailed data on settlement distribution, spatial relations, and site variability in evaluating the three models for chiefly development (Cowgill 1975a; Wobst 1983). Additionally, full coverage was chosen to offer an additional scale in examining sociocultural evolution in the Central Region of Panama and a different resolution to complement and contrast the use of stratified random sampling by unaligned transects and purposive surveys of key zones by a previous regional settlement project within the confines of the Río Santa María drainage basin (Cooke and Ranere 1984, 1992a; Hansell 1987, 1988; Weiland 1984:31). Settlements are easily delineated in the survey zone as areas of dense surface artifacts surrounded by vacant areas, and the present research is aimed at identifying settlements, settlement densities, settlement hierarchies, inter-settlement conflict, site catchments, and differential craft production at these sites. For this research, then, “traditional” settlement pattern methodology (Fish 1999) is more appropriate than “siteless survey” (Dunnell 1992; Dunnell and Dancey 1983).

Determining the distance to employ between team members in regional survey is a difficult task that involves many different factors (Banning 2002:197-198; Orton 2000:Table 4.1). It is commonly thought that by increasing the distance between team members more territory will be covered, albeit, at the expense of locating smaller sites. It was found that, during the Río Parita survey, smaller distances between surveyors did not increase the amount of time necessary to cover a specific area. It must be remembered that walking is not the only activity of regional survey and smaller distances enabled faster recovery and description of collections and, then, reformation of the survey line. The greater the distances between team members, the more time was needed to congregate and the greater the chance that, not noticing other team members have stopped, a team member would continue walking. The spacing used in this survey ensured that team members were always in visual and audial contact with each other, which

helped to maintain the alignment of the survey line and enabled the expedient collection of surface samples. The distance of 25 m was chosen since this was the smallest diameter of site size found in the Río Santa María survey of the Central Region (Weiland 1984:35); likewise, the smallest site found during the Río Parita survey was 23 m across.



Figure 2.7. Ground surface at He-4 (Photo by Lina María Pineda).

The survey was conducted by two teams (each consisting of one leader and three locally hired workers). Team members walked parallel to each other while maintaining the 25 m distance and examining the surface for archaeological remains (Figure 2.6). The intended survey area for each day was determined by parceling out areas, approximately 1 km² in size, following natural and cultural features on the landscape (e.g., rivers, roads, and topography) to help orientate and align the teams. Although the survey zone is relatively accessible and easily traversed, full coverage meant entering many disagreeable areas (swamps [freshwater, mangrove, and *aguas negras*], thick brush, forested peaks, and pig and chicken farms). Other impediments to surveying included encounters with Africanized bees, ticks, snakes, crocodiles, and other hazardous plants and animals, and the constant crossing of barbed-wire fences. Despite these hindrances, each team averaged approximately 1 km² a day and the survey was completed

in 54 days in the field. Fortunately, surveying private landholdings was not a problem as permission was granted freely, permitting access to the entire survey zone (Figure 2.1).

When the first artifact was found on the surface, the finder would call out and the other team members would continue their pace, notifying others if additional artifacts were located. We avoided stopping and searching the ground surface more carefully after the initial artifact was found in order to standardize collection practices and not to bias the recovery of artifacts—if the first artifact was found walking at a specific pace so should the others. The threshold for undertaking surface collections was three artifacts per hectare; therefore, if three artifacts were not found after 100 m of walking from the location of the initially recovered artifact, the count was terminated and the one or two artifacts were discarded, although, this rarely happened.

After reaching the three-artifact threshold, survey team members spread out and the ground surface was examined more carefully to ascertain the limits of the artifact concentration. If the artifact scatter was less than 1 ha, then just one artifact sample was taken to represent the entire artifact concentration (this area is called the *collection unit*). If it was established that artifacts were distributed over an area larger than 1 ha (the ideal size of a *collection unit*), then the area of artifact concentration was divided into separate units in close approximation to 1 ha in size and each 1 ha collection unit was represented by one sample. Collection units were kept at a maximum of 1 ha to better assess intrasite variability (Drennan, et al. 2003a) and to address some of the recent criticisms of regional survey practices (Dunnell 1992; Dunnell and Dancey 1983). For example, if artifacts were scattered over an area of 2 ha, the area would be divided into two 1 ha collection units and a surface sample would be taken from each, rather than just one sample representing the entire 2 ha. As the survey zone was used for pasture and cultivation, it was usually divided by barbed-wire fences into uniform parcels of around 100 m x 100 m (1 ha). This provided a convenient way to divide multi-collection sites into *collection units* to obtain surface collections. The ubiquity of barbed wire fencing in the survey zone, conversely, entailed crossing a daily average of 60-70 barbed wire fences.

The collection unit is the base for the majority of the settlement analyses for this investigation. For some analyses, however, it was necessary to assign collection units to archaeological sites. Although there are areas of low-artifact density within the survey area, normally, artifacts are concentrated into well-defined clusters separated by vacant areas. Sites for this survey project, therefore, are considered to most likely represent actual prehistoric communities. As will be discussed below, sites, in the Río Parita Valley, do appear to be a meaningful analytical unit and formed the basis of the rank-size and site-size analyses. In the field, an arbitrary distance of 100 m between collection units was the basis for assigning corresponding site designations; collection units greater than 100 m apart, thus, would belong to different sites.

Two types of surface collections were carried out, general and systematic, and the decision depended on the relative abundance of surface remains. General collections were made if artifact densities were equal or less than 1 artifact/m², whereas densities greater than 1 artifact/m² indicated that a systematic collection should be conducted. General collections were performed by all team members, spread throughout the collection unit, and counting out loud until 20 artifacts were recovered, including the original three artifacts, to obtain a representative sample (Drennan 1996a:255-259; Drennan, et al. 2003a:24). On the other hand, systematic surface collections were made in 3 m diameter circles (7.065 m²) in order to standardize artifact-density values (Figure 2.4). The location of the 3 m circle was chosen arbitrarily without knowledge of the immediate area's artifact density in an attempt to avoid only sampling in the densest part of a collection unit. Despite the added weight for surveyors, all artifacts were collected within systematic collection circles. This practice did lead to increasing the number of small, usually unidentifiable sherds, yet it helped to avoid only collecting the most appealing or identifiable artifacts (Hansell 1988:222:Note 5).

If vegetation cover reached conditions where it was almost impossible to see the surface, shovel probes (20 cm x 20 cm x 20 cm) were placed at least every 50 m of poor visibility. Fortunately, the nature of the surface allowed for excellent visibility and few shovel probes (about 50) were need throughout the survey. Watering holes, excavated for cattle, and smaller postholes, for erecting fences, provided surveyors an additional opportunity to identify artifact concentrations. There is a concern that, even with shovel probes, deeply buried sites in the alluvial areas would not be encountered (Banning 2002:41). Overall, sites in the Río Parita survey were not found directly in the active floodplain zone, but, more often, on low rises adjacent to the alluvium. The lack of present day settlement in the active floodplain zone, the presence of prehistoric settlement nearby, and the examination of riverbank exposures suggest that habitation in the past was not focused in this area. That being said, until stratigraphic excavations are conducted the possibility that deeply buried archaeological sites were missed is a potential concern.

After team members completed a collection, the boundaries of the collection unit were drawn on field maps. There is much variability in the type of field maps used in regional survey with the most popular being topographic maps, enlarged air photos (Sanders, Parsons, and Santley 1979), and satellite images (Drennan, et al. 2003a). For this project, electronic versions of available topographic maps for the survey zone were digitized, superimposed and geo-rectified over a corresponding scanned air photo, and, then printed on photographic paper at a 1:10,000 scale (1 cm = 100 m). This scale, in conjunction with a small metric ruler, enabled rapid, yet, accurate drawing in the field of collection units, which were ideally 1 ha in size (100 m x 100 m). The field maps, thus, displayed desirable land features from the air photos and the benefit of digitized elevation and UTM gridlines together on the same map without the bulkiness of using both media. Recording, and later digitizing, of collection units was, therefore, simplified and

expedient. The result of this mapping project produced an electronic representation of the area, identity, and location of every collection unit that was linked to its artifact data through a prepared database in order to conduct the various quantitative analyses of this regional investigation.

Although the majority of lots were used to document surface collections, artifacts that had been gifts or were recovered in a manner different to the research methodology (i.e., comparative collections) were also assigned lot numbers; thus, every collection unit has a lot number, but not every lot number corresponds to a collection unit. The lot forms recorded information about the collection: lot number, associated site number, type of vegetation, surface visibility, and type of collection (see Appendix A). Information about who did the collecting, the day, and the time were noted in order to assess additional biases in sampling procedures. The number of bags and a general idea of the artifacts were listed to facilitate identification in the lab if tags were lost and to help organize collections if any discrepancies arose. Collection units were assigned a different site number when they were at least 100 m apart—a limit arbitrarily chosen to help regulate the process of determining site boundaries. Information including associated lots, UTM coordinates (using a GPS unit), sketch maps and descriptions of any features (mounds, structures and fortifications) visible on the surface, and physiographic information (terrain, surface visibility, soil type, slope, disturbances and preservation) was recorded on a separate site form (see Appendix A). The total number of lots for the Río Parita survey was 1265, which included 14 comparative collections and 14 positive shovel probes, thus, leaving a total of 1237 surface collections where 1017 (82.2 percent) were general and 220 (17.8 percent) were systematic. Additionally, there were 378 sites recorded producing an average of 3.3 collection units per site.

Once collections were obtained, they were returned to the field house in the town of Parita, Herrera Province (Figure 2.1), and the recovered artifacts were later washed and identified (to type, form, and function), measurements were made, and certain diagnostics were drawn and photographed. The four main types of artifact classes that were found in the field were ceramics, lithics, ground stone and shell. Their aesthetically pleasing decoration has made ceramics from the Central Region of Panama well known archaeologically and facilitates the chronological control of archaeological deposits (Figure 2.8). The lithic assemblage consists of a wide range of classes from chronologically datable tools to small debitage (Figure 2.9). Ground stone came in the form of Preceramic and Early Ceramic Period edge-ground cobbles, several types of metates, manos, axes, and miscellaneous tools (Figure 2.10). Artifacts designated as shell included tools, craft production debris, and the remains of consumption (Figure 2.11).

In order to obtain relative dates for collection units, lithic and ceramic artifacts were compared to well-established chronologies for the Central Region of Panama based on stratigraphy, seriation, ¹⁴C dating (Breece 1997; Cooke 1972, 1976a, 1995; Cooke and Ranere 1984, 1992a; Cooke and Sánchez 1997, 2000; Cooke, et al. 2000; Deagan 1987; Hansell 1988; Ichon 1980; Isaza 1993; Ladd 1964; Lothrop

1937, 1942; Ranere 1975; Ranere and Cooke 1996; Ranere and Hansell 1978; Sánchez 1995; Willey and McGimsey 1954; Willey and Stoddard 1954). Comparative collections at the field house and at the Smithsonian Tropical Research Institute (STRI) in Panama City greatly facilitated the identification of recovered artifacts. After laboratory analyses were completed, artifacts from the survey were catalogued and, then, stored at STRI's Cerro Juan Díaz project house, Los Santos, Los Santos Province, Panama.



Figure 2.8. Ceramic sherds from the Conte ceramic phase (A.D. 700-900).



Figure 2.9. Bifacial Thinning Flake < 5,000 B.C. (photo by Georges Pearson).



Figure 2.10. Ground stone: a) axe handle; b) Metate leg.

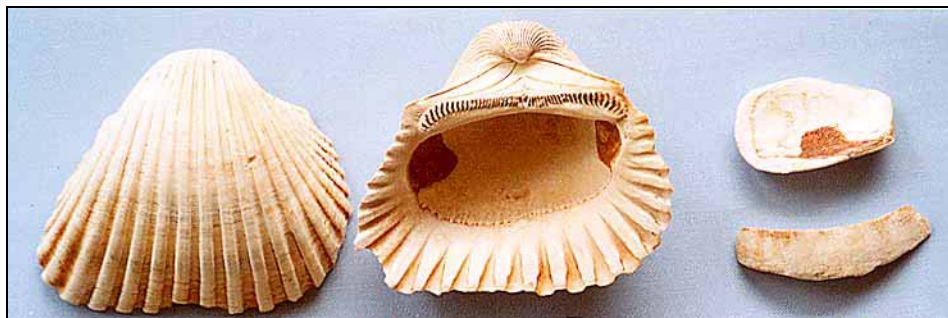


Figure 2.11. *Anadara grandis* found in the inter-tidal, beach, and mangrove-estuary zones (Whole Shell width is 9 cm; fragments on the right are possibly result of craft production).

ANALYTICAL METHODS

The field methods described above are a combination of standard regional settlement study with the addition of recent methodological refinements. In this section the analytical methods that lay the foundation for analyzing the settlement data and specific concerns and biases relating to the acquisition of field data and their study are discussed.

Chronological Framework

The overall chronology for the Central Region of Panama spans almost 11,000 years of indigenous occupation, which, for the scope of this investigation, is separated into two large divisions: the *Early Occupation Sequence* (9200-200 B.C.) and the *Late Occupation Sequence* (200 B.C.-A.D. 1522 [Figure 2.12]). The Early Occupation Sequence is characterized by relatively lower population levels and more ephemeral occupation, whereas the Late Occupation Sequence represents the emergence of permanent and nucleated settlements with increased population and socioeconomic interaction. The results from this settlement survey reveal a similar pattern, as little occupation existed in the zone until about 200 B.C. with the emergence of the formative village La Mula-Sarigua (Figure 2.1). Several different chronologies have been proposed for this part of Panama (Cooke 1976a, 1984, 1995; Cooke and Ranere 1984; Cooke and Sánchez 1997; Cooke, et al. 2000; Hansell 1988; Isaza 1993; Ladd 1964; Lothrop 1937, 1942; Sánchez 1995, 2000; Willey and McGimsey 1954). I have chosen Cooke and Sánchez (2000) for the Late Occupation Sequence as it synthesizes previous work with the addition of recent radiocarbon dates and I follow chronological schemes proposed by Cooke and Ranere (Cooke 1995; Cooke and Ranere 1992a; Ranere and Cooke 1991, 1996) for the Early Occupation Sequence. The vertical scales in Figure 2.12 are proportional to time so that larger boxes represent longer periods.

The Late Occupation Sequence, the focus of this investigation, is one of most refined chronologies in Lower Central America with relatively short phases. Although the divisions in Figure 2.12 are primarily based on ceramic seriation and radiocarbon dating, the temporal boundaries of El Hatillo and Colonial phases rely, also, on historical information. The end of the El Hatillo phase (the beginning of the Colonial Period) coincides with the official founding of the Spanish Colonial town of Natá (Figure 1.1) in A.D. 1522 (Breece 1997:23; Castellero Calvo 1967; Las Casas 1986:251; Anghiera 1912:II:179) and, more or less, the complete subjugation of the Central Region by the Spanish.

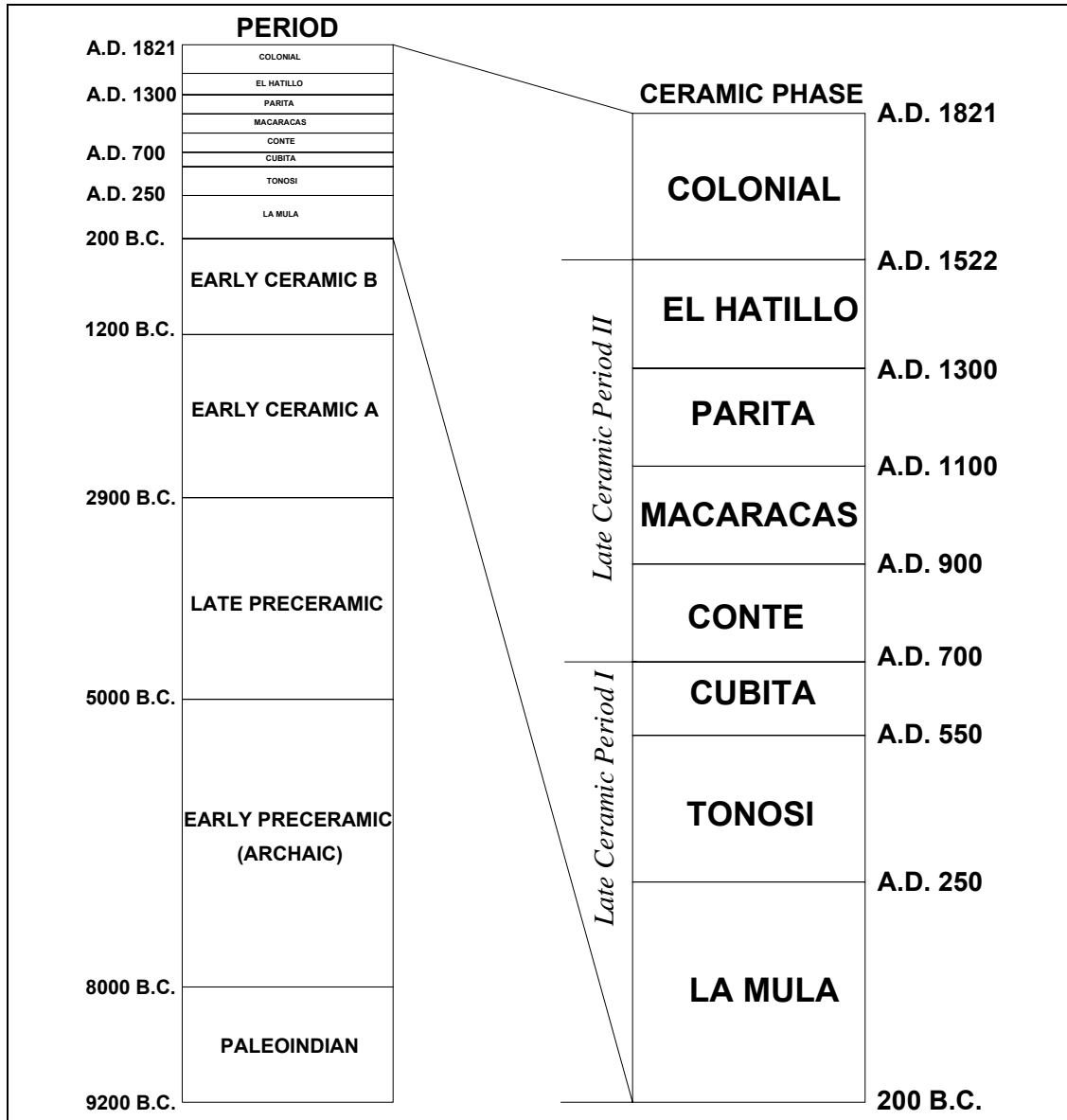


Figure 2.12. Early Occupation Sequence, Late Occupation Sequence, and the Colonial Period.

The exceptional chronological control for this part of Panama greatly facilitated assigning relative dates to the recovered artifacts and their corresponding collection units. Of the 1237 lots with surface collections (collection units), nevertheless, only 694 (56 percent) could be identified chronologically. This might seem an extremely high percentage of unidentifiable collection units, but it is not surprising as shorter transect distances (25 m between team members) increased the chance of encountering smaller sites that, in general, are characterized by more sparse artifact clusters. The majority of these smaller sites were sampled using the “general” method of collecting the first recovered 20 artifacts (and not just diagnostics) in an attempt to account for biases in the collecting procedures. This did reduce, however, the recovery of identifiable artifacts.

A worse case scenario, for example, where at least one artifact from every unidentifiable collection unit might have dated to the Parita phase would result in 21% of the population (DAI/C, discussed below) for this ceramic phase going undetected. Thus, even if we include the not dateable collection units (44% of the total) in the Parita phase population estimate, it would only account for 21% of population going undetected. If these collection units were placed within the context of the entire Late Occupation Sequence, however, only .3% of population (DAI/C) for this time span would be missing. Obviously, some people were left out of population estimates, probably in each phase, but even if all of the unaccounted people were from one phase, the overall conclusions would not be affected much.

One could conclude that reducing the transect distance between team members resulted in the identification of many sites that otherwise would not have been found, yet they added little to the analysis, as the collection units that could not be dated were, normally, the smaller more dispersed surface collections. The risk that these collection units with no dateable ceramics could influence the settlement pattern results is real within the context of one ceramic phase, but when these not dateable collection units are more realistically viewed within a larger span of time, they would have contributed little to the overall population estimates. The 25 m transect spacing appears to have recovered the smallest sites in the survey area, as indicated by the fact that our transects almost never went through any occupied area less than 25 m across.

Some artifacts could not be assigned to a discrete temporal phase, but possessed chronological information that could be assigned to larger periods. The Late Occupation Sequence, thus, was further divided into two parts (Figure 2.12): *Late Ceramic I Period* (200 B.C.-A.D. 700) and *Late Ceramic II Period* (A.D. 700-1522). The Late Ceramic I Period includes any ceramic artifact assigned specifically, or generally, to La Mula, Tonosí, and Cubitá ceramic phases, whereas artifacts that could be identified to the Conte, Macaracas, Parita, or El Hatillo phase or a combination of these phases were included in the Late Ceramic II Period. The Late Occupation Sequence was separated in this manner, between the Cubitá and Conte ceramic phases, as it creates two periods of similar length. As mentioned in Chapter 1, this division

is also thought to correspond to significant changes in the sociopolitical organization of the Central Region with the emergence of social ranking (Briggs 1989; Cooke 1984a; Cooke and Ranere 1992a; Cooke and Sánchez 1997; Cooke, et al. 2000, 2003a; Linares 1977). Although the majority of analyses in this investigation focus on changes between the individual ceramic phases of the Late Occupation Sequence, these larger periods offer a different scale to examine settlement trends.

Variability Observed in Surface Artifact Densities

Although the overall surface visibility within the survey zone was excellent, there is always a concern that the degree of surface visibility has affected the identification and collection of artifacts from the surface (Banning 2002:218; Drennan, et al 2003a; Schiffer, et al. 1978). Before each collection was made, therefore, the surface visibility was assessed and recorded using three categories: “high” (where there was little if any surface vegetation), “medium” (where surface vegetation coverage was < 50%), and “poor” (where surface visibility was seriously impeded by vegetation coverage; usually > 50%). Of the 1237 total collections made in the survey zone (220 systematic and 1017 general), 383 (31%) were made in high, 691 (56%) in medium, and 163 (13%) in low surface visibility.

An examination of the data, as feared, reveals that collections made in low surface visibility had the lowest mean artifact density and those made in high surface visibility had the highest artifact density. As the histograms in Figure 2.13 make clear, however, this difference in means is attributable to a few outliers in the high and medium visibility groups. The vast majority of collections under all visibility conditions have the minimum density value of .5 artifacts/m². The high outliers in the histograms consistently occur in areas of sites where all values (regardless of surface visibility) are unusually high. Thus the density values do seem to be indicating something interesting about prehispanic occupation patterns that is worth retaining in the dataset. The high outliers have thus not been eliminated, and the possibility that an occasional very high value is somewhat depressed because it occurs in a low visibility area seems unlikely to have had much effect either on total population estimates or on recognition of high-density occupation areas.

Density-Area Index (DAI)

Population estimates here are arrived at following an approach developed for settlement study in the Chifeng region of North China (Drennan, et al. 2003b). Reconstructing demography has played an important role in archaeological research at the regional level. More commonly in regional analysis, demographic estimates are determined by examining the number of sites, dwellings (Freter 1997; Hill 1970; Storey 1997), and identifiable sherds (Bettinger 1999), determining site size (Adams 1965), and

analyzing ethnographic or historical census data (Kolb 1985; Sanders 1981). It is useful to examine how some of these different ways of collecting demographic data can affect how estimates are calculated. I have chosen seven methods that are particularly relevant to the demographic formulations for the Río Parita Valley (Table 2.1).

The reliance on just the total number of archaeological sites as the primary analytical unit (Figure 2.14) could mask much variability in the settlement patterns as one large site counts the same as a small site—obviously skewing demographic estimates. As there was an attempt to standardize the size of collection units to no larger than 1 ha in size, the total number of collections (Figure 2.15) may help to circumvent the problem with just using total number of sites. We see in Figure 2.15, overall, a very similar pattern to that produced in Figure 2.14. The transition from Tonosí to Cubitá, however, is a sharper increase and the Conte phase represents a modest dip, rather than an increase. That being said, the rest of the sequence is, more or less, unchanged.

Although relying only on sites would have not been much of a problem, using the number of collections does make a bit of difference, and is probably sounder. Using total area (ha) for each ceramic phase should give us an even more accurate estimate of occupation, since, although collection units were targeted for 1 ha, not all are exactly the same area. Once again the general pattern as seen with total number of sites and collection units is present in Figure 2.16 with only a slight blurring of the distinction between the demographic “peaks” and “valleys” of the Cubitá to Parita phases. Another archaeological approach to addressing demography is to examine the total numbers of sherds for each phase as an indicator of the total amount of garbage produced by people. In using total number of sherds for each ceramic phase, we have a somewhat different representation than before (Figure 2.17). The first part of the sequence is basically the same, yet the Parita phase “peak” is more noticeable.

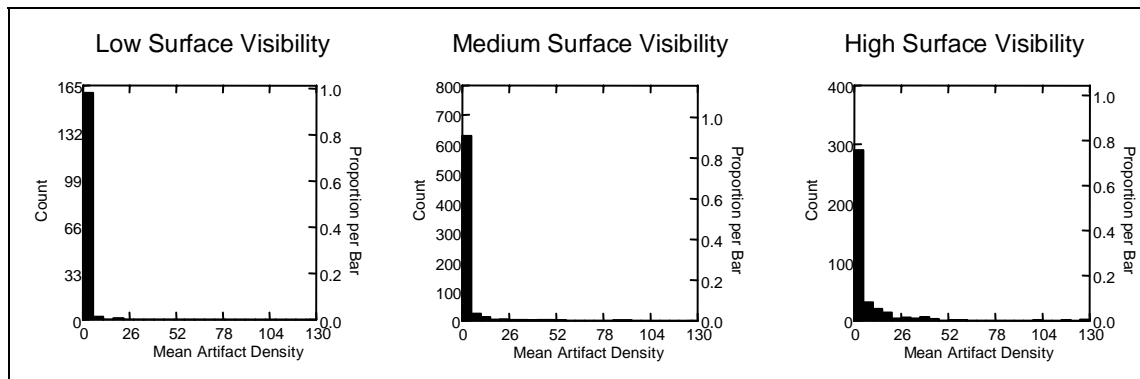


Figure 2.13. Distribution of surface artifact density by degree of surface visibility.

Table 2.1. Various methods of quantifying artifacts in formulating demographic estimates for the survey zone by ceramic phase (after Drennan, et al. 2003b:Table 4.1).

Ceramic Phase	Number of Sites	Number of Collections	Area of Collections (ha)	Number of sherds	Number of Sherds per Century	Density-Area Index	Density-Area per Century Index
La Mula	24	40	33.01	85	18.89	17.08	3.79
Tonosí	33	40	26.82	73	24.33	9.11	3.04
Cubitá	76	135	85.92	250	166.67	34.34	22.89
Conte	81	132	80.73	256	128.00	34.08	17.04
Macaracas	65	118	80.98	226	113.00	34.78	17.39
Parita	95	148	92.94	390	195.00	44.76	22.38
El Hatillo	67	102	66.01	187	84.23	21.89	9.86
Colonial Period	23	26	12.85	300	100.00	14.03	4.68
Late Ceramic I	118	231	150.03	536	59.56	68.86	7.65
Late Ceramic II	221	550	326.36	1855	225.67	221.29	26.92

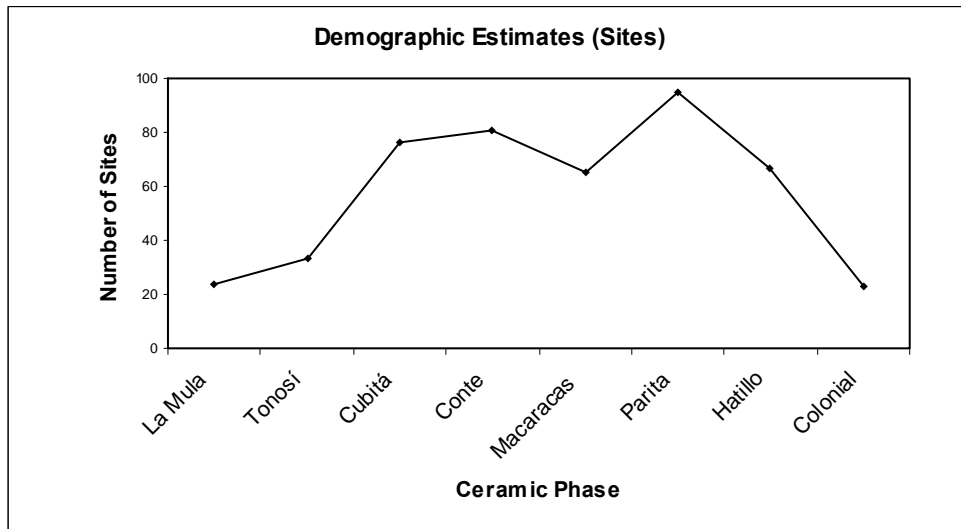


Figure 2.14. Demographic estimates from the total number of sites per ceramic phase.

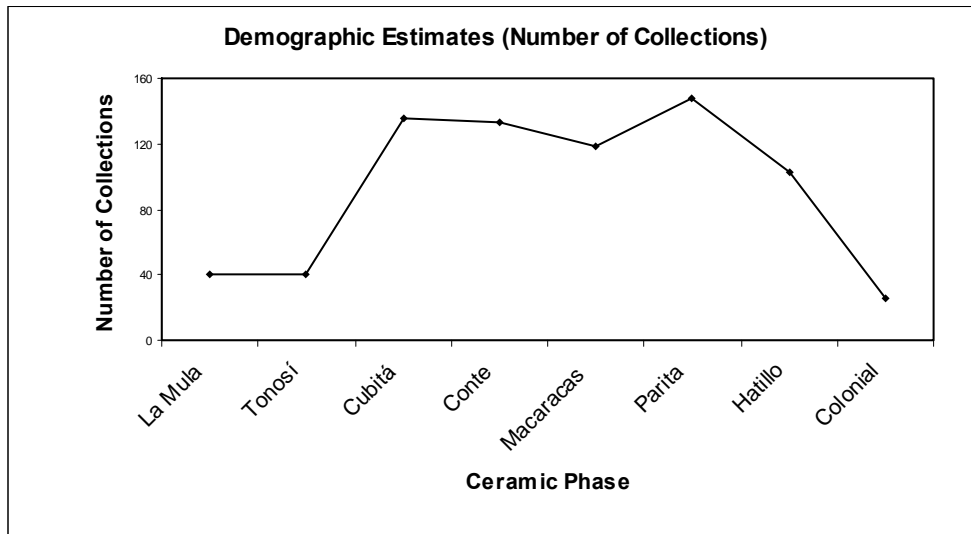


Figure 2.15. Demographic estimates from number of collections per ceramic phase.

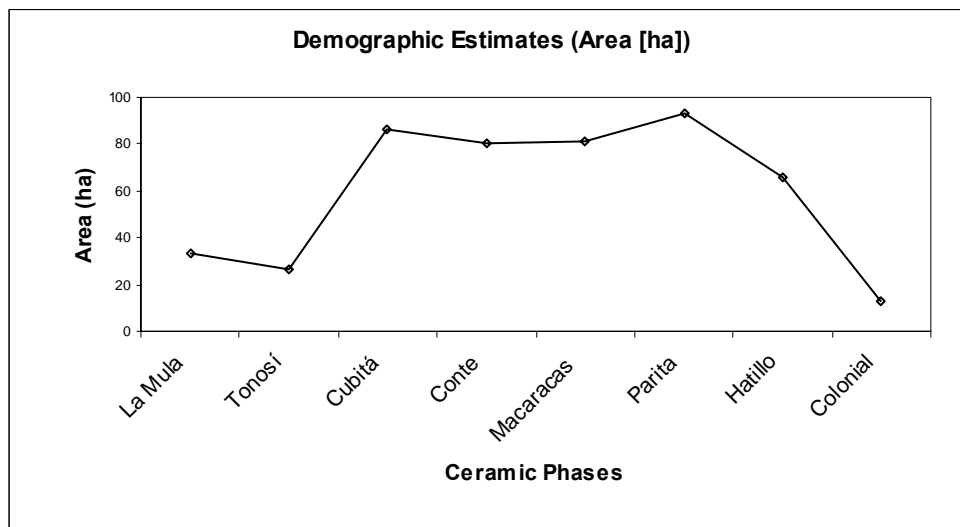


Figure 2.16. Demographic estimates from occupied area (ha) per ceramic phase.

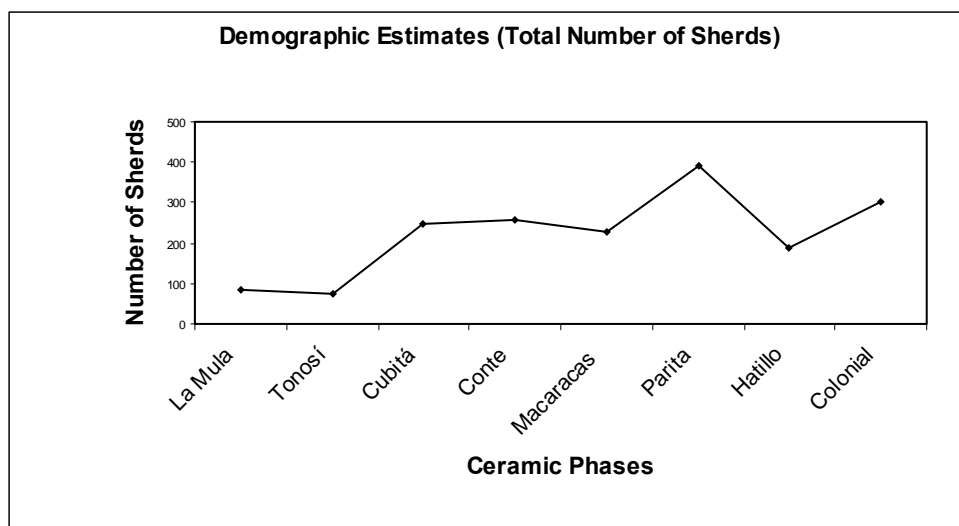


Figure 2.17. Demographic estimates from total number of sherds per ceramic phase.

As Drennan, et al. (2003b:36) point out, using the total number of sherds has a major disadvantage as not all ceramic phases are of equal length (Figure 2.13). In order to create adjusted demographic estimates from total number of sherds, we need to divide the demographic estimate for each phase by its length in centuries (Figure 2.18). When we adjust for length of period the resulting graph (Figure 2.18) is similar to the previous demographic estimates. The dramatic rise of the Cubitá ceramic phase, however, is a noticeable exception.

The methods, discussed above, fall into one of two general categories: occupied area (number of sites and collection units, and total area [ha]) and quantity of material remains (number of sherds and sherds/century). Each method has certain merits in addressing regional demography, but lacks a vital piece of information. What Drennan, et al. (2003b) did was to combine these two variables to produce the Density/Area Index (DAI) that uses the same principle as Sanders, Parsons, and Santley (1979), yet produces a more rigorous and systematic demographic index. If what we are interested in is addressing settlements and their associated populations, it is necessary to combine both variables of area and density (DAI). A 10 ha site that has a density of 100 artifacts/ha will have the same DAI value as a 1 hectare site with a density of 1,000 artifacts/ha, yet, relying only on the area (ha) will mask this similarity implying that the 10 ha site is, in fact, ten times larger demographically. As described above, the exact area of each collection unit from the Río Parita survey was recorded and, depending on the type of collection that was made (systematic or general), we know the density of artifacts within each collection unit; by combining these two variables together, therefore, we come up with the Density-Area Index (Drennan, et al. 2003b).

The demographic estimates from DAI produce Figure 2.19, which is, more or less, the same as the previous figures, but with a sharper transition between the La Mula and Tonosí phases.

Although the DAI addresses many of the concerns inherent in using the other methods, as with total number of sherds, it does not reflect variation in phase length (Drennan, et al. 2003b). When we do adjust DAI values for duration of phase (Figure 2.20), we see a distinct distribution that combines many of the features present in the other graphs of population. The majority of ceramic phases are roughly the same time span (Table 2.1) and the modified DAI (DAI/Century or DAI/C) does not produce huge contrasts, but does account for the minor changes seen in Figure 2.20. The overall pattern displays two “peaks” during the Cubitá and Parita phases separated by a more noticeable “valley” during the Conte and Macaracas phases.

Overall, these different methods produced similar results. This is encouraging as Drennan, et al. (2003b:36) have pointed out that similarities between these different methods suggest that the changes in the graphs are actual demographic changes and not just the result of the vagaries of sampling or other biases already mentioned. DAI/C values, therefore, were calculated for every collection unit with a different value, obviously, for each phase. The units that we have for a DAI/C value could be considered sherd-hectares per m² per century (Drennan, et al. 2003b:38); this is not as easy to conceptualize as say total area (ha), but it is a relative scale and changes in demographic estimates can be easily identified. The DAI/C, thus provides a more accurate measure of occupation than other methods and serves as the basis for site-size and rank-size analyses of settlement patterning in the survey zone. Site-size histograms and rank-size plots, as done by Drennan, et al. (2003a), are usually created from information of the area of occupation (ha), but this does not give us the most accurate data to use in examining demography.

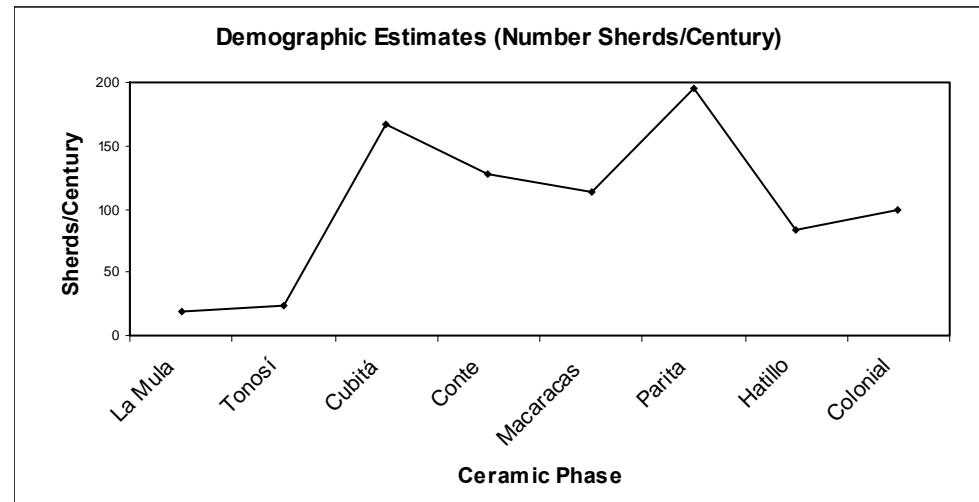


Figure 2.18. Demographic estimates from total number of sherds/century per ceramic phase.

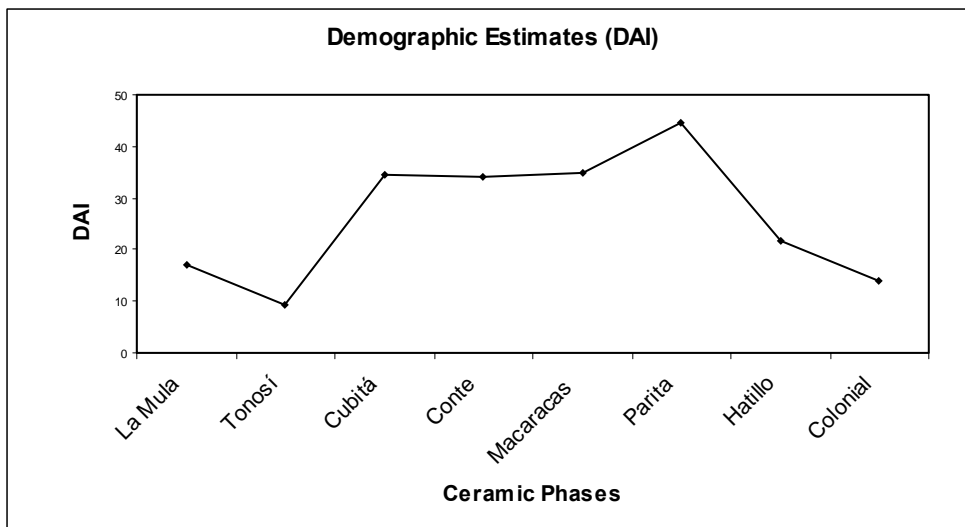


Figure 2.19. Demographic estimates from the Density-Area Index per ceramic phase.

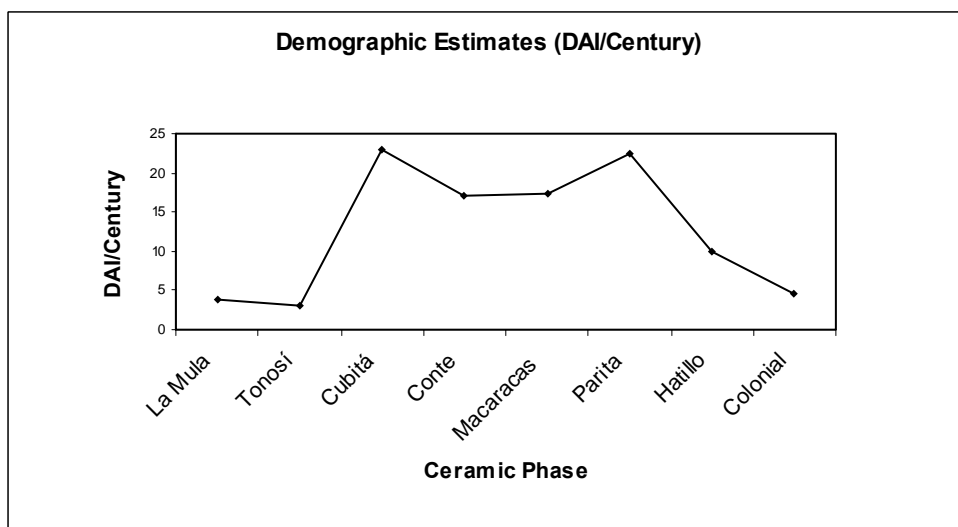


Figure 2.20. Demographic estimates from the Density-Area Index/century per ceramic phase.

Rank-size Plots and Site-size Histograms

The analytical unit “site” is ubiquitous in archaeology and has laid the foundation for how the archaeological record is conceptualized and investigated (Dunnell and Dancey 1983). In regional analyses, traditionally, the site has been an important unit for determining regional settlement hierarchies and assessing the distribution of people across the landscape (Blanton 1976; Crumley 1976; Johnson 1977, 1980; Smith 1976; Steponaitis 1981; Wright and Johnson 1975). Its usefulness in regional and general applications in archaeology, however, has been criticized (Chang 1992; Crumley and Marquardt 1990; Dunnell 1990, 1992; Dunnell and Dancey 1983; Ebert 1992; Wandsnider 1992). In this section I propose that site, as constructed for this investigation, is a meaningful entity, and will discuss how sites are incorporated into this settlement study and justify their use.

Dunnell and Dancey disapprove of the notion of “site” as “[t]he uncritical use of the concept amounts to assuming that all significant cultural information occurs within high-density clusters of artifacts” and that the determination of site boundaries, therefore, is arbitrary, rather than a natural occurrence (1983:271). I agree with Dunnell and Dancey (1983) that an “uncritical” use of the concept of site can mask much variability in the archaeological record. The collection unit, therefore, was adopted for this survey as the basic unit for collecting samples, analyzing survey data, and for defining sites. Commonly in archaeology, areas of high artifact density are labeled sites (Adams 1965), which are normally distinguished from each other by some threshold distance between artifact clusters. Kowalewski, et al. (1989), as with the Proyecto Arqueológico Río Parita, distinguished artifact concentrations (sites) in the Valley of Oaxaca when the concentrations were at least 100 m apart.

In their recent analysis of survey data from the Chifeng area of Northern China, Drennan, et al. (2003a) varied the threshold distance between collection units in an attempt to examine its effects on determining number and size of sites. The three different thresholds (contiguous, 100 m, and 200 m) each produced a different set of site configurations, which were then used for rank-size plots and site-size histograms. These analyses, produced from the same original data, but modified by varying distances between collection units, resulted in dramatically different interpretations—to the point that Drennan, et al. (2003a:30) abandoned the further use of “sites” in their analyses.

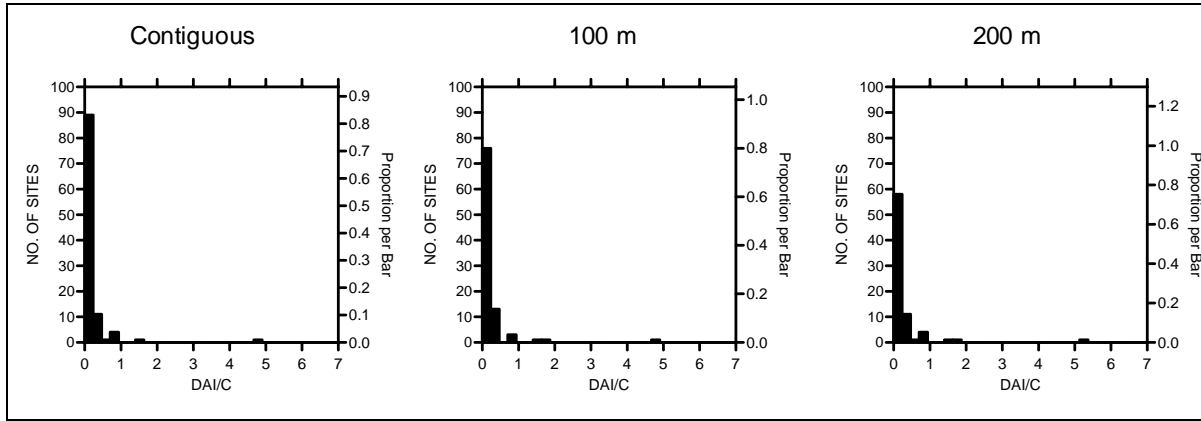


Figure 2.21. Site-size histograms for the Parita ceramic phase based on DAI/C values

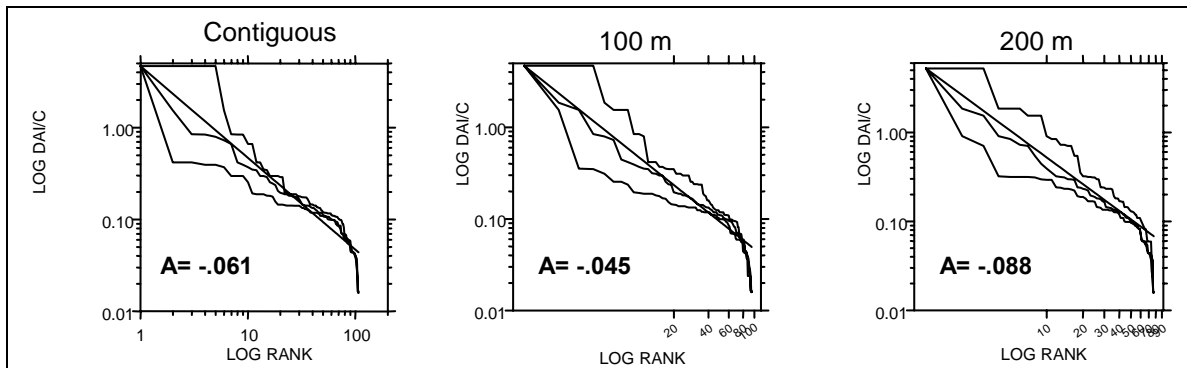


Figure 2.22. Rank-size plots of the Parita ceramic phase sites based on DAI/C values with 90% confidence zones (Drennan and Peterson 2004).

As I was interested in using these analytical tools on the Río Parita survey data, rank-size plots and site-size histograms were created for three different thresholds (contiguous, 100 m, and 200 m) for the Parita ceramic phase (Figure 2.21) to evaluate their effect on interpretations. In each of the histograms, DAI/C values appear to display a Poisson distribution with one a large outlier (He-4) suggesting the existence of a site-size hierarchy with at least two tiers. The upper tier consists of one site (He-4), which is at least double to ten times larger than the smaller sites. The main difference between the contiguous and 100 m histograms is the total number of sites for each tier (except the largest, which is always 1 site—He-4). With the creation of a 200 m threshold, as would be expected, the number of sites continues to decrease and the largest tier's size increases to a DAI/C value of over 5. The Parita phase histograms, despite the variation in threshold distance between collection units, demonstrate a remarkable similarity in that whichever distance was employed they would be interpreted, more or less, in the same manner.

Rank-size plots, likewise, demonstrate that different distances between collection units would not significantly alter interpretations. The rank-size plots for the Parita ceramic phase (Figure 2.22) have *A* values (Drennan and Peterson 2004) of -.061, -.045, and -.088 for, respectively, contiguous, 100 m, and 200 m distance thresholds between collection units. All three represent no significant departure from a log-normal pattern. Thus, regardless of whether a conservative or liberal criterion is taken for determining what a site is, the same conclusion would be reached. Only different thresholds between collection units for the Parita phase are illustrated here, but analyses for other phases exhibit similar results.

The close correspondence between the site-size histograms and rank-size plots based on different threshold distances suggests that the “site” is a meaningful analytical unit for the Río Parita data set, as originally defined in the field with a 100 m separation criterion. Although sites, as aggregations of collection units, are a necessary unit for rank-size plots and site-size histograms, they are not the basic unit of analysis. The Density/Area Index (DAI/C), for example, depends only on collection units, and thus circumvents many of the concerns voiced by critics (Chang 1992; Crumley and Marquardt 1990; Dunnell 1990, 1992; Dunnell and Dancey 1983; Ebert 1992; Wandsnider 1992) of traditional settlement pattern analyses.

3. SETTLEMENT PATTERNS OF THE EARLY OCCUPATION SEQUENCE

Few archaeologists—whatever their credos—would decline to agree that when slash-and-burn horticulture turns into an extensive agriculture based on a few productive seed crops, a complex interplay of mechanisms, pathologies, and processes is activated [Flannery 1972a]. This interplay involves population growth, settlement nucleation, environmental circumscription, technological innovation, high (but irregular) yields, the increase of risk, and ultimately, the ascendancy of ascribed social status (e.g., Rindos 1984:209, 231; Sanders and Webster 1978). (Cooke and Ranere 1992a:274)

Although the Early Occupation Sequence includes roughly 9,000 years of human settlement within the Río Parita Valley, it was difficult to assign artifacts to the specific periods presented in Figure 2.12. Since few artifacts attributable to this time-span were recovered (29 in total), it will only be dealt with briefly. It is, however, important to discuss the settlement and subsistence trends of this sequence as it lays the foundation for later developments. The Early Occupation Sequence was divided into two roughly equal parts. This division was not arbitrary, but reflects changes in artifact technology, themselves closely linked to changing subsistence strategies, which, most likely, were the result of an evolving subsistence strategy. The first part includes the Paleoindian and Early Preceramic periods (9,200-5,000 B.C.) that are characterized by the presence of bifacial thinning as a lithic reduction technique and the addition of several cultivated plants to the subsistence base of wild resources (Cooke 2004; Piperno and Pearsall 1998; Ranere and Cooke 1995, 1996, 2003). The presence of grinding implements and the emergence of ceramic technology suggest, respectively, an increased reliance on processing root and tree crops (Ranere and Cooke 1996:59) and increasing sedentism (Cooke 1995; Cooke and Ranere 1996; Willey and McGimsey 1954) during the second part of the Early Occupation Sequence that spans the Late Preceramic to the Early Ceramic B periods (5,000-200 B.C.; Figure 2.12).

THE PALEOINDIAN/EARLY PRECERAMIC PERIOD (9,200-5,000 B.C.)

The Paleoindian Period, associated with the “Clovis” technological horizon, is thought by some scholars to represent the earliest human occupation in the Americas (Anderson and Gillam 2000; Fiedel 1999; Sauer 1944; Steele, et al. 1998; Webb and Rindos 1997), whereas others (Adovasio, et al. 1978, 1999;

Dillehay 1989, 1997, 2000) accept the presence of pre 10,500 B.C. settlement. Despite claims that early peoples migrating between the Americas would have had to pass through the isthmus, there is little evidence for a pre-Clovis occupation in Panama (Pearson 2002:Figure 38c; Ranere and Cooke 2003:219:Figure 7.5d; Ranere 1992:27). Even at the beginning of human settlement, the earliest archaeological sites occur in a broad range of ecological settings (i.e., tropical forest, savanna/thorn scrub). Ranere and Cooke (1991:248; 1996) suggest that, since it is easier to exploit faunal resources rather than plant resources when moving into new biomes, Paleoindians most likely relied primarily on hunting.

The Proyecto Santa María survey discovered Paleoindian and Early Preceramic Period occupation at five cave sites and rockshelters (Aguadulce, Corona, Los Santanas, Carabalí, and Cueva de los Vampiros), which have yielded a long sequence of stratified dates for most of the Early Occupation Sequence up to the end of the La Mula phase (A.D. 250) of the Late Occupation Sequence (Cooke and Ranere 1992a:275-277; Pearson and Cooke 2002; Ranere and Cooke 1996). The majority of open-air archaeological sites, however, from these periods come from unstratified deposits (Ranere and Cooke 1996:58). The more than 20 open-air sites recorded during the Proyecto Santa María survey were quite small (< .1 ha) and often located in areas above the alluvium of secondary streams (Piperno and Pearsall 1998:212). The location of these sites, the presence of some ground stone tools and phytoliths of domesticated plants, and evidence for the clearing and burning of forests are all used to support Piperno and Pearsall's (1998:212-217) claim that at least small-scale horticulture of a bottle gourd (*Lagenaria siceraria*), arrowroot (*Maranta arundinacea*), leren (*Calathea Allouia*), and a squash (possibly *Cucurbita moschata*) was practiced before 5,000 B.C. at three Central Panamanian sites (Carabalí, Vampiros, and Aguadulce) (Cooke 2004; Piperno and Pearsall 1998; Piperno, Andres and Stothert, 2000; Piperno and Holst 1998; Piperno, et al. 2000). Carbonized remains of wild tree products, including palm fruit (*Attalea, Elaeis, Acromia*), nance (*Byrsonima*), and zapote (*Zapotaceae*), recovered from these sites (Cooke 2004; Cooke and Ranere 1992a) suggests that cultigens formed only a small proportion of the subsistence base (Piperno and Pearsall 1998).

Within the whole Río Parita drainage, lithics similar in manufacture to the Clovis tradition from North America have been recovered at the open-air quarry and workshop sites of La Mula-West and Nieto (Cooke and Ranere 1992a:253; Pearson 2002, 2003; Ranere and Cooke 1991, 1996, 2003; Figure 3.1). At the site of La Mula-Central, recovered lithics (broad stemmed, unfluted and tanged points) from the Early Preceramic Period (8,000 to 5,000 B.C.) reflect a bifacial reduction tradition that is quite different from that of the Paleoindians (Cooke and Ranere 1992a:Figure 6 a-d; Ranere 1992). Despite these technological and stylistic differences between the Paleoindian and Late Preceramic period lithics, none of these could be discerned in the artifact sample from the Río Parita Valley. As the bifacial lithic-

reduction strategy was no longer practiced in the Central Region of Panama after 5,000 B.C., lithics produced in this way were considered to pertain to Paleoindian or Early Preceramic periods. The only exceptions are some wedge-shaped tools, whose edges have been bifacially prepared, found at a shell workshop at Cerro Juan Díaz (Mayo 2004:201).

Although La Mula-West and La Mula-Central are located within the Río Parita survey boundaries, collection units in these areas failed to recover lithics dating to these periods and, as mentioned above, the recovered artifacts could not be separated between the Paleoindian and Early Preceramic Periods. Nonetheless, nine previously unknown Paleoindian/Early Preceramic sites were identified based on the presence of bifacial fragments, end scrapers with lateral spurs, and, more commonly, bifacial thinning flakes (Figure 2.9). These artifacts possess technological and stylistic traits similar to other Paleoindian/Early Preceramic Period lithics found at sites elsewhere in Panama, such as Lake Madden, Lake Yeguada, La Mula-West, La Mula-Central, and Nieto (Bird and Cooke 1977, 1978; Pearson 2002, 2003; Pearson and Cooke 2002; Ranere and Cooke 1991, 1996, 2003).

All of the Río Parita Valley Paleoindian/Early Preceramic Period collection units were from open-air sites (Figure 3.1) and located in the Lower Zone, usually, in the Lower Central Plain on low hills less than 1 km from a present source of water (the Río Parita or secondary streams) and averaged approximately .5 ha in size. No rockshelters or cave sites were identified during the Río Parita survey. Sites were located at elevations ranging from 10 to 40 m above modern sea level, which would have been 110 to 140 m above sea level during the Glacial Maximum (Pearson 2003:Figure 1). Inferences based on the sea-level curve proposed by Golik (1968) for the Parita Bay suggest that these Paleoindian sites would have been a considerable distance—perhaps 50 km—from the coastline (Ranere and Cooke 2003:230).

In summary, I propose based on prior investigations carried out in the Río Parita and in neighboring drainages that the Paleoindian/Early Preceramic Period is characterized by human groups occupying a wide variety of ecological zones practicing a subsistence based on a variety of resources. In essence, the Early Preceramic Period subsistence economy was mixed with hunting, wild fruit collection, and the cultivation of plants (e.g., arrowroot, leren, squash and bottle gourds) (Cooke 2004). This was supplemented with the processing of domesticates (or pre-domesticates), whose growth was encouraged by direct modification of the environment through the clearing and burning of forests (Cooke, et al. 1996; Piperno and Pearsall 1998:212-217). The settlement patterns from the Río Parita survey suggest sites located in open-air locations similar to those found in the Proyecto Santa María (Cooke and Ranere 1992a; Piperno and Pearsall 1998; Ranere and Cooke 1996; Weiland 1984). There is no direct evidence from the Río Parita to suggest limited horticulture for this time, but the evidence from Aguadulce and Vampiros caves, in neighboring valleys, suggest that early plant cultivation, likewise, occurred in the Río Parita Valley (Piperno, Andres, and Stothert 2000; Piperno and Holst 1998; Piperno, et al. 2000).

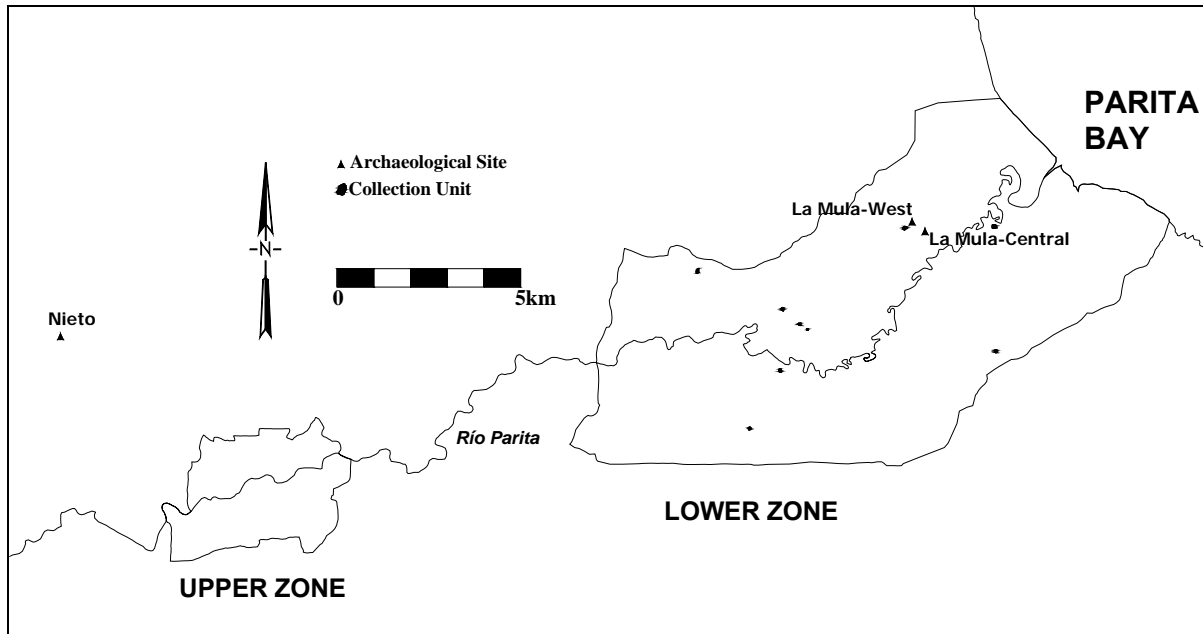


Figure 3.1. Paleoindian/Early Preceramic settlement.

THE LATE PRECERAMIC TO EARLY CERAMIC B PERIOD (5,000-200 B.C.)

The Late Preceramic period (5,000-2900 B.C.) witnessed significant changes in the subsistence base, artifact technology, and settlement patterns across the Pacific watershed of the Central Region. It is during the Late Preceramic Period when cultivation becomes an important subsistence strategy, which, initially, was conducted near household locations, then, by approximately 5,000 B.C., larger fields were prepared for slash-and burn cultivation of several plant domesticates (Piperno and Pearsall 1998:287). A primitive species of maize, the bottle gourd, and a species of squash arrive in central Panama around 5,000 B.C., followed by a sweet form of manioc a thousand years later (Cooke 2004; Piperno and Pearsall 1998:286-287; Piperno, et al. 1985; Piperno, Bush and Colinvaux 1991).

Ranere and Cooke (1996:61) note that the lithic technology changes dramatically during the Late Preceramic period as bifacial thinning techniques are no longer practiced, and are “replaced by core reduction in which flakes are almost haphazardly struck from irregular cores.” It is not known why this occurs, but the abundance of white-tailed deer at Cerro Mangote suggests that a change in the orientation of hunting occurred with a focus on this species using nets, wooden spears and clubs by driving and setting fire to grasslands (Cooke 2004; Cooke and Ranere 1989; Oviedo 1853:III:136; Andagoya

1994:31). Edge-ground cobbles and boulder milling stones (Figure 3.2), which have been identified as plant-processing tools, along with the presence of starch grains on these tools (Piperno and Holst 1998), support an increased reliance on cultivated resources (Ranere and Cooke 1996:61). It should be noted that the increase in the number of grinding implements might just as likely suggest an increase in population, rather than an increase in the reliance on cultigens.



Figure 3.2. Edge-ground cobble (left) and chopper/axe/edge-ground cobble (right) from the survey zone.

Settlement patterns in the Río Santa María suggest that these horticulturalists were not sedentary people, but adapted the location of their settlements to rainfall patterns, the suitability of specific topographies for planting and the availability of non-cultivated resources. Although Late Preceramic sites were larger than earlier sites, they were still small (< 1 ha) and usually located on elevated areas overlooking streams. There was a 15-fold increase in the number of sites on the landscape, implying that the higher yields of domesticated crops contributed to population growth (Piperno and Pearsall 1998:287; Weiland 1984). It has been suggested that coastal sites, such as Cerro Mangote, were occupied during the dry season and, then, the inhabitants relocated to interior locations during the wet season, focusing on cultivation (Norr 1991, 1995; Piperno and Pearsall 1998:292-293). Cooke (2004), however, states that

current data cannot distinguish between two settlement scenarios, where [1] the same social groups would practice a transhumance settlement round, or [2] the inland/coastal sites were occupied by different groups. The diversity of faunal assemblages throughout the Central Region documents the inland and trans-cordilleran transport of shellfish (Cooke 2004; Cooke and Ranere 1992a, 1999; Ranere and Hansell 1978) revealing that exchange of resources in different ecological zones occurred.

Pottery appears in the Río Parita Valley during the period of manufacture of the crude, low-fired Monagrillo pottery (Early Ceramic A), thought to have been made expeditiously when required for liquids, drinking, and eating (Cooke 1995; Cooke and Ranere 1992a; Willey and McGimsey 1954). The Monagrillo period (2900-1200 B.C.) is found at the Monagrillo type-site, which was occupied between about 2400 to 1200 uncal. B.C., and has been reported at the Cueva de los Ladrones in association with slightly earlier dates (Cooke 1995, Cooke 1984a). Monagrillo sites in central Panama are often found in the same locations as were utilized in the Late Preceramic period based on stratigraphic evidence at Corona, Carabalí, Aguadulce, and Ladrones (Cooke and Ranere 1992a; Ranere and Cooke 1996:65). Sites near the coast, however, are larger and more numerous, and there is an increase from the previous period in the clearance of coastal vegetation and in the frequency of edge-ground cobbles and millstone bases (Cooke and Ranere 1992a; Piperno, Bush and Colinvaux 1991; Piperno and Pearsall 1998:294). During the Monagrillo Period, La Mula-Sarigua is 1.3 ha (Hansell 1988:199), the Monagrillo site is 1.4 ha (Willey and McGimsey 1954:Figure 3), and the site of Zapotal, in the Río Santa María valley, is 3.1 ha (Cooke and Ranere 1992a:273). Grinding stones from Monagrillo and La Mula-Sarigua have been analyzed for starch grains (Piperno and Holst 1998) recovering maize, yuca, and palm. As with the previous period, the faunal record documents the inland and trans-cordilleran transport of coastal resources, except instead of shellfish, now, and during the Early Ceramic B, it is small estuarine fish (Cooke 1995, 2004; Cooke and Ranere 1992a, 1999; Ranere and Hansell 1978).

It appears that this trend towards an increased reliance on coastal resources and farming of the alluvium might have been the result of severe destruction of upland forests (Cooke and Ranere 1992a:273; Piperno and Pearsall 1998; cf. Cooke). Cooke and Ranere (1992a) and Piperno and Pearsall (1998) have advanced the hypothesis that the increase in the numbers and sizes of coastal sites was related to the gradual decline in fertility of hill-slope soils, which to judge from the vegetational history of the La Yeguada basin in the Pacific foothills, had become so intense by 5000 B.C. that the long-fallow cycle would have been curtailed. Once again, is it not clear if this is an increased reliance on coastal resources or is it just a reflection of increased population along the coast of the Parita Bay (Cooke 2004). Cooke and Ranere (1992a:274) note that overall during the Monagrillo Period, “site hierarchies and occupational specialization are more apparent” than in the Late Preceramic, suggesting, “some segments of the regional population were becoming larger, less self-sufficient, and more sedentary.” All of which

might have been the results of increased demand for land and reliance on cultigens, and decreasing opportunities for emigration (Cooke and Ranere 1992a:274).

During the third millennium B.C. (Early Ceramic B), population continued to shift from the foothills to the coast, concluding with the establishment of large permanent settlements, such as La Mula-Sarigua (Ranere and Cooke 1996:67; Figures 2.1, 3.3). Gradually, a few cultigens, which responded particularly well to human manipulation, came to dominate food production. The agricultural system becomes specialized in a few select crops (maize, manioc, and a type of yam) cultivated on the alluvium of major rivers in the Lower Coastal Plain (Piperno and Holst 1998; Piperno and Pearsall 1998:295). Over time, edge-ground cobbles and milling stones are replaced with manos and breadboard metates, a polished stone-axe technology emerges (most likely, as a more effective means of clearing riverine forest), and pottery comes to be better made in a variety of shapes (Cooke and Ranere 1992a; Piperno and Pearsall 1998:295). The increased levels of firing, decoration, and standardization of late third-millennium B.C. pottery suggest that it had become a new medium for symbolic expression (Cooke and Ranere 1992a:278-280). The disappearance of edge-ground cobbles by the La Mula phase suggests to Cooke and Ranere (1992a:Note15) that the processing of certain cultivated plants (arrowroot and a variety of yuca [*M. esculenta*]) had ended in favor of more productive cultigens (i.e., maize). Piperno and Pearsall (1998:296) conclude that slash-and-burn agriculture lasted approximately 5,000 years, but eventually populations increased and over-exploited the environment, creating a need to move to the more productive alluvium.

Starting in the third millennium B.C., exchange of goods intensifies between the inhabitants of different ecological zones culminating with the regional exchange of utilitarian (small estuarine fish, breadboard metates, polished stone axes, and ceramics) and prestige goods (shell, gold, and stone ornaments) during the La Mula phase (200 B.C. to A.D. 250; Figure 2.12) (Cooke 2004; Cooke and Ranere 1992a: 275-281; Cooke and Sánchez 1997; Cooke, et al. 2000:161-162, 2003a:117-118; Hansell 1988). The recovery of similar styled pottery from the Atlantic watershed starting in the Early Ceramic A Period by John Griggs, et al. (2003b), has led Cooke, et al. (2003a:113) to suggest that this homogeneity in style “derived from continual exchange of people and information across the mountains” (Cooke and Ranere 1992a:247, 1996:71-76). Whether this exchange was regulated through the control of resources or along kin lines, or if it represents periodic extraction by individuals, is not known.

Diagnostic artifacts recovered from the Río Parita survey could be placed within the larger 5,000-200 B.C. period, but only few could be identified to the shorter temporal divisions within it (Figure 2.12). As little material was recovered for the second part of the Early Occupation Sequence, all artifacts were grouped together and were taken to represent the entire period, including the edge-ground cobble and milling base complex and early ceramics. Although the edge ground cobbles/milling stone complex appeared in the Early Preceramic, it was not until 5,000-200 B.C. when it reached its zenith (Piperno and

Pearsall 1998:212; Ranere and Cooke 1996:60). This ground stone complex, therefore, has been assigned to the 5,000-200 B.C. period rather than earlier. In support of this separation, no ground stone from this complex was recovered in the same lots as Paleoindian or Early Preceramic material.

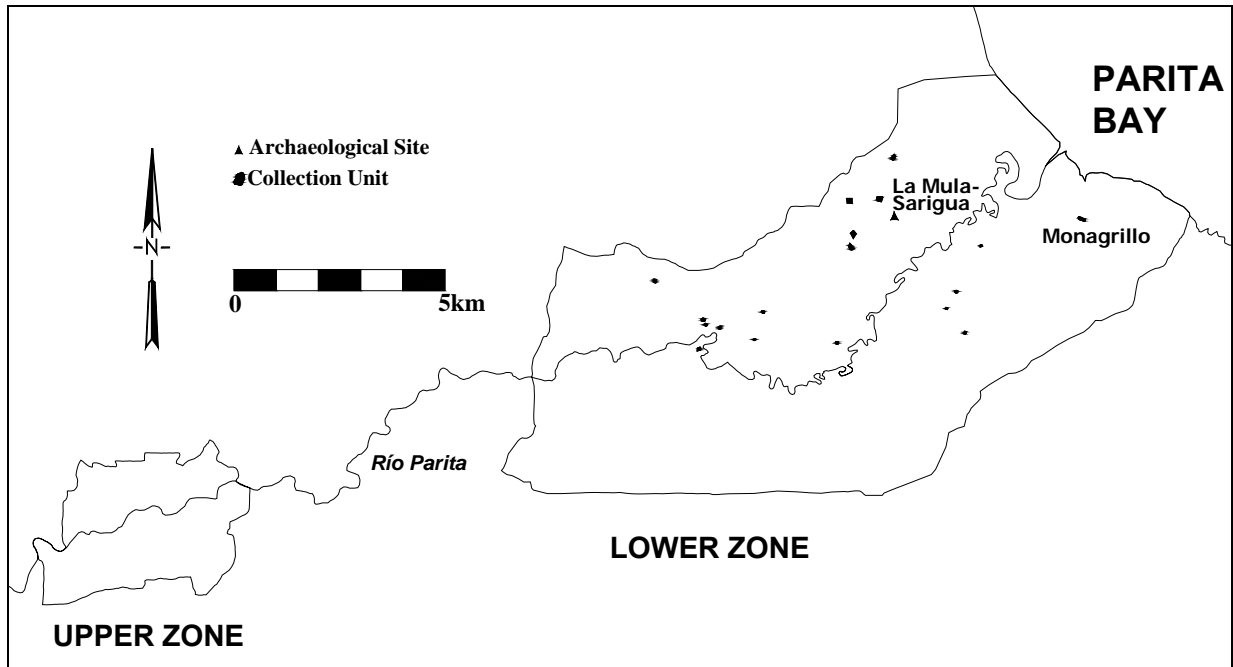


Figure 3.3. Late Preceramic/Early to Early Ceramic settlement (5,000-200 B.C.).

In the Río Parita survey there were 18 collection lots totaling 12 ha of occupation for the 5,000-200 B.C. Period Figure 3.3 illustrates that occupation was dispersed throughout much of the survey zone. No occupation, however, was found in the Upper Zone or in the Lower Central Plain south of the Río Parita in the Lower Zone. The majority of identified sites are located just above the floodplain on small hills or elevated zones. The location of sites near the floodplain and the presence of edge-ground cobbles and milling stones might suggest a reliance on cultivation, but the lack of temporal control for this period makes it difficult to discuss whether the settlement patterns represent something similar to those found for the Proyecto Santa María. There is an increase in the number of occupied sites in the later part of the Early Occupation Sequence, but, for both parts, sites are located in roughly the same locations. Hansell's (1988:199-201) investigations at La Mula-Sarigua provide the best settlement information for the transition from the Early to Late Occupation Sequence. She determined that La Mula-Sarigua gradual grew from the Monagrillo phase (1.3 ha) to the first millennium B.C. (8.4 ha). It was during the La Mula

phase (200 B.C. to A.D. 250), however, that population dramatically increased with La Mula-Sarigua becoming a large village (58 ha by her estimate), representing a seven-fold increase in occupation based on site size (Hansell 1988:200).

During the 5,000 to 200 B.C. Period in the Central Region, settlements, overall, increase in size and number and concentrate towards the coast. There is a continuation of the mixed subsistence economy from the previous period with the introduction and increased reliance on specific cultigens (i.e., maize, yuca, and palm). It is not clear if there was a gradual migration to the coast from inland sites due to decreased fertility during the 5000 to 200 B.C. period, or if this was a reflection of the ability of coastal sites to maintain higher populations (Cooke 2004). Either way, the trend of larger sites located near the coast and fertile river valleys continues and intensifies during the Late Occupation Sequence (Cooke and Ranere 1992a:275).

4. EMERGENCE OF REGIONAL SETTLEMENT HIERARCHIES: The Late Occupation Sequence

Or maybe my settlement pattern background in Perú would have found expression some way in Panamá—but I am inclined to doubt it. Panamanian archaeology, at least from what I have seen of it, would not lend itself easily to settlement analysis, certainly not of the kind that is possible in Peruvian coastal valleys, and deserts, nor even to what we can do in the bush in the Maya Lowlands. (Willey 1996:302)

The Late Occupation Sequence (200 B.C. to A.D. 1522), during which time large sedentary villages emerged and developed, is a relatively much shorter period of time than the Early Occupation Sequence, but the majority of recovered archaeological remains from the Río Parita Valley date to this later part. One of the most refined chronologies in Lower Central America, the Late Occupation Sequence is divided into eight ceramic phases, each roughly 200 years in length, starting with the beginning of settlement nucleation (La Mula phase) and extending to the start of European colonization (Figure 2.12). Overall, there are three significant demographic shifts in the survey zone, but population, in general, tends to nucleate. It is during the Late Occupation Sequence that the emergence of social ranking is thought to have occurred in the Río Parita Valley and throughout the Central Region of Panama.

The emergence of chiefly hierarchies in Central Panama is supported through such evidence as large settlements which might have been chiefly centers (Breece 1997; Cooke 1993; Cooke, et al. 2000; Hansell 1988), the site hierarchies these imply (Cooke 1984a; Hansell 1988; Weiland 1984), differential distribution of and access to a variety of natural and cultural resources (Hansell 1988:220), and public works. Architectural remains recovered from archaeological sites consist of high-status burials (Briggs 1989; Bull 1965; Cooke, et al. 2000; Lothrop 1937; Mason 1941, 1942), stone sculpture (Fitzgerald 1996; Linares 1977; Lothrop 1937; Verrill 1927), earthen mounds (Fitzgerald 1996; Ladd 1964; Verrill 1927), and large structures for residences, ritual and storage activities (Carvajal, et al. 2004; Cooke and Sánchez 1997; Cooke, et al. 1998; Desjardins 2000; Ladd 1964; Verrill 1927).

That being said, the majority of information available concerning social ranking comes from mortuary data. The burials from Sitio Conte (Briggs 1989, 1993; Hearne and Sharer 1992; Lothrop 1937, 1942; Mason 1941, 1942) provide the most vivid example of high-status individuals of the Central Region (Figure 1.1). There is, additionally, mortuary information from numerous Panamanian sites (Table 4.1) and Briggs (1989) conducted a cluster analysis on some of the more detailed reports including Sitio Conte and sites from the Tonosí Valley (Ichon 1980). Briggs' (1989) examination revealed that Sitio Conte was the only site with detailed mortuary information that supported the existence of social ranking

in the Central Region, suggesting that this site represents more of an anomaly than a common pattern as expected from ethnohistoric accounts. Cooke, et al. (2000:172; 2003a:126-127, 2003b:9) suggest that Sitio Conte and El Caño, together, possibly formed the principal ritual center for the Central Region, with El Caño housing the ceremonial precinct and Sitio Conte being the locale where the high-status burials were interred between A.D. 750 and 950. Instead of each valley having its own high-status cemetery, elites from all over the Central Region were interred at a common necropolis at Sitio Conte, whereas other sites, such as Cerro Juan Díaz, served the mortuary ritual needs of commoners (Díaz 1999:68).

Prior to this survey, the best lines of evidence available for the presence of social ranking in the Río Parita Valley were ethnohistoric accounts and excavations of mortuary remains at He-4 (Bull 1965; Dade 1972; Ladd 1964; Mitchell and Acker 1961; also known as El Hatillo, Pr-1, Pa-1, and Finca Calderon)—the only site in the survey zone that has indisputable evidence for ceremonial/public architecture (Cooke, et al. 2003b:10). At the site's center several low mounds (< 3m in height) with clay floors, presumably built up by stages, i.e., after each burial event, are arranged in what appears to have been an open plaza (Bull 1965:33, Figure 1). Excavations at He-4 have been conducted mainly by amateur archaeologists and published accounts suggest that the burial mounds, at least the high-status graves, date to the later phases of the Late Occupation Sequence, i.e., Macaracas, Parita, and El Hatillo. Cooke, et al. (2000:172, 2003a:127) propose that He-4 possibly replaced Sitio Conte as the main necropolis for the Central Region after A.D. 1000. What is not known, however, is how this played out on a regional scale.

In this chapter, the general settlement pattern for each individual ceramic phase is described and discussed with regard to the identification of social ranking on a regional scale. Although no mortuary features were excavated during this survey, burial data from several sites in the Río Parita Valley, in conjunction with settlement pattern data, and mortuary data from elsewhere in the Central Region, will be used in addressing social ranking. Since there was a substantial increase in recovered artifacts and occupied area for these ceramics phases than for the Early Occupation Sequence, it was practical to compare phases in regard to settlement location and, additionally, demographic densities. Following the examples discussed in Chapter 2, site-size histograms and rank-size plots were produced for each phase based on the DAI/C for archaeological sites; stem and leaf plots were added for more detail. As there was no appreciable settlement in the Upper Survey Zone, except during the Cubitá phase, the density maps for the Late Occupation Sequence only include the Lower Survey Zone to provide a larger figure to view settlement locations.

Table 4.1. Recovered Mortuary remains from archaeological sites of Panama.

Ceramic Phases	La Mula (Pr-14)	Tonosí Valley	Cerro Juan Diaz	Venado Beach	He-4	Sitio Conte	El Caño	Western Panama
El Hatillo					Burial Mounds	Burials?	Burial Mounds	
Parita			2 nd Phase (up to A.D. 1400)		Burial Mounds	Burials?	Burial Mounds	
Macaracas		Cañaza Phase	2 nd Phase		Burial Mounds	Burials (AD 900-950)	Burial Mounds	
Conte		Cañaza phase	2 nd Phase	Burials?	Burial Mounds?	Burials (AD 700-900)		
Cubitá	Burials?	Cañaza Phase	1 st Phase	Majority of Burials	Burial Mounds??			Barriles Shaft Burials
Tonosí	Burials?	El Indio Phase	1 st Phase					Barriles Shaft Burials
La Mula	Burials	El Indio Phase	1 st Phase?					

LA MULA CERAMIC PHASE (200 B.C.-A.D. 250)

Previous surveys in Panama have demonstrated a dramatic increase in the number and size of settlements at the end of the first millennium B.C. for the Central Region (Cooke and Ranere 1984, 1992a; Hansell 1988; Ichon 1980; Piperno and Pearsall 1998; Ranere and Cooke 1996:75; Weiland 1984), western Panama (Linares and Sheets 1980), and along the Atlantic coast in eastern Panama (Drolet 1980). The end of the first millennium B.C. in the Central Region concludes with the emergence of large nucleated settlements, such as La Mula-Sarigua (whose extent during its major occupation was proposed by Hansell [1988:225] to be 58 ha), SA-27 (6 ha; Cooke and Ranere 1992a:275), Sitio Sierra (Cooke 1979, 2004; Cooke and Ranere 1992a), and Cerro Juan Díaz (Cooke 2004; Figure 1.1). A systematic pedestrian survey conducted in 1982 by Cooke (Cooke 1979, 1998a:104; Weiland 1984:40) indicated that Sitio Sierra covered at least 45 ha, whereas Isaza's (2004) survey of Cerro Juan Díaz suggests a maximum extent of 100 ha. It is not known, however, how large these sites were during the La Mula occupation. Thus, as

mentioned in Chapter 3, the impression of a very sudden increase in size of sites near the coast might be misleading (Cooke 2004). La Mula-Sarigua, however, was intensively investigated by Hansell (1988) and she demonstrates a 7-fold increase in size for the La Mula phase compared to the Early Ceramic B Period (Cooke and Ranere 1992a:274-275; Hansell 1988:19-201).

The reasons for the growth of these large villages (i.e., La Mula-Sarigua) are not completely known, but it occurs in conjunction with significant changes in subsistence practices. With the emergence of these large sedentary villages, the edge-ground cobble and milling-stone complex of the Early Occupation Sequence is replaced by manos and legless metates (breadboard type); likewise, polished stone axes begin to be used and become plentiful (Cooke and Ranere 1992a:277; Hansell 1988:231; Piperno and Holst 1998; Piperno and Pearsall 1998). These new technologies suggest a greater importance placed on agricultural productivity through the clearing of alluvial forests and, then, the cultivation and processing of a few select crops, i.e., maize, manioc, sweet potato, American yam, and squash (Cooke 2004; Cooke and Ranere 1992a:274; Piperno and Holst 1998:765-776; Piperno and Pearsall 1998:295; Ranere 1992; Ranere and Cooke 1996:75; Sauer 1966:241). Some La Mula phase sites near the coast (e.g., Cueva de los Vampiros), however, were special extraction settlements for the procurement of fish and other coastal and estuarine resources (Cooke, et al. 1992:291).

La Mula phase ceramics have been found at several sites along the Pacific littoral of the Central Region and at one site on the central Caribbean (Isla Carranza). Excavations at Cerro Juan Díaz (Desjardins 2000; Cooke, et al. 2003a, 2004) have revealed that there was a substantial La Mula phase occupation at this site, but La Mula pottery is rare on the surface and it is not clear how extensive settlement was at this time. Ichon (1980; Cooke and Ranere 1992a:275) recovered La Mula phase pottery from 11 sites in the Tonosí Valley. Settlement is sparse and the largest three sites assigned by Ichon (1980:46, 71) to this phase are spread out 6-12 km apart with one site mentioned as being .1 ha, whereas the other eight smaller sites are dispersed in the floodplain or near the estuary.

The most detailed information about the La Mula ceramic phase comes from survey and excavation of the La Mula-Sarigua site (Figure 1.1; Cooke and Ranere 1984, 1992a; Hansell 1987, 1988; Ranere and Cooke 1996; Weiland 1984; Willey and McGimsey 1954). Although, today, the site is approximately 3.5 km from the Pacific Ocean, during the La Mula phase, it was only several hundred meters from the mangrove-covered strandline of the coast, and was adjacent to the Río Parita, mangrove-estuary, and alluvium (Clary, et al. 1984:65; Hansell 1988:27). The site, thus, had an advantageous location near fertile alluvial soils, coastal, mangrove, and riverine resources, and a large 10 ha field of chert cobbles (Cooke and Ranere 1992a:277-278; Hansell 1988:28). Hansell (1988:224) suggests that during the La Mula phase, a spatial reorganization of the region's population occurred and she concludes, cautiously, that a settlement hierarchy existed with La Mula-Sarigua as the regional center (see also Cooke and Ranere

1992a: 293-294; Weiland 1984:46). Hansell, however, does not state where this potential settlement hierarchy existed, i.e., along the coast or up the Río Parita Valley.

During the La Mula phase, there was an increased investment in mortuary activity at several sites in the Central Region of Panama. Excavations beneath a round structure at Sitio Sierra recovered a cemetery with 25 burials placed in primary flexed positions with grave goods of utilitarian pottery, polished stone axes, stingray spines, iron pyrite, and shell beads (Cooke 1979; Isaza 1993:82-84). The presence of tools and a repair kit recovered in three of the graves has been associated by Cooke (1977; 1984:287) with woodworking and axe manufacturing activities. Five adult individuals interred at La Mula-Sarigua received less careful treatment; bundle burials with possible grave goods (sherds, and shell; Hansell 1988:237, 213), and flexed burials lacking associated artifacts (Hansell 1988:237). Additionally, Hansell (1988:213) recovered disarticulated human bone elements in two trash features.

The large site of Cerro Juan Díaz, located on both sides of the Río La Villa approximately 15.5 km from He-4 (Figure 1.1), attained a maximum size of 100 ha (Cooke 2004; Cooke, et al. 2003b:23; Isaza 2004). Since 1992, excavations, under the direction of Richard Cooke, have recovered a large sample of burials that have been carefully excavated and analyzed (Carvajal, et al. 2004; Cooke, et al. 1998, 2000, 2003a; Díaz 1999). The burials at Cerro Juan Díaz have been divided into two mortuary phases based on excavations of a mortuary platform that has yielded about 200 skeletons of primary and secondary interments, and other features at the site. The first mortuary phase contains burials that correspond to the La Mula to Cubitá phase, whereas the second is associated with ceramics from Conte to Parita phases (Cooke, et al. 2000).

Four graves from the first mortuary phase at Cerro Juan Díaz have been excavated (Cooke, et al. 1998; Cooke, et al. 2000; Diaz 1999). Two contained several secondary burials with human bones wrapped in bundles. The other two consisted of a single primary interment placed over earlier burials. These graves, all cut through bedrock, were stratified under a circular arrangement of stone-lined features, which have been described as ovens (Cooke and Sánchez 1997; Cooke, et al. 2000, 2003a:117). Nine radiocarbon dates bracket these burials between 1780 ± 40 and 1360 ± 60 B.P., while artifact associations confirm their use during the La Mula, Tonosí, and Cubitá ceramic phases (Cooke, et al. 2000:164).

It is not clear what these ovens were used for, but Cooke and Sánchez (1997:63; Cooke, et al. 1988: 129) suggest they were used for some sort of ritual activity possibly for desiccating corpses before burial as described by Espinosa (1994b:63-64; Lothrop 1937:46) for Chief Parita and for the main interment of Grave 5 at Sitio Conte (Cooke, et al. 2003a:121; Lothrop 1937:230). The burials located above the ovens have been summarized by Díaz (1999), date to A.D. 700-1050 (Cooke, et al. 2000:166), and will be discussed in the section on the Conte ceramic phase.

Feature 16 contains at least 18 individuals placed tightly in bundles within a burial shaft (Cooke, et al. 2000:162). This mortuary feature was associated with small objects of marine shell (i.e., *Spondylus*), pearls, animal teeth and one metal ring; the latter was recovered with 73 perforated felid canine teeth and two polished stone bars in a package containing an adult and an infant (Cooke, et al. 2000:163, Figures 8.6, 8.7). A human dentin date from the adult individual in the package returned 1780 ± 40 B.P. (cal A.D. 130-170). A charcoal date from the tomb fill, returned 1730 ± 80 (cal A.D. 120-530). Therefore it is likely that these interments were made during the last part of the La Mula or during the Tonosí phase (Cooke and Sánchez 1997:Figures 5, 8; Cooke, et al. 2000:164). By the end of the La Mula phase, interments from Cerro Juan Díaz suggest that disparities in wealth and status are increasingly becoming evident. The association of grave goods such as goldwork, polished stone bars, clothing adorned with shell, felid tooth pendants, and incense burners has led Cooke, et al. (2003a:117-118; Cooke 1988c:107-108) to suggest that some individuals buried below the oven features held a special position, most likely, that of healer or shaman.

Hansell (1988:238) proposed that the small sample of burials she excavated at La Mula-Sarigua, which belong to the La Mula phase, represented low-status people, in contrast to high-status people buried in the shaft-chamber tombs found at sites like Cerro Guacamayo (Harte 1958). Hansell's assumption that the Cerro Guacamayo graves belong to the late first millennium B.C. has been questioned by Cooke (1995) who proposed that the types of vessels interred at Cerro Guacamayo should date on stylistic grounds to the late second or early first millennium B.C.

In order to access the productive alluvium adjacent to the site, the inhabitants needed stone axes, which are present at the site, but are made of non-local material. Likewise, the processing of agricultural products (i.e., maize) was performed on breadboard metates made from non-local material. Hansell (1988:249), therefore, states that the inhabitants of La Mula-Sarigua would have been "dependent, in part, on the resources, labor and skills of populations from other communities." The possible existence of a site hierarchy, the presence of a regional exchange network, standardization of lithic and ceramic artifacts, and differentiation in mortuary remains from the Central Region have led Hansell to conclude that there might have been some sort of labor specialization and emerging variation in social status in the Central Region of Panama during the La Mula phase (Hansell 1988:238).

Although Hansell (1988:247, 250, 253) notes that there is no evidence of any redistributive centers, a fixed authority, or that resources were managed at La Mula phase sites in the Central Region, she suggests that the flow of goods between sites in an increasingly wider socioeconomic sphere in conjunction with burial data hints at "emerging social differences within the region." Cooke (1984:287; Isaza 1993:82-84) argues, however, that the mortuary goods recovered from the Sitio Sierra burials are almost all utilitarian and that differences in burial goods reflect sex and occupation, rather than social rank.

Furthermore, Cooke and Ranere (1992a:281) favor exchange during the La Mula phase as a system based more on kin lines than controlled by a few individuals, but they do suggest that differential access was perhaps responsible for creating circumstances for “a particular clan or corporate group to maneuver itself into a politically favorable situation.”

La Mula is the first ceramic phase for which appreciable material was identified from the Río Parita Valley survey. Not only is there a significant increase in the artifact densities for the La Mula ceramic phase, but population nucleates overwhelmingly towards the coast (Figures 4.1, 4.2). It should be noted that the Río Parita survey recovered little material from the previous period, which might have been a reflection of deeply-buried sites near the coast lacking surface remains. Hansell (1988:200), however, has shown that at the site of La Mula-Sarigua did indeed undergo a dramatic increase in size (ha) by a factor of 7 and follows a similar settlement pattern as suggested for other areas of the Central Region of Panama at the end of the first millennium B.C. (Cooke and Ranere 1984, 1992a; Ichon 1980; Piperno and Pearsall 1998; Weiland 1984). For the entire Early Occupation Sequence, there were only 27 lots with diagnostic material; a much shorter period of time (450 years), it was possible to assign artifacts from 40 collection units to the La Mula phase.

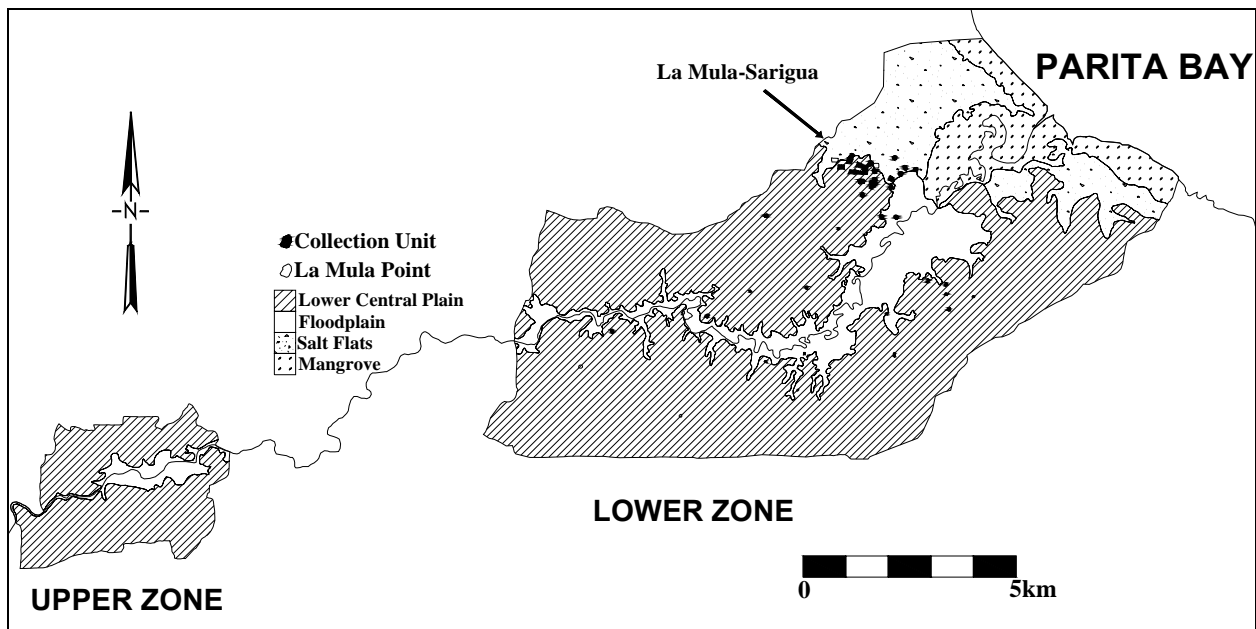


Figure 4.1. La Mula ceramic phase settlement locations.

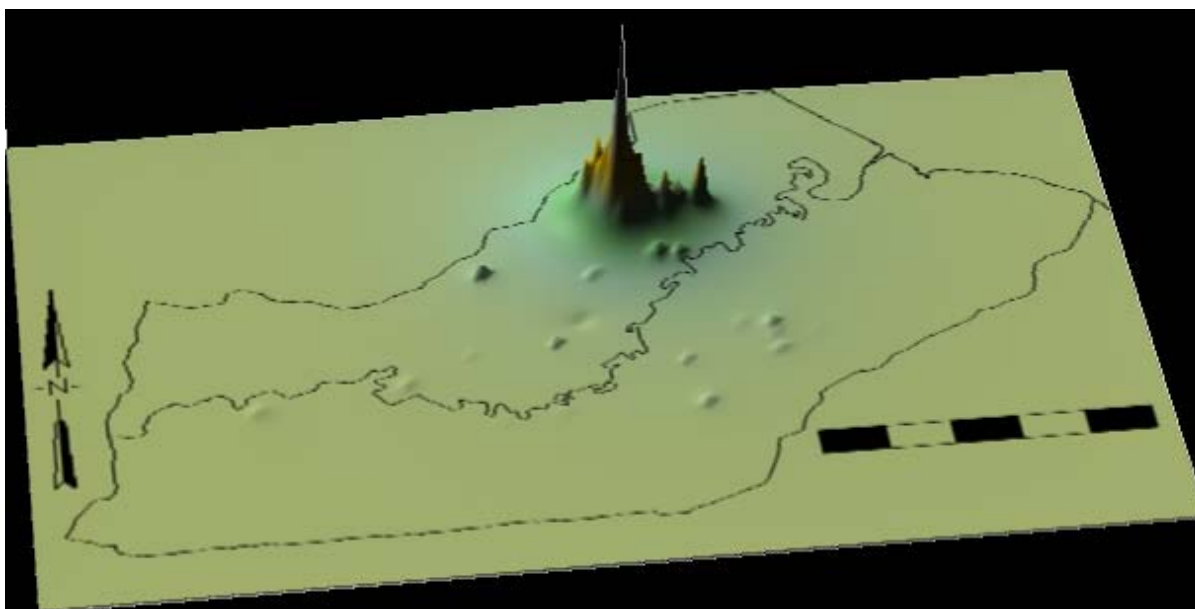


Figure 4.2. Relative settlement density (DAI/C) for La Mula ceramic phase.

The large Formative settlement of La Mula-Sarigua dominates the site-size hierarchy, with population concentrated towards the coast with only modest dispersal upriver (Figures 4.1, 4.2)—supporting Hansell’s (1988) identification of La Mula-Sarigua as a regional center. Additionally, the rank-size graph (Figures 4.3, 4.4) reveals a highly primate distribution ($A = -.87$) where we are around 95% confident that this represents a different settlement dynamic than expected for a log-normal distribution (Drennan and Peterson 2004).

Hansell’s (1988) investigation of La Mula-Sarigua has been of interest to many scholars as it was occupied for a very long period of time and was the largest and earliest formative village in Panama. Hansell (1988) estimates the size of La Mula-Sarigua during the La Mula phase as 58 ha. The Río Parita Valley survey, however, determined that La Mula-Sarigua was only 18.8 ha with dense pockets of settlement close by, but greater than 100 m from the site. Hansell (1988) determined her site boundaries by collecting samples every 25 m along transects systematically aligned 100 m apart throughout a 2 km² survey zone. If materials were separated by more than 100 m, they were considered separate entities, but still part of the La Mula-Sarigua site. On the other hand, if collection units in the Río Parita survey were separated by more than 100 m they were assigned to separate sites. It is difficult to evaluate these estimates with a one to one comparison; the Río Parita Valley survey was conducted with surface collections, whereas Hansell incorporated several collection strategies (surface collections, shovel tests, and excavation units), but does not say how she standardized these into one site estimate. It is

disconcerting that the Río Parita survey does not come close to Hansell's estimate. Hansell (1988) conducted three field seasons of intensive investigation at the site and, thus, her estimate of 58 ha, although not substantiated by this project, is plausible. The salt flat zone is a very active erosional and depositional area with the presence of wind-borne fine salt deposits, which have contributed to the destruction, alteration, or re-deposition of diagnostic ceramics and, thus, affecting the site-size estimates for the Río Parita survey. There is, however, a close correspondence with Hansell's (1988:19-201) size estimates for La Mula-Sarigua during other ceramic phases and those found during the Río Parita survey. Regardless of differences in site size, La Mula-Sarigua within the Río Parita Valley survey is a very large site, similar to He-4 in area, but producing a primate distribution of settlements in the region (Figure 4.3). Additionally, both Hansell's (1988) and the present investigation identified a dramatic increase in population at the site during the La Mula phase compared to the Early Ceramic B Period.

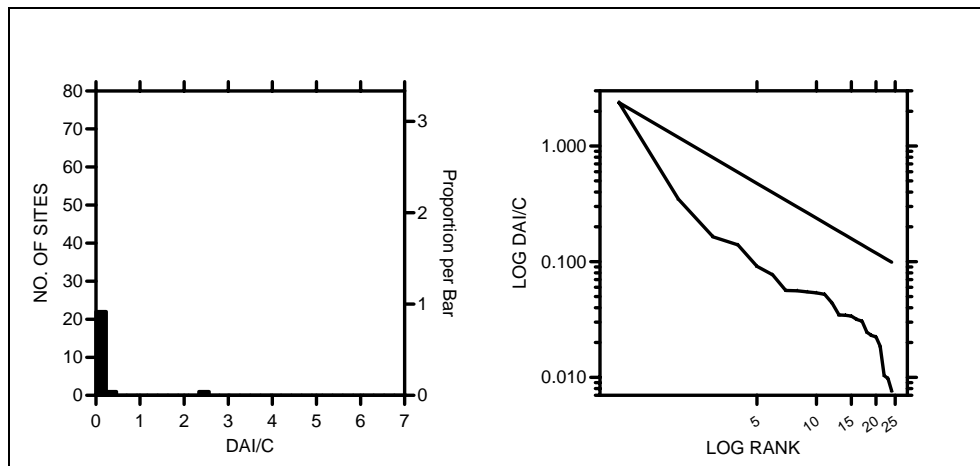


Figure 4.3. Site-size histogram and rank-size plot for La Mula ceramic phase.

The site-size histogram (Figure 4.3) and the stem and leaf plot (Figure 4.5) illustrate that the largest of the total 24 sites during this phase is the first-order site of La Mula-Sarigua (DAI/C=2.4)—almost seven times larger than the next largest site in the survey zone. Near La Mula-Sarigua, but greater than 100 m away, is a site (Site 317) with an area of 0.9 ha and a DAI/C value of .34, which following the methodology of this project is considered a second-order site (hamlet) most likely consisting of several households (Figure 4.6, Table 4.2). Taking La Mula-Sarigua and the nearby second-order site together, we find that 72% of the La Mula phase population is living in the area around La Mula-Sarigua (~1 km²). The third-order sites in the valley, at this time, appear to be isolated residences (farmsteads) as they are considerably smaller with a mean site size of 0.60 ha and a .05 DAI/C. The majority of these third-order

sites are dispersed settlements located near relatively fertile soils, above the floodplain (20-60 m asl), and within 1 km of permanent streams or the Río Parita floodplain. Interestingly, one of the third-order sites is He-4, which is the only site occupied for the entire Late Occupation Sequence (Figure 4.1, Table 4.2). Hansell (1988:199-201), however, found pottery at La Mula-Sarigua indicating that this site was occupied continuously from the Monagrillo period to Parita/El Hatillo phase.

Although La Mula-Sarigua is by far the largest site in the valley, it is still not clear whether La Mula-Sarigua represents the emergence of a central place, or if this site reflects more of a difference in degree, but not kind from other sites in the valley. The concentration of people in the environs of La Mula-Sarigua might have been just a result of plentiful resources, for example. The standardization of lithic and ceramic artifacts at the site suggests that at least part-time craft specialization had emerged (Hansell 1988:245). The presence of the cryptocrystalline stone outcrop at the center of the site points to differential access to these resources for the inhabitants of La Mula-Sarigua with respect to what we know about the distribution of raw lithic material for the rest of the valley. The presence of breadboard metates and polished stone axes from non-local material at La Mula-Sarigua suggests that these artifacts were received in trade from sites located in other areas in exchange for La Mula-Sarigua's local products, such as finished chert tools or coastal resources (i.e., dried and salted fish).

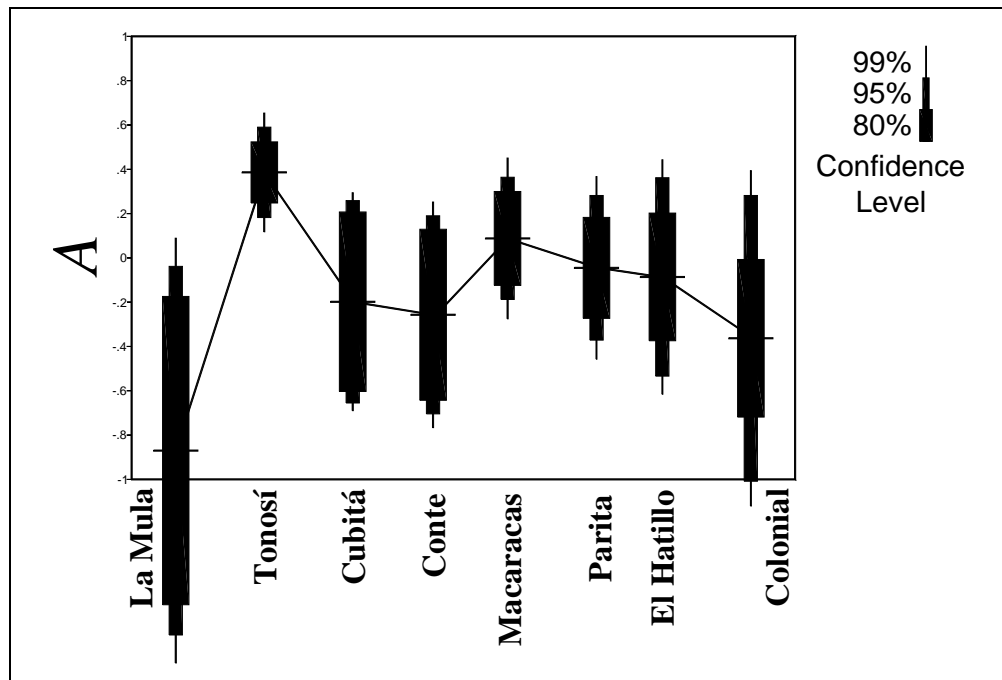


Figure 4.4. A values for the Parita Valley rank size patterns.

La Mula			Tonosí	
(La Mula-Sarigua)	76	23		
		23		
		≈		
		8		
		8		
		7		
		7		
		6		
		6		
		5		
		5		
		4		
		4		
		3	95,97	(He-2; He-4)
Site 317	48	3		
		2		
		2	17,43	
	64	1	69,71	
	40	1	06,08,37	
	91,77,	0	50,50,51,53,60,61,65,73,74,76,77	
56,55,54,52,44,35,34,34,32,31,25,23,22,19,10,10,08		0	09,13,13,14,18,19,30,32,35,36,40,40	

Figure 4.5. Back to back stem and leaf plot of the DAI/C for La Mula and Tonosí phase sites.

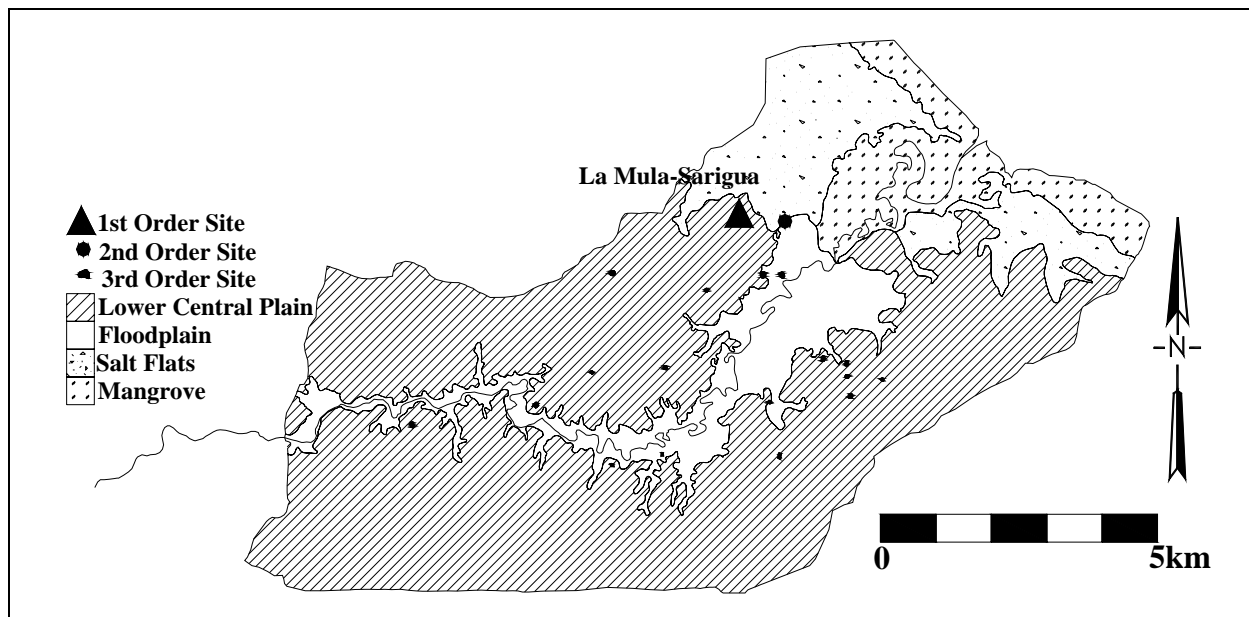


Figure 4.6. La Mula ceramic phase settlement type distributions.

Quarries and processing sites for the production of stone axes during the Late Occupation Sequence have been recorded in the Cordillera Central (Cooke and Ranere 1992a:281; Cooke, et al. 2003a:115; Griggs 2000; Figure 1.1). These stone axes and breadboard metates were found at other sites in the Tonosí Valley during the La Mula phase (Cooke and Ranere 1992a:275; Ichon 1980) and point to the presence of a trade network or socioeconomic interaction sphere. Breadboard metates, however, were not recovered at the site of Sitio Sierra (Cooke and Ranere 1992a:277) suggesting that despite increased exchange, there was regional diversity in trade items. It is not clear if this exchange was controlled by a fixed authority, by a cooperative, or through individual kin ties (Cooke and Ranere 1992a:281; Hansell 1988:247). The lack of differentiation in mortuary investment and absence of communal features from La Mula-Sarigua does not support the existence of social ranking (Cooke and Ranere 1992a:283). La Mula-Sarigua offered the best access to resources in the valley, which could potentially attract and support higher populations from the immediate environs without needing to draw a surplus from other areas.

Table 4.2. Late Occupation Sequence for second-order sites in the Río Parita Valley (X=not occupied; 1=first-order site; 2=second-order site; 3=third-order site).

SITE	LA MULA	TON	CUB	CONT	MAC	PAR	HAT
La Mula-Sarigua	1	2	3	3	2	3	X
He-2	X	2	2	2	2	2	3*
He-4	3	2	1	1	1	1	1
6	3	3	3	3*?	X	2	3
48	3	X	2	3	3	3	3
54	X	3	2	3	3	X	3
68	X	X	2	X	3	3	X
128	X	2	2	3	3	2	3
128A	X	2	N/A	N/A	N/A	N/A	N/A
174	X	2	2	2	3	3	X
184	X	3	2	3	X	X	X
191	X	2	2	3	3	3	3
194	3	X	2	2	2	2	3*
232	X	X	3	2	3	3	3
271	X	X	X	2	3	3	X
317	2	X	X	3	3	X	X
345	X	X	3	X	2	3	3
355	X	X	X	X	3	3	2
363	X	X	X	3	3	2	2

Site DAI/C values decrease as one moves away from La Mula-Sarigua (Figure 4.2). If density reflects age of settlements, the La Mula phase settlement pattern might reflect growth, or colonization, from La Mula-Sarigua of the upriver zone—a reversal of the previous trend. The pockets of higher population density near La Mula-Sarigua might represent daughter communities, while granddaughter communities would be those located farther upstream in the Lower Coastal Plain (Flannery 1976b:172, Figure 6.7 B). If the La Mula phase settlement pattern can be explained by “natural growth,” then with succeeding phases we should expect to see a continuation of sites spreading upriver with the second-order sites being the older sites in the valley—a pattern that does occur.

Overall, the Río Parita Valley survey supports the conclusions derived from previous investigations in the Central Region of Panama (Cooke and Ranere 1984, 1992a; Hansell 1988; Ichon 1980; Piperno and Pearsall 1998; Weiland 1984). There is an increase in the number of sites and a pronounced population nucleation with the emergence of the first and largest formative community in Panama (La Mula-Sarigua). The settlement distribution for the La Mula ceramic phase demonstrates that a new pattern had solidified after the previous pattern of small sites dispersed throughout the survey zone and in different ecological zones throughout the Central Region. Settlement size and density decrease, and spacing between sites increases as one moves upriver away from the coast. There is an obvious difference in size between the La Mula phase sites, but settlement distribution reflects population concentrating into one area without the presence of social ranking, or any administrative or specialized ceremonial functions. Thus, although La Mula-Sarigua is at the apex of a site-size hierarchy, it is unlikely that it was a central place of a centralized polity or economy.

TONOSÍ CERAMIC PHASE (A.D. 250-550)

Within the Central Region, several of the large nucleated sites of the La Mula Phase continue to be occupied into the Tonosí phase. Sitio Sierra is occupied for at least the early part of the Tonosí phase until around A.D. 350 and burials continue to reflect an egalitarian pattern based on achievement, rather than rank (Cooke 1979, 2004; Cooke and Ranere 1992a; Isaza 1993:82-84). Cerro Juan Díaz, on the other hand, is occupied throughout the entire Tonosí phase and, more or less, continuously until Spanish contact (Carvajal, et al. 2003; Cooke and Sánchez 1997; Cooke, et al. 1998, 2003b; Desjardins 2000; Sánchez 1995). Tonosí pottery remains are plentiful at Cerro Juan Díaz and some recovered in mortuary contexts (Cooke, et al. 1998, 2000:164, 2003a; Sánchez 1995). Weiland (1984:46) notes that for the regional survey of the Santa María River Valley, Tonosí phase sites, although few in number, were large

nucleated settlements located in the floodplain and in the coastal zone. It should be noted, however, that the Cubitá ceramic phase, at this point in time, was included with the Tonosí ceramic phase and that settlement studies done before 1995 conflate these two phases (Cooke and Sánchez 1997, 2000; Sánchez 1995).

The most detailed settlement and mortuary information comes from investigations in the Río Tonosí Valley (Ichon 1968, 1970, 1974, 1975, 1980). Ichon's (1974) survey of the entire valley documented approximately 51 residential sites with 11 of them possessing cemeteries. Unlike other areas in the Central Region, La Mula occupation was characterized by a few small (.1 ha) and dispersed sites (6-12 km apart) in the Río Tonosí Valley with no mortuary evidence (Briggs 1989:21; Ichon 1980:46, 71). Although site-size information is not given, it appears from a detailed account of one site (La India; Figure 1.1.) that Tonosí phase sites grew in size, but were still small (.5 ha) and roughly .5 to 4 km apart (Ichon 1980:78-82, 194). All of the La Mula phase sites were re-occupied in the Tonosí phase with the emergence of nine new sites focused on the Río Tonosí floodplain. Many burials from El Indio (n=43) and from a cemetery at El Cafetal (n=38) were assigned to the Tonosí ceramic phase (Briggs 1989; Cooke, et al. 200:157; Gonzalez 1971; Ichon 1980; Figure 1.1). Both of these sites are located near the floodplain and adjacent to the mangrove-estuary zone (Ichon 1980:194).

Over half of the Tonosí ceramic phase graves from the site of El Indio were occupied by children or adolescents. Children, although not all, were buried with the most elaborate mortuary arts (painted double-bodied vessels; see Ichon 1980:Plates 19-22), whereas only shell objects were found in adolescent graves (Briggs 1989:28-31). Although most adults were associated with ceramic vessels, they do not share any salient mortuary objects with burials of children or adolescents. Few gold or tumbaga objects were found in these Tonosí phase burials; those that were appear to represent the final century of the phase. Overall Briggs' analysis determined that age was an important criterion at El Indio for determining the presence or absence of certain mortuary objects—as age increases, personal achievement produced more individualistic social identities that are reflected by less standardized grave goods (Briggs 1989:33). Briggs (1989:34) supports his conclusion that El Indio was an egalitarian society, as these burials are located in domestic contexts, rather than a formal cemetery (Saxe 1970).

At El Cafetal, however, 38 skeletons appear to have been deposited in a formal cemetery away from habitation debris (Briggs 1989:56; Gonzalez 1971). Shell, bone and metal mortuary goods were exclusively associated with adult burials, whereas lithics only appear with children and adolescents; ceramics do not follow any noticeable pattern (Briggs 1989:61). The cluster analysis shows that several graves were unusually rich in costume goods that were meant to be worn and suggests an increased desire to display one's social status (Briggs 1989:62). Briggs (1989:62-63) claims that a higher level of social complexity existed at El Cafetal than at El Indio, but, overall, he concludes that both sites reflect

egalitarian social organization. Nonetheless, Cooke (1984:290) notes that these Tonosí phase burials contain artifact types (i.e., bar pendants of polished agate and onyx, mica, animal bone beads, and tumbaga or gold), which, several centuries later, become indicators of social rank and suggest that disparities in status and wealth were increasing during the Tonosí phase. It should be noted that Briggs (1989:153-154) demonstrates that some artifact types are important indicators of social rank, but that the sheer quantity of grave goods is equally important.

As dramatic as the settlement changes in the preceding phase is the Tonosí reversal of the nucleation process, resulting in a dispersal of population throughout the valley (Figures 4.7, 4.8). Unlike Sitio Sierra and Cerro Juan Díaz, La Mula-Sarigua suffers a substantial decrease in population and is now just one of several second-order sites (hamlets) that congregate, more or less, near the floodplain of the Río Parita. Hansell, likewise, notes a similar drop in site size at La Mula-Sarigua (1988:200). There are no first-order sites for the Tonosí phase, but the term second-order sites is still used to illustrate the similarity in size (ha) and population (DAI/C) with second-order sites from other phases. Overall, there is no meaningful change in occupied area or population in the survey zone; DAI/C values for these two phases are more or less the same as Tonosí sites are, on average, larger than those of the La Mula phase (Figure 2.20.; Table 2.1). For the first time we have occupation in the Upper Survey Zone and considerable population density in the southwestern part of the Lower Survey Zone—an area that will come to dominate the valley.

Although the stem and leaf plot and the site-size histogram (Figures 4.5, 4.9) suggest that there is little variation in site size (DAI/C), Figures 4.7 and 4.8 reveal that there are six loci of higher population density, although relatively small in size (average=.25 DAI/C; 1.8 ha). The majority of these second-order sites are single high-density collection lots. When the 100 m threshold between collection units is used in delineating sites (Figure 4.5), He-2 and He-4 are unquestionably the largest sites (respectively .395 and .397 DAI/C). Both of these sites are occupied continuously until the Spanish colonization in the sixteenth century. Similarly, Stirling and Willey (Ladd 1964:Plate 15j, He-4; Plate 10, He-2; Plate 16a, b, He-1 across from He-2) found Tonosí occupation at these sites during their 1948 excavations.

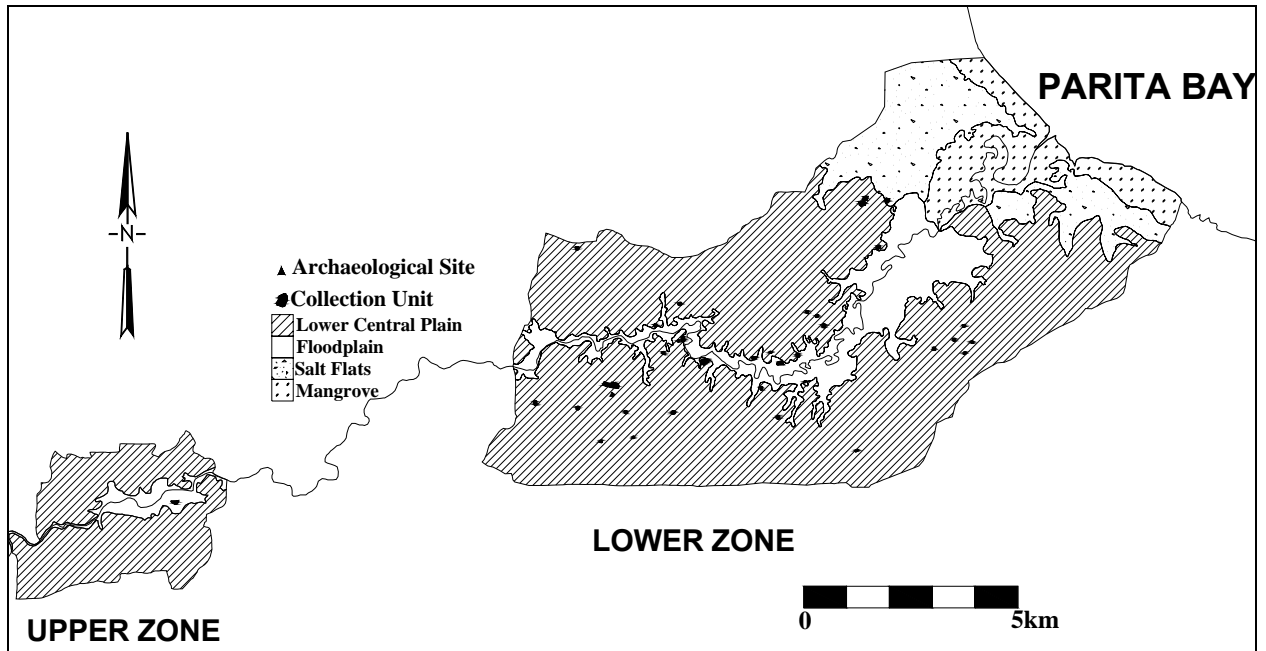


Figure 4.7. Tonosí ceramic phase settlement locations.

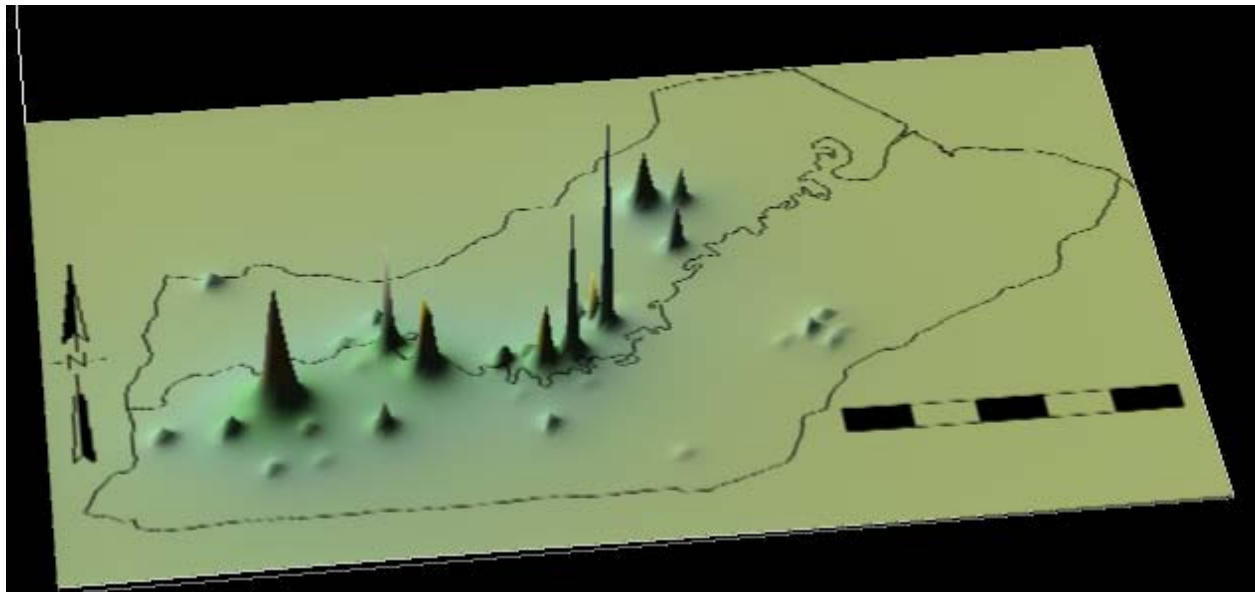


Figure 4.8. Relative settlement density (DAI/C) for the Tonosí ceramic phase.

The other four second-order sites (Figure 4.10; Sites 128, 174, 191, and La Mula-Sarigua) reflect more of a Poisson distribution, and suggest that these “hamlets” differ more in degree than in kind from third-order sites. With the convexity of the rank-size plot for the Tonosí phase ($A = .386$; Figure 4.9), we are more than 99% confident that this represents a different settlement dynamic than that for the La Mula phase ($A = -.87$; Figure 4.3; Drennan and Peterson 2004). This does not suggest any supra-hamlet integration, but a settlement organization characterized by independent self-sufficient communities dispersed throughout the survey area. That being said, these areas of higher density in the floodplain all continue to be important sites that, more or less, are occupied throughout the entire Late Occupation Sequence (Table 4.2). The majority of the second-order sites are adjacent to the floodplain, whereas He-4 and La Mula-Sarigua are approximately 700 m away. Although this is not a great distance to the floodplain, it is interesting that the two largest sites in the survey zone have a noticeably different location than other hamlets.

Hansell (1988:200) noted a dramatic drop in site size at La Mula-Sarigua from 58 to 3 ha, and most of the Tonosí settlement is found in different areas than those occupied during La Mula phase. The Río Parita survey documented a similar reduction in site size as La Mula-Sarigua now becomes a second-order site (2.9 ha, .14 DAI/C; Table 4.3). With the depopulation of La Mula-Sarigua, people radiated throughout the valley. The 26 third-order sites have a mean site size of .54 ha and .05 DAI/C. The majority are isolated residences spread out in the survey zone, but concentrate in three general areas. Seven are concentrated around He-4, nine are located in the floodplain, and five are grouped together in the eastern end of the Lower Survey Zone south of the Río Parita (Figure 4.10).

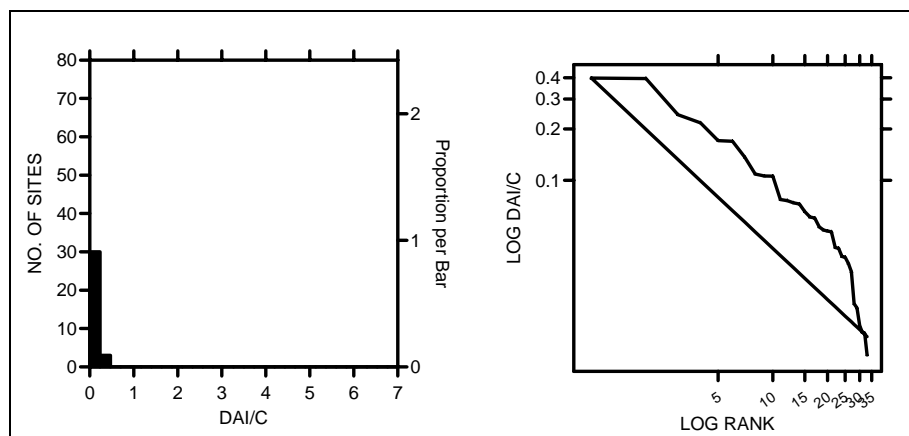


Figure 4.9. Site-size histogram and rank-size plot for Tonosí ceramic phase.

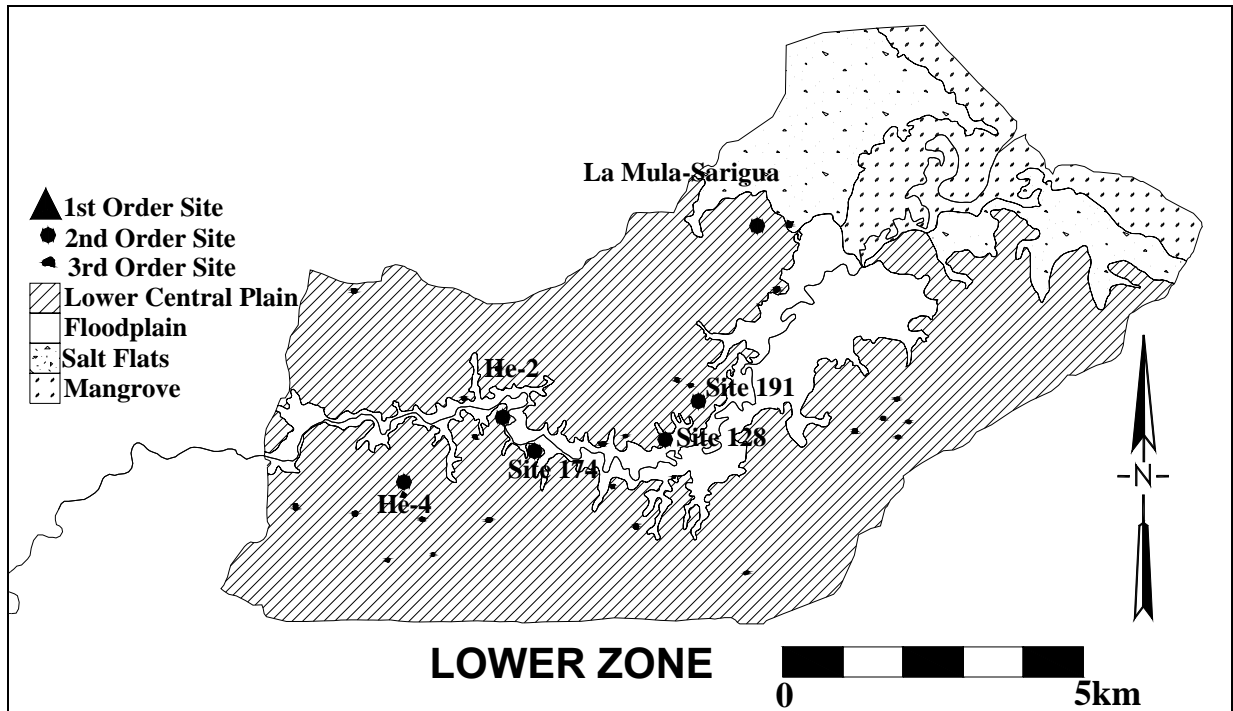


Figure 4.10. Tonosí ceramic phase settlement type distribution.

Table 4.3. Average site size by site type for the Late Occupation Sequence.

Site Rank	Size/DAI/C	La Mula	Tonosí	Cubitá	Conte	Macaracas	Parita	El Hatillo
1st-order	size (ha)	19		20.4	19.6	11.1	14.9	19.5
	DAI/C	2.4		6.34	5.31	3.0	4.7	2.3
2nd-order	size (ha)	0.9	1.8	2.5	2.1	3.3	2.9	2.1
	DAI/C	0.34	0.25	0.75	0.73	1.1	1.2	0.89
3rd-order	size (ha)	0.6	0.54	0.65	0.67	0.93	0.72	0.66
	DAI/C	0.05	0.05	0.15	0.11	0.17	0.13	0.09

During the Tonosí phase, geomorphological changes reduced the efficacy of the resources near La Mula-Sarigua possibly making areas upriver more attractive (Clary, et al. 1984; Richard Cooke, personal communication; Hansell 1988:28). The site was encroached upon by mangrove swamps and salt flats, and progradation, due to deltaic sedimentation, located the coastal resources farther away. Starting in the Tonosí phase, and completed by A.D. 800, the salt flats that presently separate the site from the coast 4 km away began to form (Clary, et al. 1984; Hansell 1988:240). Hansell (1988:241) notes that the creation of the salt flats would have resulted in making the area around La Mula-Sarigua, and towards the coast, an

unpleasant and unproductive place to live. During the dry season, katabatic winds (Cooke and Ranere 1989:295) would have picked up salty sands and deposited them throughout the area reducing the productivity of the agricultural soils and availability of potable water through high evapotranspiration and making it unpleasant for habitation (Cooke and Ranere 1992a:Note 16; Hansell 1988:241). Additionally, deforestation would have reduced the availability of wood for cooking and construction (Hansell 1988:241). Thus, relocating settlements closer to the coast would have not been the most desirable option. On the other hand, population shifted to the Río Parita floodplain upriver (Cooke and Ranere 1992a:Note 16). Although it is possible that with paleoenvironmental changes at La Mula-Sarigua, population gravitated outside the survey zone towards Cerro Juan Díaz (11 km away) that has much Tonosí pottery (Cooke and Sánchez 1997; Sánchez 1995), there is no meaningful change in overall population levels in the Río Parita Valley (Table 2.1, Figure 2.20).

During the Tonosí phase, breadboard metates were no longer used at La Mula-Sarigua (Hansell 1988:204). Additionally, Hansell (1988:207) noted that pear-shaped stone axes are associated with La Mula phase ceramics, but not with later phases; trapezoidal shaped stone axes may have been associated with La Mula and earlier ceramics, but appear to be distributed predominantly with Tonosí and later phase ceramics remains. After a recent visit to the 10 ha chert outcrop at La Mula-Sarigua, Richard Cooke (personal communication) noted that decent sized nodules of chert for detaching flakes were difficult to find and suggests that most likely the outcrop became exhausted in pre-Columbian times. The disappearance of good workable stone could, then, have been a another factor involved with La Mula-Sarigua's declining importance as a settlement and could have affected the migration of people from the site during the Tonosí phase.

Only two pear-shaped stone axes were recovered during the Río Parita survey, both from collection units lacking any diagnostics. Of the 28 trapezoidal stone axes, five were not recovered with diagnostic artifacts, one was associated with La Mula phase and Conte ceramics, whereas the remaining 22 were associated with a mix of ceramics from all of the Late Occupation Sequence phases except La Mula (Tonosí to El Hatillo). Thus, the distribution of stone axes recovered during the Río Parita survey supports Hansell's (1988:207-208) separation into chronological types; however, Lothrop 1937 recovered many pear-shaped stone axes in the Late Ceramic II burials at Sitio Conte. It appears that settlement changes during the Tonosí phase were a reflection of environmental changes at La Mula-Sarigua in addition to probable changes, or disruptions, in the La Mula phase socioeconomic exchange and interaction sphere. If, as Richard Cooke (personal communication) suggest, the 10 ha chert outcrop was exhausted, the inhabitants of La Mula-Sarigua could have lost an important resource to trade for highland products. This suggests that there was a major shift in exchange of goods beginning with the Tonosí phase with pear-shaped stone axes and breadboard metates disappearing from the archaeological record.

CUBITÁ CERAMIC PHASE (A.D. 550-700)

The Cubitá ceramic phase was only recently separated from its previous place within the Tonosí phase. Sánchez's (1995; Cooke and Sánchez 1997, 2000; Sánchez and Cooke 1997) investigation of several middens at Cerro Juan Díaz revealed that a ceramic style that Ichon (1980) had included with his El Indio Phase II (A.D. 200/250 to 550), was not in fact part of the Tonosí ceramic phase, but chronologically belonged to a separate succeeding phase. The best chronological information for Cubitá comes from Cerro Juan Díaz with radiocarbon and stratigraphic associations placing this ceramic phase at A.D. 550-700. Through Sánchez's seminal work, the Cubitá ceramic phase has been identified at many other sites where before it had been lumped in with other phases.

Cubitá ceramics have a much wider distribution within the Central Region than previous ceramic styles and are found in many different domestic and ritual contexts representing important sociopolitical change, as people are participating in wider networks of social and economic exchanges (Cooke and Sánchez 1997, 2000, 2001; Sánchez 1995; Sánchez and Cooke 1997). The Cubitá phase is associated with the dawn of the chiefdom era as these economic networks were focused on "obtaining, producing and distributing goods which were badges of power" (Cooke and Sánchez 2000:7). Information for the Cubitá ceramic phase comes from the Río Tonosí Valley, Playa Venado, and Cerro Juan Díaz.

Ichon's Phase III at the Río Tonosí Valley sites corresponds to the Cubitá, Conte, and the early part of Macaracas ceramic phases (ca. A.D. 550-1000), during which time the trends of the Tonosí phase, are continued and intensified. Settlement in the Tonosí Valley increases from 13 to 25 sites, although it is not possible with available information to address increases in site size (Ichon 1980:313-315). Interestingly, all of the Tonosí phase sites are re-occupied during the Cubitá to Macaracas phases with an additional 12 sites emerging equally in the floodplain and the piedmont (Ichon 1980:313). Sites are approximately .5 to 4 km apart in the floodplain and 5 to 15 km apart in the piedmont. Re-occupied sites with the most recovered burials are the largest sites of this phase and are located in the floodplain and in the mangrove-estuary zone.

For the Cubitá to Macaracas mortuary features there is an increase in the presence of sumptuary goods (i.e., gold or tumbaga) and, overall, greater variation in the number of grave goods, such as ceramic vessels, shell, and some tumbaga, or gold, objects (Briggs 1989:62). Starting in the Cubitá ceramic phase, social criteria other than age (e.g., group affiliation) become important in determining which graves goods are incorporated into individual burials (Briggs 1989:62-3). Although there is increased use of formal cemeteries and costume grave goods (used for visual display) suggesting that social divisions are becoming more rigid within a developing social hierarchy, Briggs (1989:63) still considers these sites to be egalitarian villages, rather than representing the ranked social classes evident at Sitio Conte.

Playa Venado, located in the Southwest Pacific corner of the former Canal Zone near Panama City, was excavated mainly by amateur archaeologists (Bull 1961) and Samuel Lothrop (1954), who uncovered burials representing 369 individuals. These burials exhibited much variation in burial treatment including flexed (50%) and extended (14%) burials, large urns (17%), bundles (6.5%), and large globular chambers possibly containing upwards of 50 individuals (1%) (Lothrop 1954:226, Table 8). Some extremely well crafted ornaments made of metal, marine shell, and polished stone were found in some graves (Bull 1961; Cooke and Sánchez 2000:Note 12; Lothrop, et al. 1957). Their relationship with pottery styles, however, has yet to be determined. Sánchez recently reexamined these ceramic collections and the painted varieties are almost all Cubitá (95%) with some Conte (3%) (Cooke and Sánchez 2000:13-14). Additionally, marine shell artifacts made of *Spondylus* are associated with many Cubitá burials at Playa Venado and Cerro Juan Díaz (Bull 1961; Cooke and Sánchez 1997; Lothrop, et al. 1957).

It is mentioned above that small well-crafted shell and bone artifacts were also found in the four graves stratified under the oven features at Cerro Juan Díaz (Cooke, et al. 2000:164, 2003a:95, 117; Cooke and Sánchez 1997; Díaz 1999), which date between about A.D. 150 and 650 (Cooke, et al. 2000:164). The earliest, Feature 16, was described in the context of the La Mula pottery phase. Three of the graves, Features 1, 2 and 94, had burials during the Tonosí and Cubitá phases. In Feature 1, which was not radiocarbon-dated, but was stratified below Feature 2, the most recent burial was that of an adult, associated with two hammered gold plaques, two pottery incense burners, 24 perforated canines of jaguar and puma, and 400 or so elongated *Spondylus* beads (Cooke and Sánchez 1997:Figure 4; Cooke, et al. 2000:161-163). It is possible that the felid teeth, goldwork and beads formed part of a single artifact such as an apron or shirt (Cooke 1988c:107-108; Cooke, et al. 2003a:117-118). Feature 2 had at least 18 individuals buried in bundles. Burial goods comprised five agate beads, one puma and four jaguar canines, 34 *Spondylus* beads, and a gold plaque with raised spirals (Cooke and Sánchez 1997:Figure 4; Cooke, et al. 2000:162:Figures 8.6, 8.7). Dentin samples from the teeth of two of the individuals returned dates of 1640 ± 40 B.P. (cal A.D. 340 [410] 530) (Beta-147876) and 1460 ± 40 B.P. (cal A.D. 540 [620] 660) (Beta-147877) (Cooke, et al. 2000:162). Feature 94 contained two burial episodes. In the bottom of the shaft, scattered remains of an adult were associated with around 90 pearl oyster pendants and associated charcoal was dated to 1570 ± 80 B.P. (cal A.D. 340 [530]650) (I-18637) (Cooke, et al. 2000:163). In the upper section of the grave, a 20 to 25 year-old woman, buried in a supine primary flexed position, was placed on top of a broken legged metate with a single shell anuran and three large intentionally broken Cubitá-style plates (Cooke and Sánchez 1997:Figure 6; Cooke, et al. 2000:163). A sample of her tooth dentin was dated to 1500 ± 40 B.P. (cal A.D. 450 [570] 640) (Beta-147878) and associated charcoal returned a date of 1380 ± 80 B.P. (cal A.D. 550 [660] 800) (I-18638) (Cooke, et al. 2000:164).

The quantity and diversity of grave goods associated with the early mortuary phase suggests that disparities in social status and wealth were more prominent at Cerro Juan Díaz than in the Tonosí Valley. The association of goldwork, incense burners, felid tooth pendants, clothing adorned with shell, and polished stone bars with a few individuals from these burials has led Cooke, et al. (2003a:117-118; Cooke 1998c:107-108) to suggest that they had a special occupation of healer or shaman. The later (A.D. 700-1050) mortuary platform above the ovens at Cerro Juan Díaz, however, appears to be a community burial where status was based on age, sex, and occupation, rather than ascription (Díaz 1999:3).

The similarities between the sites of Cerro Juan Díaz and Playa Venado are remarkable, especially, as they are over 250 km apart (Cooke and Sánchez 2000:7). At both sites, a great variety of modes for preparing and placing the dead occurred, consisting of flexed, extended, urn, and bundle burials with many grave goods fabricated from *Spondylus* shell (Bull 1961; Cooke 1998b, 1998c; Cooke and Sánchez 2001; Díaz 1999; Lothrop 1954). Additionally, the Cubitá pottery for both sites is very similar in form and style (Cooke and Sánchez 2000). This ceramic standardization and the similarities in burial practices between Cerro Juan Díaz, Playa Venado, and other sites, have been used to support Cooke and Sánchez's (2000:13-15) claim that during the Cubitá ceramic phase there was a dramatic reorganization and expansion of economic and social networks throughout the Central Region of Panama.

In the Río Parita Valley survey zone, once again, there is a striking demographic change. If the La Mula phase represents a dramatic increase in number of occupied collection units, the Cubitá phase should be characterized as a population explosion. Likewise, a similar phenomenon was demonstrated by Isaza (2004) for the adjacent Río La Villa Survey. In a ceramic phase only half the temporal span of Tonosí, Cubitá has over three times the collection units (135) in the Río Parita Valley and, overall, a seven-fold jump in DAI/C (Figure 2.20; Table 2.1). Despite the dramatic increase of population in the valley, many of the higher-density sites occupied during the Tonosí phase continue during the Cubitá; thus, this phase represents more of a change in site population density, rather than location (Figures 4.11, 4.12)—similar to the Río Tonosí Valley (Ichon 1980:313). With the Cubitá phase, the general settlement pattern for the remaining ceramic phases is established.

Both the stem and leaf and rank-size plots suggest the emergence of what appears to be a three-tiered site-size hierarchy dominated by He-4 (Figure 4.13). We can be over 99% confident that the primo-convex distribution of the Cubitá rank-size graph ($A = -.198$; Figure 4.4) represents a change in settlement dynamics from the preceding Tonosí phase (Drennan and Peterson 2004). There is, however, a gradation of DAI/C values (Figure 4.14) that could be described as a Poisson distribution, rather than discrete groups of site types. Nonetheless, there are distinct demographic patterns that do support a separation of sites, at least based on population size (DAI/C), into the proposed site typology (Figure 4.14).

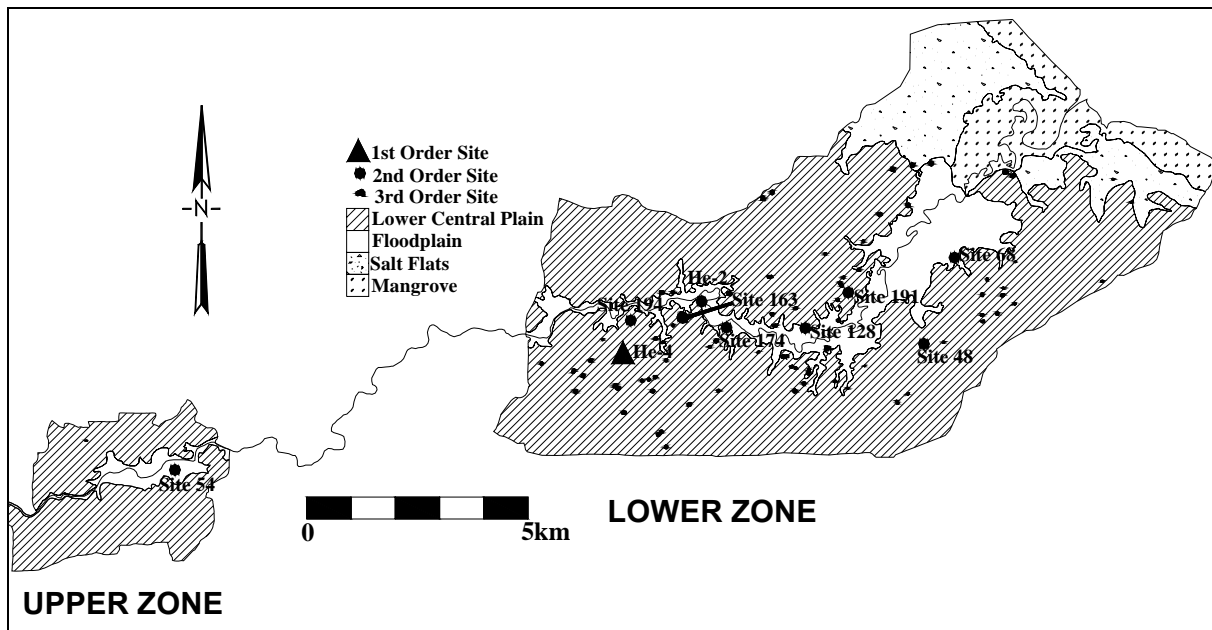


Figure 4.11. Cubitá ceramic phase settlement type distribution.

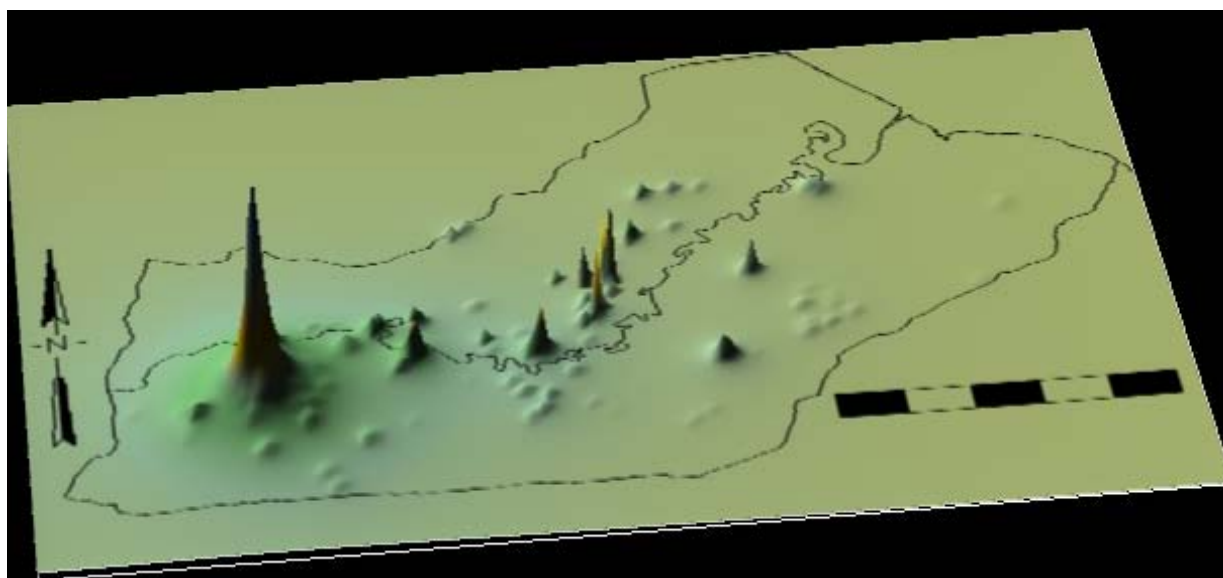


Figure 4.12. Relative settlement density (DAI/C) for the Cubitá ceramic phase.

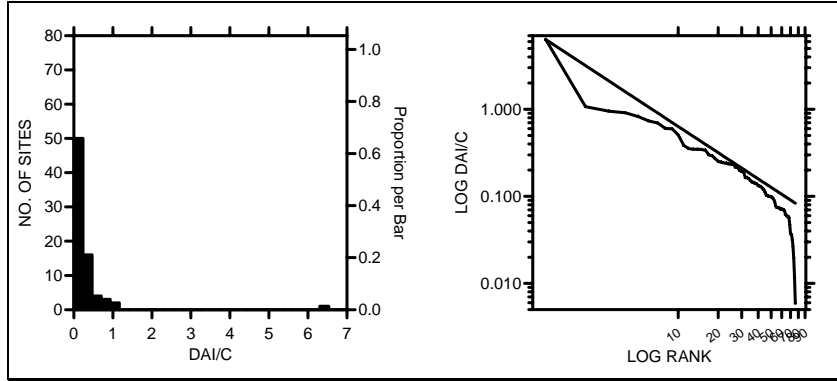


Figure 4.13. Site-size histogram and rank-size plot for Cubitá ceramic phase.

Cubitá			Conte	
		63		
(He-4)	43	63		
		≈		
		53		
		53	11	(He-4)
		≈		
		11		
		11		
	70	10		
		10	06	
	51	9		
(He-2)	12	9		
		8	83	
	25	8		
		7		
	34	7	17	(He-2)
		96		
		02		
		96	57	
		09		
		4	74	
		4		
	54,84	3		
	39,44,47,47	3	08,36	
	52,70,92,99	2	50,55,57,79,81	
	14,16,33,35,36,40,43,47	2	18,27	
	52,59,64,64,90,93,98	1	50,52,55,60,64,66,68,71,72,96	
	00,02,03,12,19,24,29,31,32,39,40,44,45	1	02,04,07,10,19,19,19,24,38,42,43,43	
	58,58,60,61,62,69,70,71,71,71,74,74,74,75,78,88,94,97,99,99	0	52,54,54,54,56,57,62,66,67,68,71,74,75,76,77,80,87,87,92,93,95,96,97,97,98	
	06,12,20,27,32,37,37,48	0	14,20,21,24,26,27,30,32,33,38,39,43,43,43,44,46,46,47,49	

Figure 4.14. Back to back stem and leaf plot of the DAI/C for Cubitá and Conte ceramic phase sites.

At the bottom of the site-size hierarchy there are 66 third-order sites with a mean size of 0.65 ha and a DAI/C value of .15 (Table 4.3). Third-order Cubitá sites are just slightly larger in area, but three times greater in DAI/C value than their Tonosí phase counterparts. Only 8 out of the 25 Tonosí phase third-order sites continue to be occupied during the Cubitá phase and, thus, the majority of these sites represent new settlement locations. These third-order sites are not dispersed evenly throughout the zone, but tend to gravitate towards the floodplain or near He-4 (Figure 4.11).

With a mean site area of 2.5 ha and a DAI/C value of .75, the nine second-order Cubitá phase sites are four times larger in area and five times larger in density than Cubitá third-order sites (Figure 4.11, Table 4.3; He-2, 48, 54, 68, 128, 174, 184, 191, 194). Cubitá second-order sites, in general, increase by one-third in site size (ha) and three-fold in DAI/C over Tonosí second-order sites. All, but one, of the 7 second-order Tonosí sites have continued occupation: four remain hamlets, one (He-4) becomes a first-order site, and La Mula-Sarigua is now a third-order site, a designation that accords with Hansell's (1988:200) site-size estimates. In addition to the re-occupation of four Tonosí hamlets, there are also five second-order Cubitá sites, thus nine in total. Of these five hamlets, all but one are found in previously unoccupied locations. A Cubitá phase hamlet is located in the Upper Survey Zone (Site 54) in a location previously occupied by a Tonosí third-order site—the only second-order site in the Upper Survey Zone. Overall, the Tonosí phase second-order sites were small, adjacent to the floodplain, and roughly 1.5 km apart.

The first-order site (He-4), previously a Tonosí hamlet, has an area of 20.4 ha and a DAI/C of 6.34, dominating the site-size hierarchy of the region, where it is eight times larger than the average hamlet (Table 4.3). He-4, known for its burial mounds, was excavated by professional (Ladd 1964) and amateur (Bull 1968; Dade 1972; Mitchell and Acker 1961) archaeologists. Although it appears from the available reports that the most elaborate graves date to the Macaracas, Parita, and El Hatillo ceramic phases, there is some data that suggests the area was a formal cemetery in use by the Cubitá phase. The area that eventually contained these small (< 3 m in height) mounds was within the Cubitá site limits of He-4. In one of the few available reports from excavations of mortuary remains at the site of He-4, Bull (1965:Plate IIA) includes a picture of an Espavé Red incense burner that dates to the Cubitá ceramic phase (similar to vessels found in the “shaman” graves at Cerro Juan Díaz [Cooke 1988c:107-108; Cooke, et al. 2003a:117-118]). In the same burial mound (VI) and Mound VII, Stirling and Willey recovered sherds dating to the Tonosí/Cubitá ceramic phase (Ladd 1964:38-39). Apart from scattered human bone, these finds were not associated with any burials or offerings (Bull 1965; Ladd 1964:38) and might have just been mound fill, but the Cubitá vessel was complete making this unlikely.

Although the majority of mortuary goods at Sitio Conte date to Conte and early Macaracas phase, Lothrop (1937) did find one ceramic vessel, possibly an heirloom, that dated to the Cubitá phase in Grave

32—one of the more elaborate burials at Sitio Conte (Cooke, et al. 2000:165). Recently, Luis Sánchez (personal communication) reanalyzed some of the materials from Sitio Conte (stored at the Peabody Museum at Harvard University) and determined that there were 10 Cubitá vessels found in Graves 14, 18, 32, 26, 37, and 45. Although there is only limited artifactual evidence, this small sample suggests that both the cemeteries at He-4 and Sitio Conte, which possesses evidence for high-status graves and social ranking in later phases, were in use by the Cubitá phase.

The demographic explosion during the Cubitá phase is characterized by population being attracted to pre-existing hamlets, with one (He-4) increasing substantially due to natural population growth or migration. Third-order sites tended to be located in previously unoccupied areas (collection units), but near previous Tonosí occupation. A settlement hierarchy with two levels above the base of production sites continues for the rest of the prehispanic period within the survey region. This is quite different from what Isaza (2004) found for the lower Río La Villa Valley where several large nucleated villages (first-order sites) occurred at even 2 km intervals, beginning in the Cubitá phase and continuing through Parita.

CONTE CERAMIC PHASE (A.D. 700-900)

The lavish Sitio Conte burials excavated by Lothrop (1937, 1942) have been thought by many scholars to be the defining moment in the existence of hereditary status in the Central Region when “some people...were able to amass and show off a lot of wealth” (Cooke, et al. 2000:172). The spectacular finds of gold, painted ceramic, bone and other artifacts have influenced many researchers’ ideas about the emergence of social rank at the site, and have been a source of inspiration for interpreting other areas of the Central Region (Briggs 1989, 1993; Cooke 1984a; Cooke, et al. 2000; Hearne and Sharer 1993; Helms 1995, 2000; Ladd 1964; Linares 1977; Lothrop 1937, 1942; Sánchez 2000:131-132) and areas outside of Panama (Creamer and Haas 1985; Marcus and Flannery 1996:100).

The burial pottery associated with these graves suggests that the cemetery was in use from A.D. 750-950, (or earlier bearing in mind the Cubitá data) during which time there was a diversification of gold artifacts types along with an increase in size and number of objects in individual graves (Cooke, et al. 2002:172). The site has been described as a necropolis covering 3 to 4 ha along the Río Grande de Coclé (Briggs 1989:65). There is some residential occupation extending the site size to 8 ha, but it was not intense and is associated to times when the cemetery was not in use (A.D. 200-700, A.D. 950-1100 [Linares 1977:34, 58]). The majority (72%) of the identified Sitio Conte burials were adult males, and many were associated with hoards of weapons, giving support to the idea that these were warriors whose

grave offerings represented their military rank in life (Briggs 1989:75; Cooke, et al. 2000; Linares 1977). Contrary to the age profiles of other cemeteries in the Central Region, Cooke, et al. (2000:168, 2003a:124) note that, of the 156 burials recovered by Lothrop, only one was a child.

Briggs (1989:130) notes that the necropolis at Sitio Conte was a special facility for those who had achieved a unique status. The primary interment in the most elaborate graves was a seated adult male with gold objects and other individuals (in one case 23 other males; Briggs 1989:199-203; Cooke, et al. 2003a:122; Mason 1941:263). The main occupants of these graves (Briggs' cluster 1) were covered in golden costume components very similar to those described for Chief Parita's funerary attire observed by the Spanish in 1519 (Espinosa 1994b:63-64; Lothrop 1937:46).

Briggs' cluster analysis demonstrates that the distribution of graves in terms of quantity and diversity of grave goods follows a pyramidal structure where social ranking was expressed as an additive process (Briggs 1989:138). In other words, the highest social rank will have the same types of grave goods as the social ranks below with the addition of objects restricted to the highest rank. Thus, the individual who had the highest rank possessed the most identity relationships with more segments of society (Briggs 1989:138).

The presence of a specific type of artifact material (i.e., gold) was not the prime marker of social rank. The type of artifact, however, appears to be a more useful indicator of social status; it is not just gold, but plaques, disks, beads, pendants, head coverings, and gravees manufactured from gold or tumbaga that are indicative of higher social status (Briggs 1989:137-138). An equally important gauge of higher social status was jewelry (pendants, beads, and ear and nose decorations) made from stone and animal teeth and bone (i.e., jaguar, manatee, and whale; Briggs 1989:138; Cooke 1998c:110). Thus, "both the simple presence or absence and the absolute number of sumptuary and costume mortuary arts indicates higher or lower status among the deceased at Sitio Conte" (Briggs 1989:137). This manner of indicating rank appears to be similar to that found at Moundville, Alabama, where copper artifacts were found with the three highest ranks, but copper axes only in the most elaborate burials of adult males at the apex of the social hierarchy (Peebles and Kus 1977). Mortuary goods from the Moundville burials, however, do not suggest that an additive process of determining rank was utilized and most likely reflects a major difference in how separate social segments were integrated within these two societies.

Although the most elaborate graves at Sitio Conte indicate high status, Briggs (1989:143) notes that the additive manner of building status "clearly describes an achieved status system," not by age, but by military merit. Ethnohistoric descriptions of social ranking in Panama tell of warriors who could improve their social position through bravery in battle (Helms 1979:32). Chiefly ranks were ascribed at birth, but achievement, namely in battle, did play an important part in maintaining and increasing status and prestige (Andagoya 1994:30; Cooke and Sánchez 2004:II:24-25; Helms 1979:31-32, 67-68, 1981:223;

Oviedo 1944:II:129). With the lack of wealthy infant burials, this suggests that although status was inherited, wealth was not (Cooke, et al. 2003a:136; Sauer 1966:235).

The secondary mortuary horizon at Cerro Juan Díaz (A.D. 700 and 1050; Conte to Parita phases) is contemporary with the mortuary complexes at Sitio Conte and the early part of He-4 burials (Díaz 1999:22). At Cerro Juan Díaz, the use of bundle burials diminishes after A.D. 700, while primary extended burials appear and become a common method of placing the dead (Díaz 1999:68-69). The majority of the individuals at Sitio Conte, apart from the seated central individuals of the elaborate mass graves, were laid out in an extended position (Briggs 1989; Díaz 1999). At Cerro Juan Díaz there is an interesting relation between a group of extended burials and the most complex grave, which had several interments (Feature 4), as it was used several times (Díaz 1999). Likewise, at Sitio Sierra the second mortuary phase dates to the Macaracas and Parita phases with a predominance of extended burials (Cooke 1984a). In the Río Tonosí Valley, on the other hand, the burials at the sites of La Cañaza and El Indio only exhibit the flexed pattern (Briggs 1989:Tables 5, 10).

Operation 4 at Cerro Juan Díaz uncovered a well-defined communal burial ground that included many neo-nates and infants in the same burials, and other areas, i.e. Feature 5, reserved for adult females (Díaz 1999). The distribution of grave goods and identity of interments suggests that the main criteria for determining social status were sex, age, and/or occupation—similar to the two mortuary phases at Sitio Sierra (Cooke 1984a; Cooke, et al. 1998; Cooke, et al. 2000; Díaz 1999). Díaz (1998:70) suggests that the cemetery at Cerro Juan Díaz was not restricted to any group, but that certain areas were reserved for adults and others, Operation 4, for women and infants. This contrasts to the cemetery at Sitio Conte that is occupied almost exclusively by adult males.

Despite the presence of some exotic grave goods, the majority of features assigned to both the early and late mortuary phases at Cerro Juan Díaz lack offerings that would suggest anything similar to the social ranking that existed at Sitio Conte (Cooke, et al. 1998:151, 2003a:117-118; Díaz 1999). Excavations of the mortuary platform reveal that burial rituals were complex and lasted a long time, and package burials suggest that the site was used as a necropolis for far away communities (Díaz 1999:68). Díaz suggests that the burial platform at Cerro Juan Díaz was a community cemetery for the lower-status local and regional population (Díaz 1999:3). This is a different situation to the sub-oven burials (Operation 3) where a few individuals with special artifacts are suggestive of special occupations (i.e., healers or shamans; Cooke 1988c:107-108; Cooke, et al. 2003a:117-118).

Settlement pattern studies relating specifically to the Conte phase are limited; more common is to include the Conte phase with the Macaracas, Parita and El Hatillo phases (Late Ceramic II Period) and discuss it as a single group. For the Late Ceramic II Period in the Río Santa María Valley the overall trend was for population to nucleate in large villages located near the floodplain with special extraction sites

located near the coast (Weiland 1984:46). As discussed above, this is not a unique phenomenon as special extraction sites (e.g., Cueva de los Vampiros) near the coast for the procurement of fish and other coastal resources was occupied during the La Mula phase (Cooke and Ranere 1992a:291). Weiland (1984:40-41, 46:Figure 3) notes that one site from the Río Santa María survey, Ag-73 (approximately the same size as Sitio Sierra, 45 ha) was located 12 km from the Río Santa María floodplain. This site, however, is located less than 1 km from the floodplain of the Río Estero Salado and maybe should not be considered an exception to the general settlement trend of large villages located in the floodplain.

The Conte phase occupation in the Río Parita Valley is a continuation of the Cubitá pattern with a further concentration of settlement near the most populated site, He-4. Despite the almost 25% decrease in overall population (Figure 2.20; Table 2.1), Conte phase settlements are found in many of the same locations as the Cubitá sites; thus, changes in the settlement pattern are more of a reduction in population density than a settlement re-arrangement (Figures 4.15, 4.16).

There are 75 third-order sites with an average site area of .67 ha and a DAI/C of .11—values similar to Cubitá third-order sites (Table 4.3). Of the 66 Cubitá third-order sites, only four were occupied during the Conte phase. Therefore, 71 of the 75 Conte third-order sites are “new” and located relatively near locations of earlier Cubitá third-order sites. Occupation in the La Mula-Sarigua site area also increased, although it is still quite dispersed and of low density (Figure 4.16). Hansell (1988:201) also noticed a re-occupation of the La Mula-Sarigua site with greatly scattered habitation loci. Conte third-order sites also appear in the northwestern part of the Lower Zone; an area not heavily occupied during the Cubitá phase.

The locations of the five Conte phase second-order sites reflect population nucleation of this ceramic phase. Of the nine Cubitá hamlets, three are abandoned, three reduce to third-order sites, and three continue as second-order sites into the Conte phase. In addition to the 3 Cubitá second-order sites that continue into the Conte phase, 2 more emerge. One, near He-4 (Site 232), was a Cubitá phase third-order site, and the other, near He-2 (Site 271), was not previously occupied. Second-order Conte phase sites are, on average, 2.1 ha and .73 DAI/C, more or less the same as Cubitá second-order sites (Figure 4.15, Table 4.3). As mentioned above, second-order sites are located within 1-2 km of He-4, with four of the second-order sites located adjacent to the floodplain.

During the Conte phase, He-4 declines slightly in size (19.61 ha; 5.31 DAI/C; Figure 4.14; Table 4.3), but continues to dominate the site-size hierarchy. The rank-size plot ($A = -2.57$; Figure 4.17) is almost identical to that for the Cubitá period; Figure 4.4 reveals that we would have little confidence in distinguishing a change in the settlement dynamics (Drennan and Peterson 2004). During the Conte phase, the formal cemetery with burial mounds at He-4 is in limited use. Of the eleven burial mounds, three contained Conte ceramics, and from the published reports it appears that at least one burial contained Conte phase ceramics (Mitchell and Acker 1961:Plate VIIIa, a’). Unfortunately, this burial was

excavated by local *huaqueros* and no other information is available. The other instances of Conte ceramics were not complete vessels, so it is not known whether they were offerings or mound fill. Interestingly, the two mounds possibly in use during the Cubitá phase were also in use during the Conte phase and are continuously occupied for the rest of the pre-Columbian sequence. It does appear that while high-status burials were prepared at Sitio Conte during the Conte ceramic phase, there is little if any mortuary activity at the formal cemetery at He-4.

Apart from the five adult burials excavated at La Mula-Sarigua (Hansell 1988:187-190), burials from other sites previously excavated in the Río Parita Valley all date to the Conte ceramic phase. Several burials at He-1 (located across the river from He-2) were recovered by Stirling and Willey (Ladd 1964). Burial 1 contained the remains of a young adult and the richest cache at the site, consisting of a harpoon point, two flint points, some green-stained bone awls, a copper chisel, seven polished axes, a three-legged metate, and a shark's tooth located near the chest of the interred (Ladd 1964:206; Stirling and Stewart 1949:375, 394). Three other individuals (adult, adolescent, and indeterminate) were associated with only Conte ceramics. Two other individuals (adult and indeterminate) were found in a dome-like chamber grave with ceramics, legged metates and red and white lumps of clay. The interments at He-2 were much simpler and consisted of possibly six individuals of indeterminate sex or age, all with ceramics, and one with a polished celt in the mouth (Ladd 1964). Although there are only a few burials recovered for the Conte phase in the Río Parita Valley, mortuary activity was not concentrated at one site, but took place at several, with little to suggest marked differences in social status. Despite a 25% reduction in population, settlement patterns are similar to the preceding Cubitá phase (Figure 4.4) with no meaningful difference in size (ha) or DAI/C of all settlement types. In fact, the rank-size plots for both phases are statistically the same (Figures 4.4, 4.13, and 4.17).

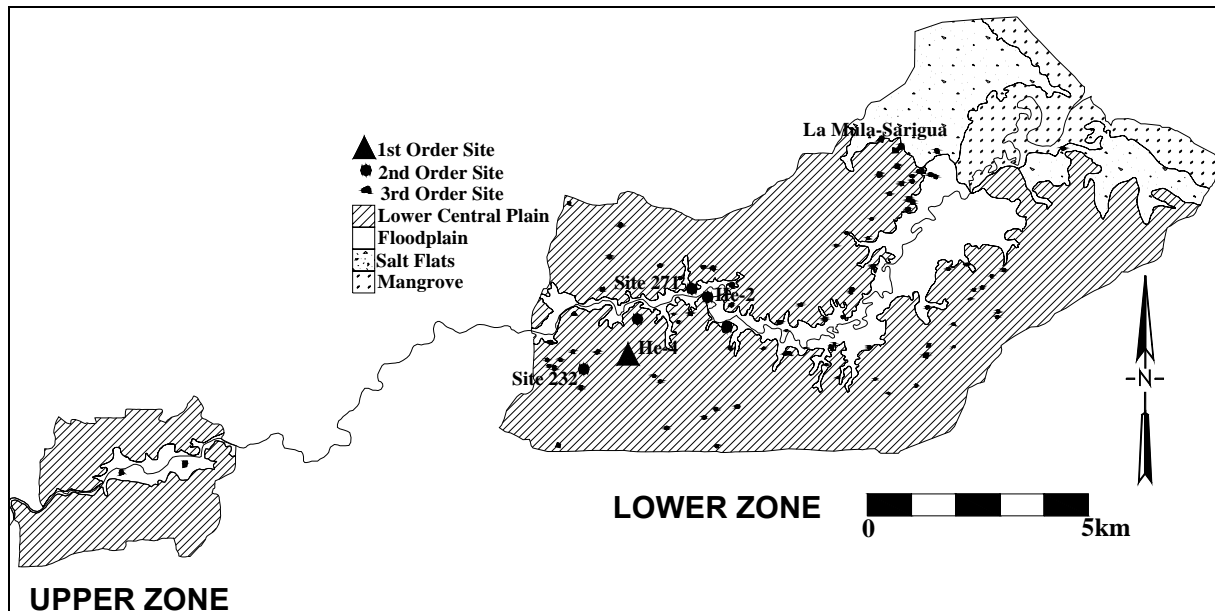


Figure 4.15. Conte ceramic phase settlement type distribution.

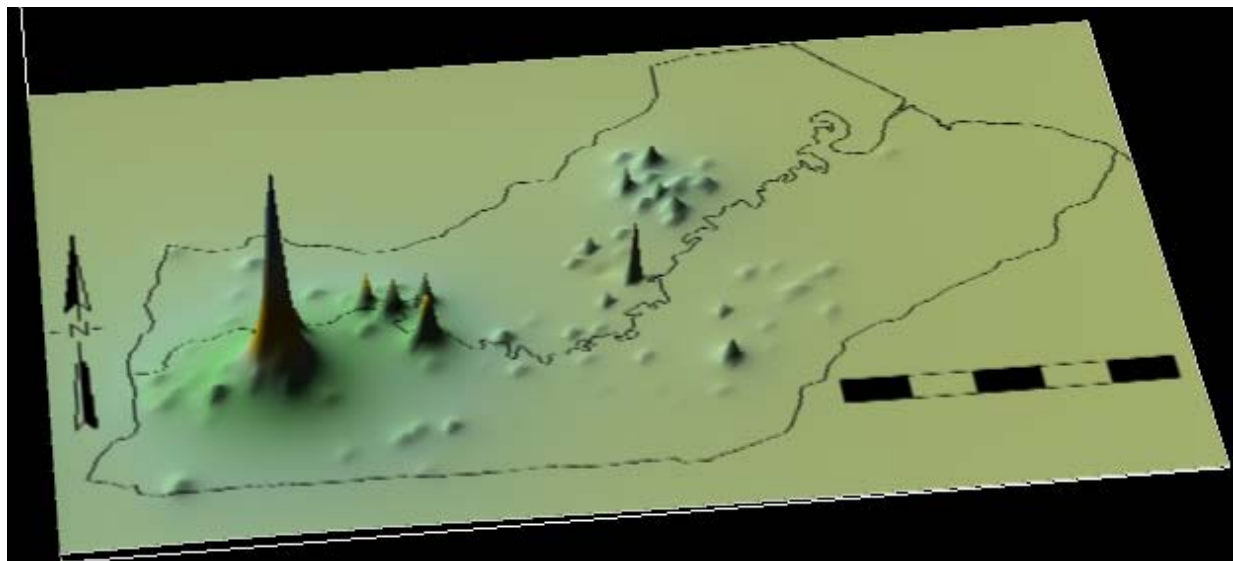


Figure 4.16. Relative settlement density (DAI/C) for the Conte ceramic phase.

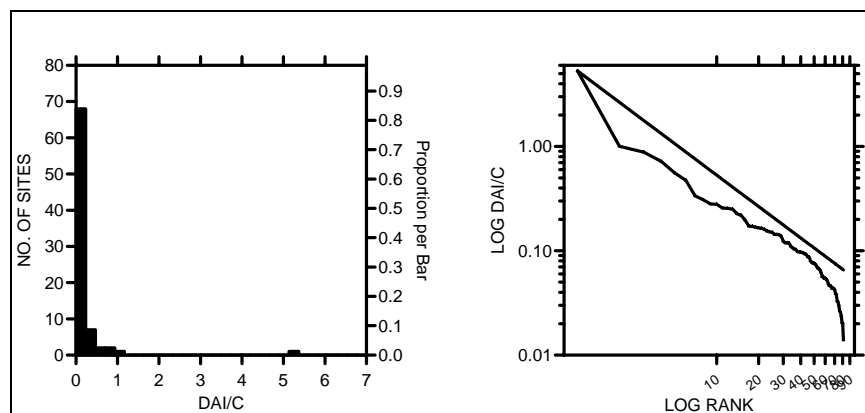


Figure 4.17. Site-size histogram and rank-size plot for Conte ceramic phase.

MACARACAS CERAMIC PHASE (A.D. 900-1100)

Macaracas ceramic wares were manufactured and exchanged over a large area from near Panama City (MilaFlores; Cooke 1998b:Figure8.8; Cooke, et al. 2000:166), sites in the Río Tonosí Valley (350 km apart), and are found as trade goods in Western Panama (250 km away from the Parita Valley; Cooke 1980; Sánchez 2000:137). There is little specific information for the Macaracas phase concerning settlement patterns. Burial information, however, is available from many sites. The Sitio Conte burials have been described above and high-status burials continue into the early part of the Macaracas phase. Near Sitio Conte, the site of El Caño, known for its burial mounds (< 3 m in height) and stone sculptures around an open plaza, has provided important mortuary information from the Macaracas to El Hatillo phases and into the Colonial Period (Cooke, et al. 2000:168-172, 2003a:113). One of the burials found in a lower level of Mound 4 contained several Macaracas vessels dating these mounds to at least an initial use sometime after A.D. 900 (Cooke, et al. 2000:170, 2003a:126; Lleras and Barillas 1985). During the Macaracas phase, differentiation in social status is epitomized by differences in wealth distribution across the Central Region with commoners being buried at Cerro Juan Díaz and other sites (Díaz 1999:68; Ichon 1980), while higher status individuals are interred at Sitio Conte (Briggs 1989). Two of the richest graves at Sitio Conte, Graves 26 and 74, were deposited during the Macaracas phase (Cooke, et al. 2000, 2003a).

Although there are several changes in the settlement patterns in the Río Parita Valley during the Macaracas phase, the overall pattern of He-4 dominating the site-size hierarchy throughout the survey zone continues (Figures 4.18, 4.19). Population nucleation in and around He-4 decreases during the

Macaracas phase, but is still clearly present. Overall, the DAI/C for the Macaracas is almost the same as Conte, but there are significant changes to individual settlement sizes throughout the zone (Figure 2.20; Table 2.1).

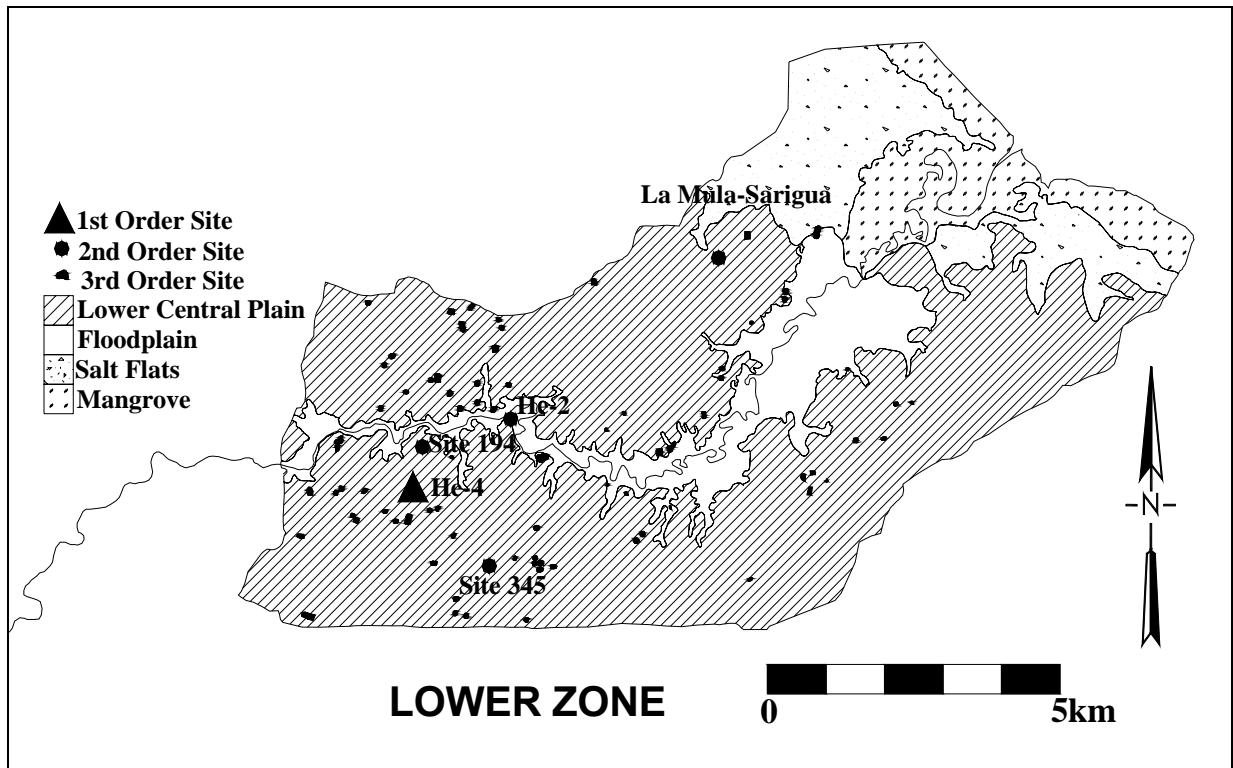


Figure 4.18. Macaracas ceramic phase settlement type distribution.

With Macaracas we have a rank-size plot that is very close to log normal (Figure 4.20; $A = .088$) and we can be over 95% confident that this represents a change in the underlying settlement dynamic from the Conte phase (Drennan and Peterson 2004). Log normality can be explained by the increase in the DAI/C of secondary sites and the decrease in DAI/C of He-4. The same secondary sites continue from Conte to Macaracas with the addition of a second-order site located less than 1.5 km away from He-4 (Site 345) and another located at La Mula-Sarigua (Figure 4.18). As with the second-order site in the Upper Survey Zone during the Cubitá phase, this is a rare occurrence having a second-order site farther than 2 km away from He-4. The Macaracas phase stem and leaf plot reveals a site-size hierarchy very similar to Cubitá and Conte, but with a noticeable reduction in DAI/C for He-4 and an increase in the size of second-order and third-order sites (Figure 4.19).

There are 60 third-order Macaracas sites with an average of .93 ha in area and a DAI/C value of .17. The area and DAI/C values increase by about 40% over Cubitá and Conte third-order sites (Table 4.3); making third-order Macaracas sites the largest in area and population for the entire sequence. Of the 75 Conte third-order sites, only 14 are occupied during the Macaracas ceramic phase. Of the 61 Conte phase

third-order sites, 31 were located near the floodplain and 29 in a general dispersed pattern in the Lower Central Plain. Of the 46 “new” Macaracas third-order sites, 17 are within 300 m of the floodplain and 29 are located greater than 300 m away from the floodplain in the Lower Central Plain.

There are a total of 4 second-order sites during the Maracas ceramic phase with an average of 3.3 ha and a DAI/C value of 1.1—a 50% increase from Conte phase second-order sites (Table 4.3). Of the five Conte phase second-order sites, three reduce in DAI/C to become third-order sites and two continue to be second-order sites (He-2 and Site 194 [Figure 4.18, Table 4.2]), both of which are located within 300 m of the floodplain zone. Two second-order-sites are “new” during the Macaracas phase. One is located 2 km to the southeast of He-4 (Site 343; Table 4.2) and the other is within the previous site boundaries of La Mula-Sarigua (Figure 4.18), possibly now a concentration of the previously dispersed Conte population in the area.

MACARACAS		
(He-4)	23	30
		≈
	20	13
		12
		12
		11
La Mula-Sarigua	48	11
		10
		10
		9
	08	9
(He-2)	89	8
		8
		≈
	88,90	4
	19,46	4
	65,72,77	3
	12,20,21,34	3
	65,79,83	2
	06,19,25,27,27	2
	53,57,60,65,67,70,71,73,76,83	1
	05,11,13,15,17,21,45,47	1
	56,59,62,67,68,71,76,80,82,82,84,86,95	0
	14,17,18,22,26,38,39,41,44,49	0

Figure 4.19. Stem and leaf plot of DAI/C for Macaracas ceramic phase sites.

Although Hansell does not separate the post-Conte phases, she does note (1988:201) an increased occupational presence at La Mula-Sarigua during the Macaracas, Parita, and El Hatillo phases. She states that the site during the post-Conte phases was 71.4 ha. Based on the Río Parita survey, the total area of occupied lots in Hansell's La Mula-Sarigua site boundaries would have been 13.7 ha—much below Hansell's estimate. To better assess site size estimates for La Mula-Sarigua, an examination of the population density of settlements for the entire Late Ceramic II Period (Conte to El Hatillo phases) is needed. The 13.7 ha estimate does not include artifacts that could only be assigned to the Late Ceramic II Period. Similar artifacts were used by Hansell (1988:168) in her estimate of the site, specifically handled tecomates that now have been dated to post A.D. 750 (Richard Cooke, personal communication). When artifacts that can be assigned to the Late Ceramic II Period, including handled tecomates, are used in determining site size for the Río Parita survey, La Mula-Sarigua is now 37.1 only half that of Hansell's estimate.

The correspondence between Hansell's estimates and those of the Río Parita Survey are not the only important avenue of inquiry—it is the relationship between the density and location of sites throughout the valley that provides the basis of settlement pattern analyses. Although La Mula-Sarigua is a large site (37.1 ha) during the Late Ceramic II Period, it has relatively sparse population (Figure 4.21). He-4, on the other hand, is a very large site (42.5 ha) for this period with much adjacent settlement and extremely high population density when compared to other areas of the survey zone. Thus, even though the estimates for La Mula-Sarigua differ substantially for the Late Ceramic II Period for the Río Parita survey and Hansell's (1988) investigations, the importance of He-4 as a draw for population is evident. He-4 reduces in size (11.1 ha; 3.0 DAI/C) and becomes more dispersed, but as is seen in Figure 4.22, the area around He-4 continues to be quite dense (Table 4.3). With the reduction of DAI/C at He-4, it appears that population densities increased at other sites in the valley. The majority of the increased settlement occurs at sites that are less than 2 km away from He-4, yet not adjacent to the site forming a ring-shaped pattern around the dominant site (Figure 4.22).

The site of He-4 is conspicuously absent in many previous analyses of the emergence or identification of rank in the Central Region (but see Cooke, et al. 2000), as there has been an absence of archaeological work at the site after the 1960s. The only professional excavations at the site were done in 1948 (Ladd 1964), in the 1950s and 1960s work was conducted by amateur archaeologists under the auspices of the Archaeological Society of Panama (Biese 1967; Bull 1965, 1967; Dade 1972; Mitchell and Acker 1961). Briggs (1989:3) left out the burials from He-4 as “[t]his site was excavated by two different individuals, and their field techniques, strategy, and results were not compatible.” It should be noted that He-4 was excavated by more than just two archaeologists. The report written by Ladd (1964) was not based on his own work but on the 1948 excavations led by Mathew Stirling, Marion Stirling, and

Gordon Willey. Bull's (1965) amateur excavation report is much shorter and limited in scope, but at many times her information is much more concise and consistent. Other amateur archaeological reports (Dade 1972; Mitchell and Acker 1961) lack detail and descriptions of the excavations and present only the most notable finds.

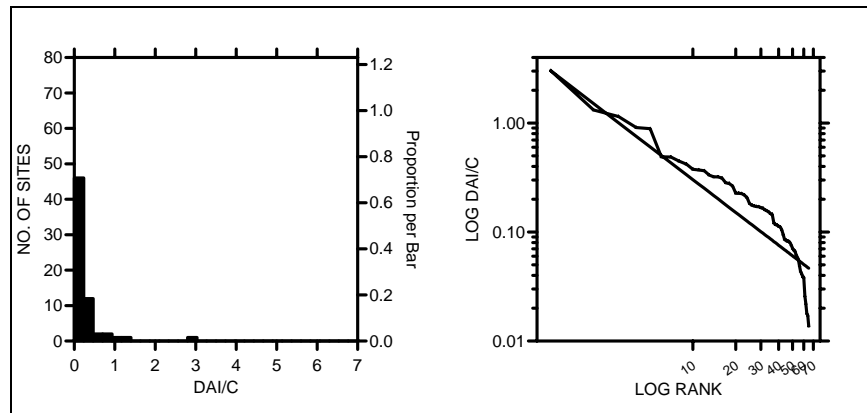


Figure 4.20. Site-size histogram and rank-size plot for Macaracas ceramic phase.

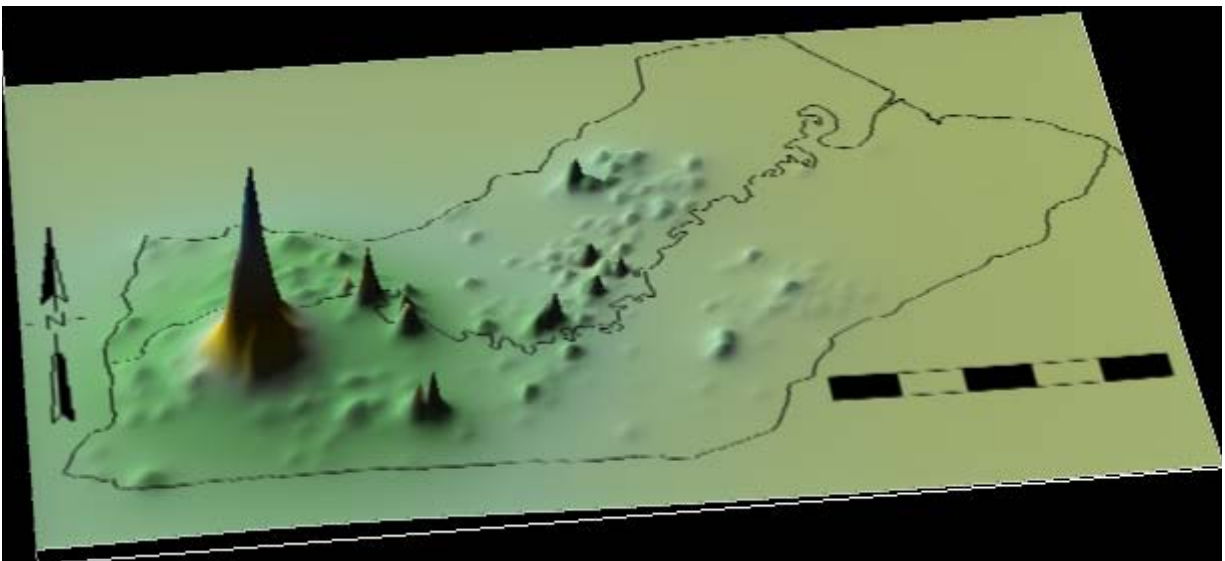


Figure 4.21. Late Ceramic II Period settlement density map.

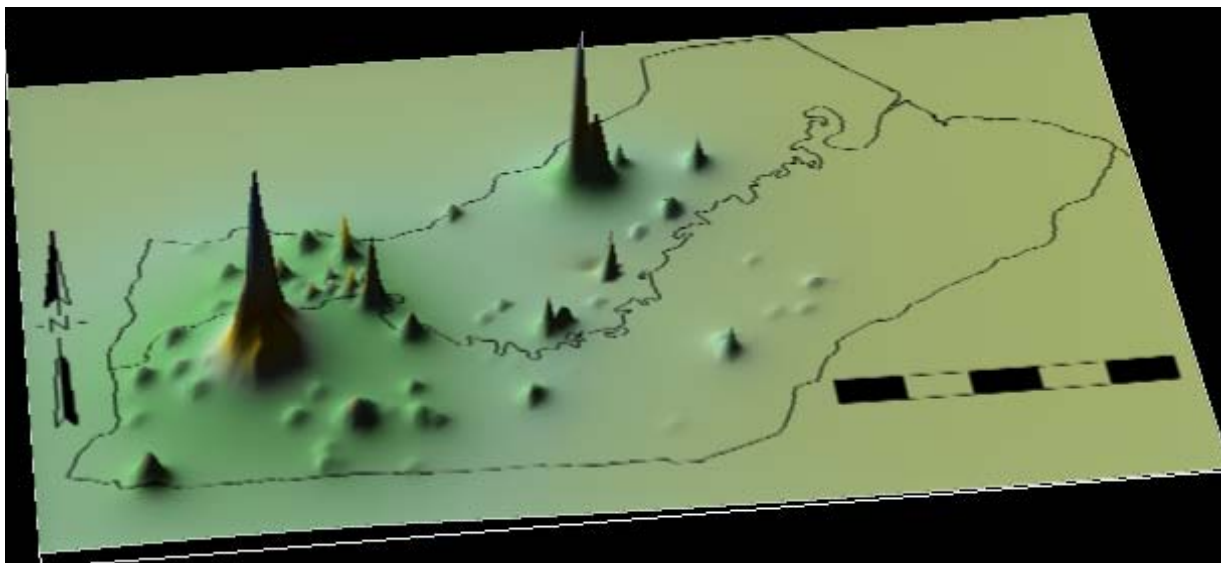


Figure 4.22. Macaracas ceramic phase settlement density map.

Despite the problems of consistency in recording and technique, there is a large corpus of burials that provide useful information on the emergence of social ranking within the survey zone. Although the burials did not contain grave goods as elaborate or as numerous as those found at Sitio Conte, many contained artifacts that suggest much wealth was possessed by certain individuals. The majority of burials were recovered from mound contexts at the site. There is some discrepancy about the total number and labeling of these mounds amongst the published reports from the site, but there were between 11 and 14 mounds ranging 1 to 3 m in height and up to as much as 20 m in diameter (Ladd 1964:24-25, 27, 29, 34; Bull 1965:32-34, 39-42; Mitchell and Acker 1961:4-7). These mounds were arranged in a circular pattern around a court or “fiesta area” (Figure 4.23; Bull 1965:31-33, 1968:1) in an area covering about 2 ha. Presently, after much careless excavation and back filling, it is impossible to determine where the mounds once stood, let alone if they were arranged around a central plaza. The strong correspondence between Bull’s (1965:30) and Ladd’s (1964:25) maps do seem to support the idea that these mounds were carefully arranged around a central flat area. He-4 was the only site encountered in the survey zone that had indisputable evidence for architectural features. Formal cemeteries with burial mounds are rare; the only other example in Panama is at El Caño, which does not have what would be considered high-status graves (Cooke, et al. 2000; Lleras and Barillas 1985; Verrill 1927).

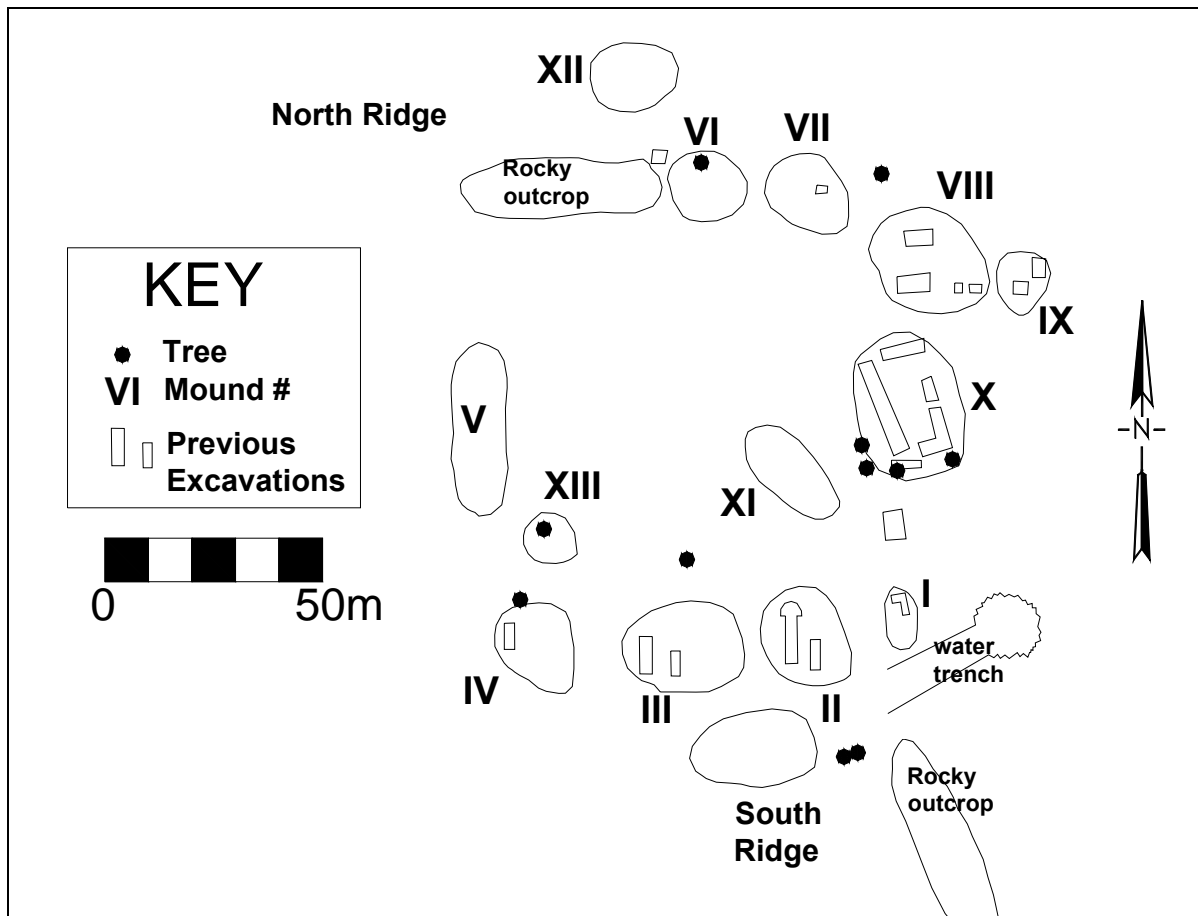


Figure 4.23. Burial mounds at He-4 with previous excavations (Based on Bull 1965:30 and Ladd 1964:25)

From the mounds at He-4, there are 44 burials comprising 96 individuals, spanning the Cubitá to El Hatillo phase (Bull 1965, 1968; Dade 1972; Ladd 1965; Mitchell and Acker 1961). This data set contains some data on age and sex, but the overall information on the skeletons and associated artifacts is limited (Table 4.4). Of the 92 individuals, 50 were identified to age and the majority, 88%, of the recovered and identified remains were adults, 8% sub-adults, and 2% infants. Only 17 individuals could be sexed, all of which were adult males. These identifications are similar to the age and sex profiles from Sitio Conte (Briggs 1989:75), but differ substantially from those reported from Cerro Juan Díaz (Cooke and Sánchez 1997; Cooke, et al. 2000, 2003a; Díaz 1999). Following the ideas of Cooke, et al. (2000:172, 2003a:127-128, 134, 136-137) and Linares (1977:76-77), evidence from the Río Parita survey supports the hypothesis that if Sitio Conte was a macro-regional necropolis for the high status and wealthy, it was replaced by He-4 during the Macaracas phase.

Table 4.4. Sex and age profiles and grave goods of recovered human remains at He-4 (Based on Bull 1965, Dade 1972; Ladd 1964; Mitchell and Acker 1961).

AGE					SEX			
Adult	SubAdults	Infant	Indeterminate	Total	Male	Female	Indeterminate	Total
44	4	2	46	96	17 (Adults)	0	79	96
88%	8%	4%	n/a					

Grave goods						Grave Goods	
Adult	Adult Male	SubAdults	Infant	Indeterminate	Total	Yes	36 82%
44	17	4	2	46	92	No	8 18%
						Totals	44 100%

As mentioned above, if we take the ethnohistoric accounts at face value, we would expect to have found many sites with similar mortuary patterns to Sitio Conte (Cooke, et al. 2003a:127), which we have not. It is possible that a lack of systematic investigation in the Central Region has failed to identify other high-status cemeteries; however, the dearth of wealth from known burials suggests that Sitio Conte is more of an anomaly than a fortuitous find (Cooke, et al. 2003a:127). Nevertheless, He-4 is the only site where burials have revealed artifact and skeletal patterning similar to that recorded for Sitio Conte (Bull 1968; Cooke, et al. 2003a:128). The majority of the high-status graves, unfortunately, were excavated by amateur archaeologists or looters and little if any information was recorded before gold and other pieces were sold for auction. The He-4 burials are not as rich as those from Sitio Conte, but the published information does suggest that some graves at He-4 were indeed wealthy and contained artifacts (gold pendants, helmets, and manatee bone batons) that are salient features of social ranking as identified at Sitio Conte (Briggs 1989:137).

An analysis of the surface ceramics recovered from the mound area of He-4 reveals that there does seem to be some support to the construction of these mounds later in the sequence. The datable ceramics from these lots in and adjacent to the central area at He-4 have a total percentage of 0% La Mula, 1.1% Tonosí, 1.1% Cubitá, 20.2% Conte, 18.0% Macaracas, 42.7% Parita, 16.9% El Hatillo, and 0% Colonial. From the surface collections, the central area is primarily occupied from Conte to El Hatillo ceramic phases; however, it should be noted that it is not possible to say that these periods represent the temporal use of the mounds or just previous occupation in the area or in areas where mound fill was obtained.

The Macaracas phase is the first time that there are burials at the He-4 cemetery that can be associated with a specific phase. Within a hollowed out pit in Mound I (Figure 4.23), 3.5 m below the

surface, two burials were recovered with Macaracas ceramics. One burial was identified as an adult, another contained the remains of an infant that was associated with three animal figurines modeled out of resin, nine gold beads, several stone beads, a pearl, and several bezoar stones (Ladd 1964:244). Despite the presence of gold artifacts, these burials should not be considered high-status (Briggs 1989); however, the following two descriptions suggest that some individuals were able to amass much wealth.

Almost 5 m deep into Mound VI, two individuals in a flexed position were recovered, and both were considered adult males based on the robustness of their skeletal features (Figure 4.23). These individuals were found with Macaracas jars (Bull 1965:Plate VII b, VIII b) and many other artifacts. Associated with one of the burials were 86 shell beads and a perforated bone pendant; a 12.5 cm diameter gold perforated disk was found near the neck of the other individual. Associated with both individuals were 44 red ware vessels (Bull 1965:35). Within the same excavation unit at a depth of 9.4 m, three adult males were found, each separately laid out over a separate four-legged metate (Bull 1964:35-36). This grave consisted of many grave goods and several adjoining caches. In total these graves were associated with over 1200 shell beads, 17 pieces of carved and hollowed bone tubes, many red ware vessels, six Macaracas vessels (Bull 1964: Plate VII a, d, Plate VIII a, c), a tumbaga ornament (possibly a disk), and a spangle made of tumbaga (Bull 1964:36). Since a cache containing two El Hatillo pedastalled plates was discovered near these burials (Bull 1964:Plate VIII d, e), caution should be used in associating these finds strictly with the Macaracas phase.

Two burials were found in Mound VII (Figure 4.23; Ladd 1964:250-252). One burial, consisting of human bone fragments, located 3 m below surface contained 25 Macaracas vessels, 8 red ware vessels and 4 greenstone beads. The other burial was encountered at 2.6 m below surface, where two adult skulls were associated with 16 Macaracas vessels, 10 red ware vessels, 2 smoked-ware vessels, and 3 chipped stone axes. There were also seven caches dated to the Macaracas phase located in this mound. None had any human remains, but consisted mainly of ceramics. One had two fragments of a carved manatee-bone baton—one of the salient artifacts for identifying the highest social class at Sitio Conte (Briggs 1989:137). In the north ridge, only 60 cm below the surface, long-bone remains of an adult were found with only ceramic wares (20 Macaracas and 25 other vessels; Ladd 1964:255).

Although there are prestige goods found with these burials, we must remember Briggs's (1989:137-138) caveat that sumptuary goods are not based specifically on material, but artifact class. The gold beads associated with an infant (Mound I) might suggest ascribed status, but we must be careful with this conclusion. The manatee-bone batons (Bull 1968; Ladd 1964; Torres de Araúz 1972a:74-77; Stirling 1950:233) are considered artifacts associated with the highest status, but the simple association of Macaracas vessels without human remains makes it difficult to forcefully conclude that social ranking had

been firmly established. That being said, the formal cemetery at He-4 was well used during Macaracas phase and there is evidence suggesting that individuals had greater access to status and wealth.

As the formal cemetery at He-4 begins to be used regularly, mortuary activity at the Sitio Conte necropolis slows down and by A.D. 950, it is not used for interments of high-status individuals. It appears that for whatever reason high-rank persons were interred at the site changed, and might have been relocated to He-4. At the same time (and continuing with the Parita and El Hatillo phase), the rank-size plots reveal that a change in the settlement dynamic occurred with the result of a distribution closest to log-normal (Figures 4.4, 4.20, 4.27). As the Macaracas phase rank-size distribution approaches log normality, the population (DAI/C) of He-4 diminishes by 77%, while second and third-order sites increase by 50% and 54%, respectively. The evening out of the rank-size distribution might reflect an increased socioeconomic integration throughout the valley, possibly a result of He-4 becoming the Central Region's high-status necropolis.

PARITA CERAMIC PHASE (A.D. 1100-1300)

When Lothrop (1937, 1942) conducted his excavations at Sitio Conte and studies of collections in the National Museum of Panama, he found some polychrome styles that he considered anomalous and therefore 'foreign'. Among these materials were some sherds and vessels painted in styles which were later defined by Ladd (1957, 1964) as Macaracas, Parita, and El Hatillo. Ladd (1957) identified sherds from Parita and El Hatillo vessels in the refuse excavated by Lothrop at Sitio Conte. Some examples of Parita and Macaracas pottery had already been described by Holmes (1888) and MacCurdy (1911) from Chiriquí graves, but these authors, whose work pre-dates the Sitio Conte excavations, believed that they were a local, i.e. Chiriquian ware. Ladd (1964) sometimes refers to sherds from the Macaracas, Parita and El Hatillo styles as the "Azuero Group," because it was often difficult to differentiate sherds from each of these styles, especially when dealing with fragmented finds in fills and from the surface. This practice was followed by Cooke (1972) and Hansell (1988). With the refinements in the Central Region's ceramic chronology (Cooke and Sánchez 1997; Cooke, et al. 2000; Sánchez 2002), it is now much easier to distinguish these pottery styles.

The second highest density of population in the Río Parita survey zone occurs during the Parita phase, just slightly less than the overall DAI/C value for the Cubitá phase (Figure 2.20; Table 2.1). With the Parita phase we encounter the most collection units (147), the most occupied area (94.93 ha) the highest number of artifacts in the zone, and hence one of the highest levels of population that existed in

pre-Columbian times in the valley. Compared to the Macaracas phase, population increases 22% (DAI/C) and there are noticeable shifts in settlement patterns (Table 2.1). The area around He-4 reaches its highest population density, but to the southeast, for the first time, another site (Site 363) emerges with high population-density levels approaching those found at He-4 (Figures 4.24, 4.25). This site is not as dense as He-4, but has the third highest population density (DAI/C) for the whole pre-Columbian settlement sequence in the Valley. These two areas of occupation are only 2 km apart suggesting that these are not separate polities, but more likely two sites within the same polity or a secondary chiefly *bohío* (Helms 1979:9, 53). Since its rise to dominate the settlement hierarchy during the Cubitá phase, for the first time, He-4 has a rival in population density. Additionally, this is the only part of the Late Occupation Sequence where no occupation is found in the Upper Survey Zone.

There are 89 third-order Parita phase sites with an average site size of .72 ha and .13 DAI/C (Table 4.3). Of the 61 third-order Macaracas sites, 18 continue to be occupied in the Parita phase. Seventy-one of the 89 third-order Parita phase sites are “new” sites. Of these 71 sites, 36 are located 300 m from the floodplain, 30 in the Lower Central Plain, and five near He-4. Overall, 52% of third-order Parita phase sites are located within 300 m of the Floodplain; 38% in the Lower Central Plain; and 10% near He-4. The three third-order sites with the highest density are located between the floodplain Parita phase second-order sites (Figures 4.24, 4.25, 4.26).

There are a total of five second-order Parita sites with an average of 2.9 ha and a DAI/C of 1.2, similar to the Macaracas values (Figure 4.24; Table 4.3). Of the four Macaracas second-order sites, two (He-2 and Site 194) continue to be occupied in the Parita phase; both have among the longest occupation sequences in the valley (Figure 4.24). The second-order site in the former boundaries of La Mula-Sarigua is abandoned. The other second-order site 2 km east of He-4 (Site 345) is now a third-order site. One of the Macaracas third-order sites north of the river in the floodplain zone is now a second-order site (Site 128). One of the two “new” Parita phase second-order sites is located near the Macaracas second-order site 2 km east of He-4, Site 363, which has an area of 3 ha and a DAI/C value of 1.9, 40% that of He-4 and the highest DAI/C value for any site other than He-4 or La Mula-Sarigua. The other “new” Parita second-order site is located south of the river in the floodplain (Site 6).

He-4 regains some of its former size with an area of 14.9 ha and a DAI/C of 4.7 and still dominates the site-size hierarchy in the valley (Table 4.3). Although the rank-size graph (Figure 4.27) is the closest to log-normal of any phase ($A = -0.045$), we can say with much confidence (Figure 4.4) that there is no meaningful change in the Parita phase settlement dynamic from that of the Macaracas (Drennan and Peterson 2004). During the Parita phase, there is much mortuary activity at the formal cemetery at He-4, as seven of the possible eleven burial mounds are with a haphazard record of associated burials.

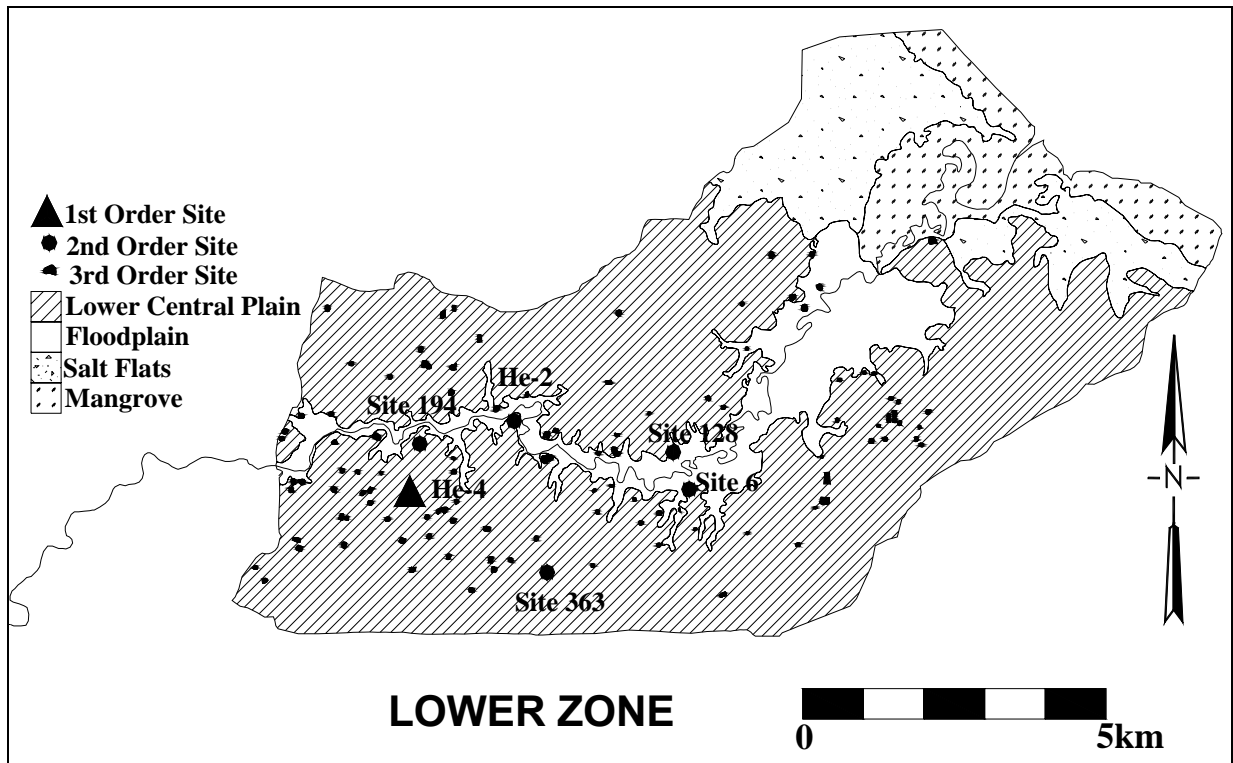


Figure 4.24. Parita Phase Settlement Location

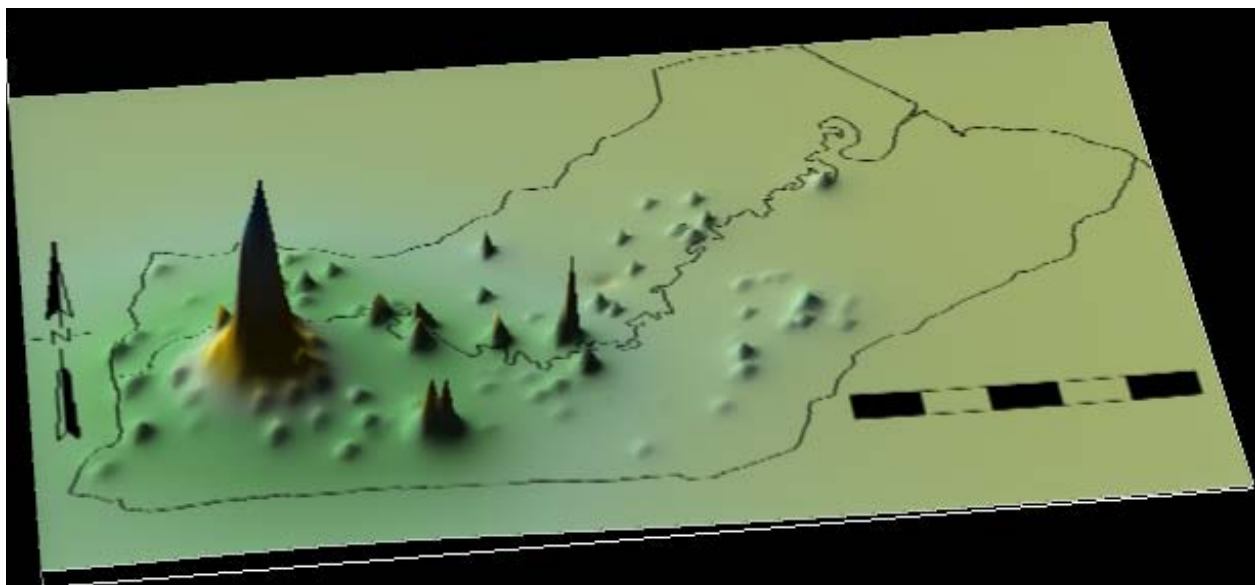


Figure 4.25. Relative settlement density (DAI/C) for the Parita ceramic phase.

		Parita
46	94	(He-4)
46		
≈		
23		
23		
≈		
18	56	(Site 363)
18		
17		
17		
16		
16		
15		
15	46	
≈		
8		
8	43	(He-2)
7	96	
7	27	
6		
6		
5		
5		
4		
4	18,45	
3	50,54,71,94	
3	12,16	
2	55,97,98	
2	37,39	
1	53,60,66,68,74,77,81,81,88,89,92,95	
1	00,00,02,03,07,09,10,11,11,12,18,18,19,20,24,27,30,33,33,35,38,41,42,42,44,45	
0	52,54,56,58,59,60,60,62,68,69,69,71,71,77,82,82,85,89,92,93,94,95,96,97,99	
0	16,17,24,27,29,32,37,39,40,43,44,45,46	

Figure 4.26. Stem and leaf plot of DAI/C for Parita ceramic phase sites.

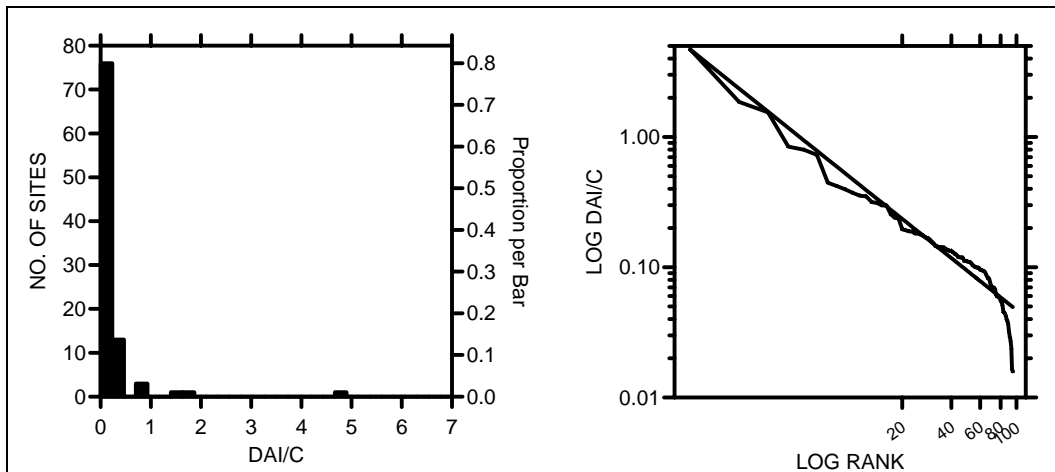


Figure 4.27. Site-size histogram and rank-size plot for Parita ceramic phase.

A single extended individual with no associated grave goods was found in a shallow burial in Mound IX (Mitchell and Acker 1961). In Mound X, Bull (1965:42) excavated a shaft burial, 3.1 m deep, and recovered two extended individuals, who were considered adult males because of their unusually large stature (Figure 4.23). It appears that these skeletons were covered with ash and then the grave was capped with a layer of clay (Bull 1965:42). These burials were associated with five Parita (or possibly some El Hatillo) vessels. Located above this grave within the same excavation unit, several individuals were found laid out on top of legged metates and others in various positions. Unfortunately, none of these other 11 skeletons were buried with identifiable artifacts, and it is not possible to associate these remains with any particular ceramic phase.

The most elaborate burials found at He-4 were recovered from a deep (6.7 m) excavation in Mound XI by Dade (1972), who uncovered three graves within 3 m of each other (Figure 4.23). Graves B and C contained only one individual apiece, but Grave A contained 23 individuals. There is no information about sex or age for these skeletons, but they were associated with 13 decorated bottles, 6 effigy bottles, 7 miniatures, and other painted and red wares (Dade 1972). The majority of these ceramic wares date to the Parita phase with some possibly being late Macaracas (~A.D. 1000-1300). A disintegrated gold disk was found in Grave A, with a similar disk and gold pendant recovered in Grave C.

Although Dade (1972:38) claims that no other artifacts were found in these graves, Biese (1967) states that the “Parita Assemblage,” consisting of around 30 pieces of finely crafted hammered gold and cast figurines, was found in a grave 22 feet deep (6.7 m) that had been radiocarbon dated to A.D. 1546 ± 90. The only radiocarbon date from He-4 was submitted by Dade from his deep graves (Dade 1972:43)

receiving a date from Mathew Stirling of 415 ± 90 B.P.(cal A.D. 1395 [1460] 1660; Cooke, et al. 2003a:129-130)—roughly the same as quoted by Biese (1967:207). Both Biese and Dade were members of the Panama Archaeological Association during the 1950s and 1960s and would have been in contact with each other's finds; these deep graves are most likely the location of the largest cache of gold objects outside of Sitio Conte (Cooke, et al. 2003a:129-130, Note 48, Table 1:Note i).

The radiocarbon date is considered too late by Bray (1992:45) as some pieces in the Parita Assemblage are stylistically similar to gold work from Sitio Conte; nevertheless, he suggests a liberal time span of A.D. 700-1500 (Cooke, et al. 2003a:128-130). Additionally, some of the Parita Assemblage pieces possess similar stylistic traits to gold objects found at El Caño; however, Cooke, et al. (2000:170) state that it is not possible to attribute a date for these finds more accurate than A.D. 850 to A.D. 1502. Both estimates for the Parita Assemblage fit within the temporal span for the Parita ceramic phase. Additionally, a gold plated helmet, similar in detail to that described adorning Chief Parita (Cooke and Bray 1985; Cooke, et al. 2003a:120; Espinosa 1994b:63-64; Lothrop 1937:46;) and a high-status individual from Grave 5 at Sitio Conte (Lothrop 1937:Figures 107, 108), was recovered at He-4, but with no other contextual information (Roosevelt 1979:81). It was part of the old Museum of the American Indian and most likely sold to them by Philip Dade along with the Parita Collection (Roosevelt 1979:81; Now housed in the National Museum of the American Indian, Washington D.C.).

The settlement patterns during the Parita phase change little from the Macaracas in regard to rank-size distributions (Figure 4.4). Population in the zone, however, increases by 22% with the highest number of sites for any pre-Columbian phase (Figure 2.20; Table 2.1). He-4 regains some of its former population (a DAI/C increase of 36%), but with no meaningful change in second-order and third-order site population (DAI/C). Thus, the demographic increase during the Parita phase results in a concentration of population at He-4. Although much of the mortuary data lacks secure contexts, high-status burials are clearly present and imply that some individuals had greater access to wealth and power than others did.

EL HATILLO CERAMIC PHASE (A.D. 1300-1522)

The El Hatillo phase, named for the site of He-4 (also known as El Hatillo) excavated by Stirling and Willey in 1948 (Ladd 1964), has been further refined by Cooke (1972; Cooke, et al. 2003b) and Breece (1997) during separate surveys of the Natá region. The El Hatillo phase extends up into the contact period based on the association of El Hatillo ceramics with Spanish goods in several of the burial mounds at El Caño (Cooke, et al. 2000:168-172, 2003a:Table 1; Lleras and Barillas 1985; Figure 1.1). El Hatillo

ceramics have a wide distribution throughout the Central Region and beyond (Cooke et al 2003b:20). They are present at He-4 (Ladd 1964), several sites near Natá (Breece 1997; Cooke 1972; Cooke, et al. 2003b:20), El Caño (Cooke, et al. 2003b:20; Lleras and Barillas 1985), Sitio Conte (Cooke, et al. 2003b:20; Ladd 1957), Sitio Sierra (Cooke, et al. 2003b:20; Isaza 1993) and at sites within the Atlantic watershed (Cooke, et al. 2003b:20; Griggs, et al. 2003). El Hatillo ceramics have even been reported at the earliest Spanish settlements of Belén (Atlantic coast) and Panamá la Vieja (Pacific coast; Cooke, et al. 2003b:21). Although Ichon (1980) did not record El Hatillo pottery in the Tonosí Valley, Richard Cooke (personal communication) has identified some photographed by Ichon as El Hatillo. At Cerro Juan Díaz the fact that El Hatillo ceramics are very scarce has invited speculation that this site was sparsely inhabited at the end of the pre-Columbian era and until A.D. 1558 when the Pueblo de Indios de Cubitá is established at the site (Carvajal 2003; Carvajal, et al. 2004; Castellero Calvo 1995:63; Cooke, et al. 2000, 2003b).

Recent analyses of Mendoza ceramics, a type of El Hatillo pottery, suggests that certain varieties of Mendoza represent spatial or temporal variability in the Central Region (Cooke 20003b:16-22). The Mendoza variety was originally identified by Cooke (1972) from his survey of the Natá area. Of the five types he identified, only two (Variety D and E) were recovered from the Río Parita survey. Likewise, it appears that these two varieties are present in small quantities at Cerro Juan Díaz (Richard Cooke, personal communication). Mendoza pottery is common at many sites near El Caño/Natá and throughout Veraguas and Coclé provinces, but almost exclusively, it seems, north of the Río Santa María (Cooke, et al. 2003b:20). The distribution of Mendoza varieties suggests that they were regional variants with Varieties D and E produced south of the Río Santa María (Figure 1.1). Alternatively, Varieties D and E might be earlier and the others are later varieties were only produced north of the Río Santa María where indigenous occupation continued much later.

Although Natá was first occupied by the Spanish in A.D. 1516 (Cooke, et al. 2003b:15), the town did not receive its official *cédula* until A.D. 1522 (Castillero Calvo 1967; Tejeira-Davis 1996); the date used as the terminus for the El Hatillo phase and the pre-Columbian sequence for the Río Parita survey. Cooke, et al. (2000; 2003b:15) note that by A.D. 1516, other indigenous cultural activities in all probability had ceased among native populations subdued by the Spanish. The Spanish described Natá as a large village that was the regional center for trade and other socioeconomic activities (Espinosa 1994a:49; Oviedo 1944:VII:7)—a similar pattern to that of other regions during the Late Ceramic Phases. The town of Natá was previously the regional center for Chief Natá and his chiefdom; in fact, Lothrop (1942) posits that Natá supplanted Sitio Conte as the main village of the area. The site of El Caño is around 5 km from the chiefly center of Natá, and possibly served a religious function for the mainly habitation site of Natá (Cooke, et al. 2000:171-172).

Located near Sitio Conte, El Caño is the only pre-Columbian archaeological park in Panama. The site is known for its 12 burial mounds (3-5 m in height) and numerous stone sculptures aligned in rows (Figure 4.28; Cooke, et al. 2003a:Figure 7; Linares 1977:Figure 15; Verrill 1927). Eight of the mounds were destroyed and two were damaged by construction in 1973 (Cooke 2000:168). When the site was excavated by amateur archaeologist A. Hyatt Verrill in the 1920s (Verrill 1927), he recorded little information, and much of the sculpture was lost or removed from the site. An amateur archaeologist (Zelsman 1959) recovered nine complete skeletons from El Caño with a pair of adults (one male and one female) associated with 37 small sized gold beads and 5 round, thin gold plates (3 to 4 cm in diameter). In the 1970s and 1980s, Lleras and Barillas conducted excavations in the mounds of the main mortuary zone. In 1973, Richard Cooke (1976b) excavated several urn burials in a mound badly damaged by a bulldozer. In one of these damaged mounds, four wide-mouthed urn burials were found containing a mix of European and Native American artifacts, including glass beads, ceramic vessels, horse remains and tumbaga artifacts (Cooke, et al. 2000:168; Lleras and Barillas 1985).



Figure 4.28. El Caño Archaeology Park (cobble pavement in foreground with a line of stone sculptures leading towards a burial mound).

Only two of the urn burials have information about age. Urn 1 was an adult interred with shell and stone pendants, and Urn 2 contained an adolescent and a child with four metal artifacts including a perforated gold disk. Lleras and Barillas (1985) reported 16 burials of adults and adolescents with only one gold piece (a pendant) (Cooke, et al. 2003a:126), which brings the total of burials to 29 including the four urns (1976b; Cooke, et al. 2000:168-169) and amateur excavations (Zelsman 1959). Despite the inclusion of metal objects in one burial urn and one gold pendant in the mound burials (Lleras and Barillas 1985), these mortuary features are not what one would expect for high-status burials as they lack the quality and quantity of the remains found at Sitio Conte and at some of the He-4 mounds (Cooke et al. 2003a).

Within the Río Parita Valley, the El Hatillo phase is characterized by a decrease in the overall population estimates (DAI/C) by over half from Parita ceramic phase levels (Figure 2.20, Table 1.1). This appears to have been a common occurrence in the Central Region and has led Cooke, et al. (2003b:16) to suggest that the painted varieties of El Hatillo pottery were not produced with the same intensity as earlier phases, that they were specially used by elite sectors of society, or that being the most recent ceramic style, modern agricultural and ranching has destroyed these deposits more than other ceramic styles. El Hatillo site locations in the Río Parita Valley, however, are similar to those from the Parita phase and do not suggest a radical change in settlement patterns (Figure 4.29, Figure 4.30).

Despite the decrease in occupation in the El Hatillo phase, there is a continued demographic presence at He-4; however, population at the site decreases in half. Although still quite small in area (ha), Site 363, a second-order site, now has a population density (DAI/C) of over half of that of He-4 (Tables 4.2, 4.3). There appears to be a three-tiered settlement hierarchy with one large center (He-4), two second-order sites (Sites 363 and 355), and 64 third-order sites (Figures 4.31, 4.32). It is possible that the influence of He-4 is waning and the new site 363 is gaining in prominence. Although the rank-size graph (Figure 4.31) illustrates a well-integrated system for the larger sites, the middle sites (high DAI/C third-order sites), are not, possibly reflecting some kind of shift or disruption in the fourteenth or fifteenth centuries, or a result of Spanish contact in the sixteenth century. The El Hatillo rank-size graph ($A = .086$; Figures 4.4, 4.31), however, suggests that we can have much confidence in concluding that there is little change to the underlying settlement dynamic since the Macaracas phase (Drennan and Peterson 2004).

There are 64 third-order sites and, on average, they are .66 ha in area with a .09 DAI/C value. Of the 89 third-order Parita phase sites, only 17 continued into the El Hatillo phase (Table 4.3). Of the remaining 47 “new” El Hatillo sites, 17 were located in the floodplain, 22 in the Lower Central Plain, and three were located 500 m from the second-order sites; and four were previously second-order sites during the Parita phase. The highest density third-order sites are Sites 194 and He-2, both having a long occupational

history as second-order sites. Overall, the majority of third-order El Hatillo phase sites (31 sites) are located within the Lower Central Plain with 23 sites located within 500 m of the floodplain and two within 500 m of He-4 and three within 500 m of the second-order sites. Additionally, there is renewed occupation in the Upper Survey Zone, although these are only low-density third-order sites.

On average, the two second-order sites have an average area of 2.1 ha and a DAI/C of .89. One of the second-order sites, Site 363, has a DAI/C value half that of He-4 (Tables 4.2, 4.3). He-4 maintains its site-size primacy at 19.5 ha, but it consists of dispersed settlement with a DAI/C value of 2.3—half that of the Parita phase (Figure 4.32). For the first time since the Tonosí phase, there are sites that truly rival He-4 in population (DAI/C).

Spanish Chroniclers, in the sixteenth-century, mention Chief Parita's main settlement as the old village (Asiento Viejo) and another site as the location of elaborate and lavish burial rites upon his death (Espinosa 1994b:63-65). The Spanish encountered Chief Parita's forces twice: once in 1516 and again in 1517 (Sauer 1966:261). On one of these encounters, the Spanish noted that a main site was located near an important ford in the Río Parita. Cooke (1993:114) has suggested that the site of He-4 was the "Asiento Viejo" mentioned by the Spanish (Espinosa 1994b:65) and He-1, located north of the river near the modern town of Parita, is the site where the Spanish interrupted Chief Parita's burial rites. During the Río Parita survey, no El Hatillo phase ceramics were found at He-1, nor were any recovered in the excavations at this site by Stirling and Willey (Ladd 1964:241). Although Stirling and Willey did not find El Hatillo phase ceramics at He-2, across the river from He-1 and located near a ford in the Río Parita, the Río Parita survey did (Figure 2.1). It seems more likely that if Chief Parita's burial rites occurred at a site near a ford in the river, it was He-2, rather than He-1.

During the El Hatillo phase, 5 of the 11 burial mounds at He-4 were in use and the majority of burials were located in Mound II (Figure 4.23). Find 10, located in Mound II, was one of the largest burial features recovered by Stirling and Willey at He-4 (Ladd 1964:245; Stirling and Steward 1949:394). This mortuary feature contained about 50 pottery vessels, bone ornaments, and at least 15 individuals. The grave was fairly shallow (< 1 m below surface) and contained two layers of artifacts. The uppermost contained 45 bird effigy vessels and bottles (El Hatillo type, Jobo variety), inverted and grouped together, and carved manatee bones. Only 20 cm below these vessels was a group of six large collared urns, globular to sub-globular in shape with four loop handles (Ladd 1964:138). These burial urns were only found in Mound II and date to the El Hatillo phase.

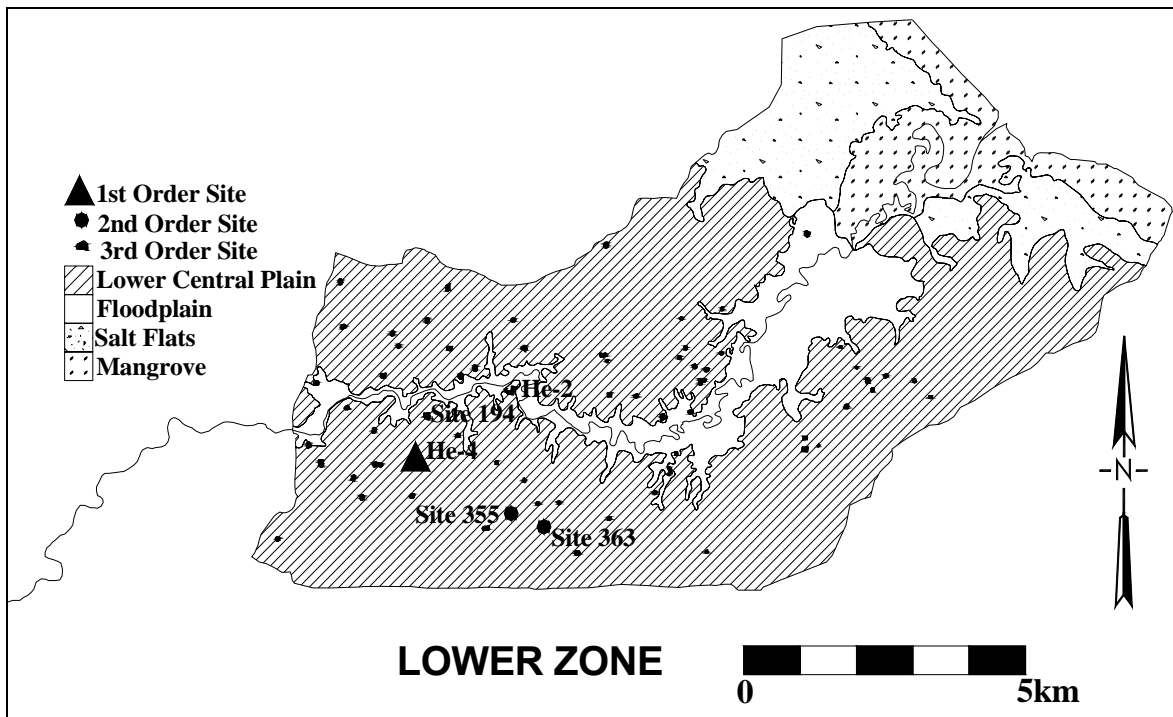


Figure 4.29. Hatillo Phase Settlement Location.

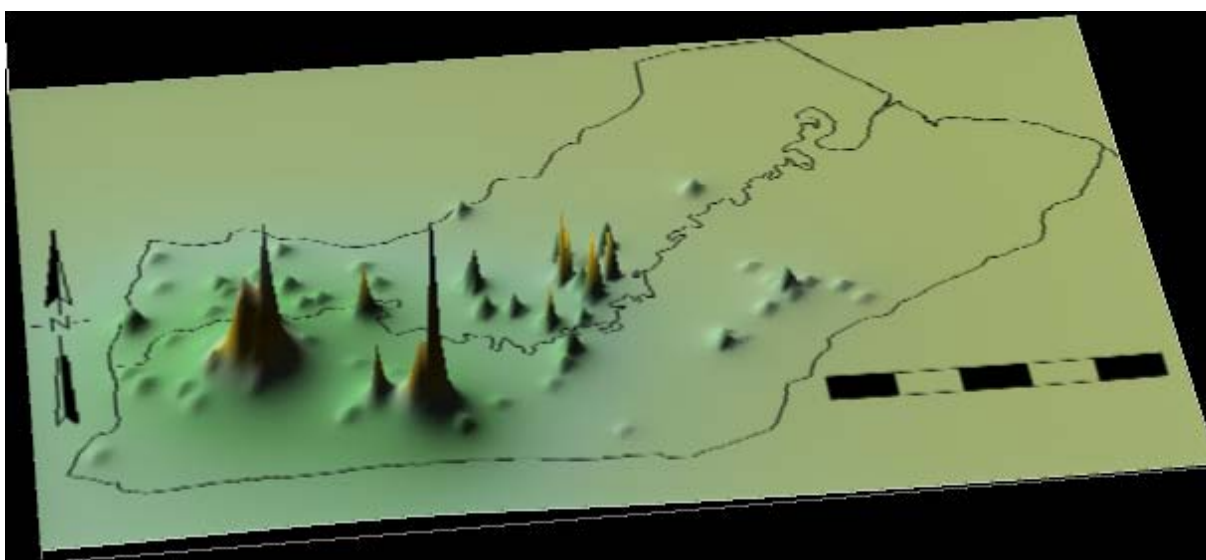


Figure 4.30. Relative settlement density (DAI/C) for the El Hatillo ceramic phase.

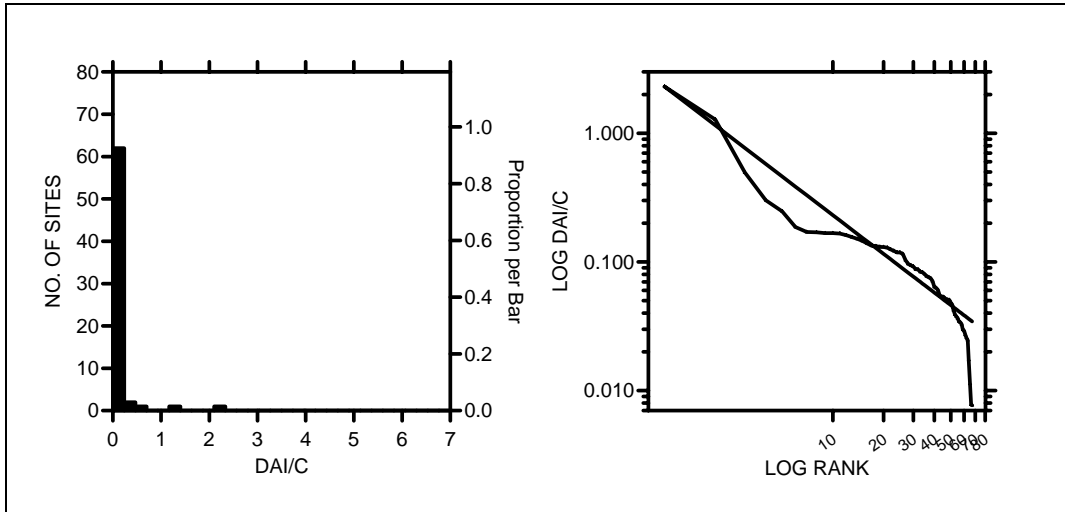


Figure 4.31. Site-size histogram and rank-size plot for El Hatillo ceramic phase.

El Hatillo		
		46
		46
		≈
		23
(He-4)	07	23
		≈
(Site 363)	78	12
		12
		≈
(Site 355)	95	4
		4
		3
	1	3
		2
(He-2)	47	2
	87,70,70,67,66,61,56,51	1
	46,39,34,33,31,31,29,25,22,18,18,16,03	1
	96,94,92,92,88,87,84,83,80,78,76,75,71,64,63,60,55,54,54,53,51,51,51	0
	48,46,42,39,38,37,35,34,33,30,29,27,26,25,17,11,08,08	0

Figure 4.32. Stem and leaf plot of DAI/C for El Hatillo ceramic phase sites.

Urn 1 contained the remains of three individuals and a necklace of 737 perforated human incisors—184 humans would have been needed to make this! Ethnohistorically, it was recorded that slaves captured in war would have their incisors knocked out to display their new social position (Andagoya 1994:28-35; Anghiera 1965:I:235, II:384; Balboa 1994:22-26; Oviedo 1944:III:8, 129, 322). At Cerro Juan Díaz, a burial unit (dating to the El Hatillo phase) was encountered near a burnt clay floor, which might have been a chanel structure to house deceased ancestors (Carvajal 2003; Carvajal, et al. 2004; Cooke, et al. 2003b:24). Humans remains, located in several jars, consisted of mandibles and maxillae lacking teeth; however, they were extracted post mortem. Thus, the necklaces found in the burials of He-4 might have been manufactured from deceased individuals and not from living slaves captured in battle. Urn 2 was packed with the remains of two adults and one adolescent and a small necklace of perforated human incisors. Urn 3 contained two adult skulls, but no artifacts. Urn 4, likewise, had no artifacts, but the remains of one adult. Urn 5 contained no artifacts and three individuals. Urn 6 contained two adults and one infant, but no artifacts. Ladd (1964:246) remarks that this mode of placing the dead in urns is rare at the site and that Jobo variety ceramics are only found scattered in one other location at He-4. Stirling and Willey, in between the painted wares and the burial urns, recovered five elaborately carved manatee bone batons (Ladd 1964:246; Mitchell and Acker 1961:Plate XI:k; Stirling 1950:233), similar to some of the carved bone excavated and illustrated by Bull from her investigation of He-4 (Bull 1968; Torres de Araúz 1972a:74-77), and considered salient artifacts for identifying high social rank (Briggs 1989:137; Cooke, et al. 2003a:136).

Also located near each other in Mound II were Finds 14, 16, and 18, which were similar in form to the large mortuary feature of Find 10. Each had the same style of large urn with human remains interred inside with nearby painted Jobo variety ceramics. Find 16 had the remains of one individual and no grave goods. Find 18 had the remains of two adults with no grave goods. Find 14 had the remains of one individual and a small necklace of perforated human teeth (Ladd 1964:246). Additionally, a feature in Mound VII contained 38 vessels dating to the El Hatillo phase with the remains of a cremated individual and a carved bone baton.

Despite the 56% reduction in overall regional population for the valley, the settlement pattern and rank-size distribution for the El Hatillo phase remains more or less similar to the Macaracas and Parita phases (Figure 4.4). Overall, He-4 and the second-order and third-order sites are reduced in DAI/C by 51%, 26%, and 31%, respectively. Although He-4 suffers a substantial reduction in DAI/C, population still concentrates in this central place, but one second-order site approaches a DAI/C value half that of He-4—the first time since the Tonosí phase. There is still much elite mortuary activity at He-4, more than would be expected considering the decline in resident population, and it appears that He-4 continues to function as an important area for elite mortuary ritual.

COLONIAL PERIOD (A.D. 1522-1821)

As mentioned above, the pre-Columbian sequence ends when the colonial town of Natá receives its official *cédula* in A.D. 1522 (Castillero Calvo 1967; Tejeira-Davis 1996). The main objectives to many of the Spanish explorations into the Central Region were to obtain subsistence resources to send back to Panama la Vieja (Old Panama; Cooke and Sánchez 2004:II:4). Sent out by Pedrarias, the governor of Tierra Firme (Panama), to obtain as much maize as possible, Espinosa (1994b:68) records that 1200 fanegas (bushels) of maize were collected in A.D. 1519. As the period of colonization begins, the native population has already been decimated by war, disease, and enslavement—only few Native Central Region Panamanians survived the Spanish onslaught (Cooke, et al. 2003b:3). Many indigenous were brought in from other areas of Panama, Venezuela, Nicaragua and the Caribbean to work the lands near Natá, so that by A.D. 1530s the population at Natá or newly created Pueblos de Indios (Cubitá [1558], Parita [1561]), for administrative and agricultural purposes, was cultural mixed (Breece 1997; Castillero Calvo 1967:47; Cooke, et al. 2003b:22; Guzmán 1956:20-22). Natá is the longest continually occupied town of the Pacific coast of the Americas and Breece (1997:200) has shown that there was a continuation of indigenous ceramic production after the El Hatillo phase, and, possibly, into the sixteenth century. Natá is the only area where native population levels (albeit mixed) did not decline, as they were important as agricultural workers (Breece 1997:200).

The overwhelming density of population is in and near the present day town of Parita and although the underlying settlement dynamic in the valley has changed, the rank-size plot where one settlement dominates the others continues (Figures 4.33, 4.34; $A = -.363$; Drennan and Peterson 2004). The Colonial Period town of Parita was officially founded as Santa Elena de Parita as an Pueblo de Indios by the Spanish in A.D. 1561 (Castillero Calvo 1995:63, 92-94, 434). By A.D. 1569, the Parita Pueblo de Indios was fused with the Cubitá Pueblo de Indios (Cerro Juan Díaz; Carvajal, et al. 2004). It was not until about a decade later (A.D. 1581) that the Colonial town of Parita was founded (Castillero Calvo 1995:90). The Colonial Period town of Parita and the next largest site from the survey, were set up on the north bank of the river, where little prehispanic settlement occurred previously in the valley, except for La Mula-Sarigua (Figures 4.35, 4.36). During the Colonial Period, the primary socioeconomic interaction of the town of Parita would have been towards Natá and further towards Panamá Viejo, which relied on its hinterland for agricultural surplus (Breece 1997:209). Thus, the placement of the town of Parita appears to reflect different socioeconomic relationships with a focus towards the capital.

Colonial Period	
2	41
1	
1	
0	66
0	25,14,12,12,11,10,09,08,08,08,06,06,05,05,05,04,04,04,03,01,01

Figure 4.33. Stem and leaf plot of DAI/C for Colonial Period sites.

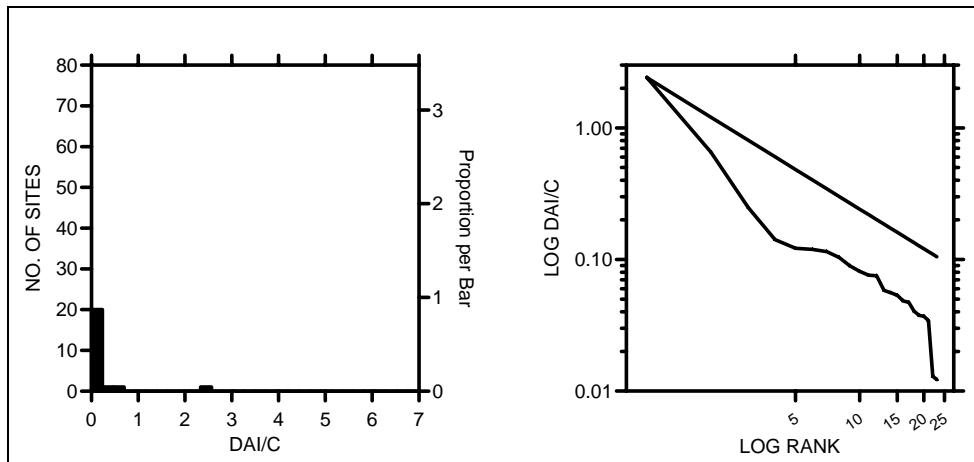


Figure 4.34. Site-size histogram and rank-size plot for Colonial Period.

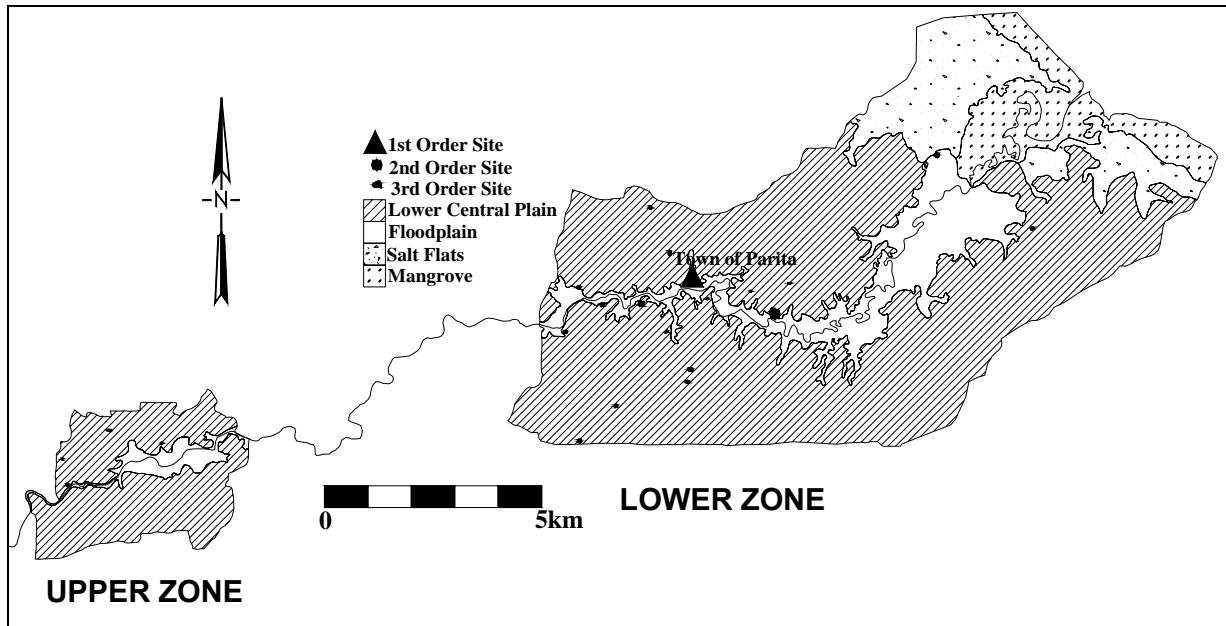


Figure 4.35. Colonial Period Settlement Location.

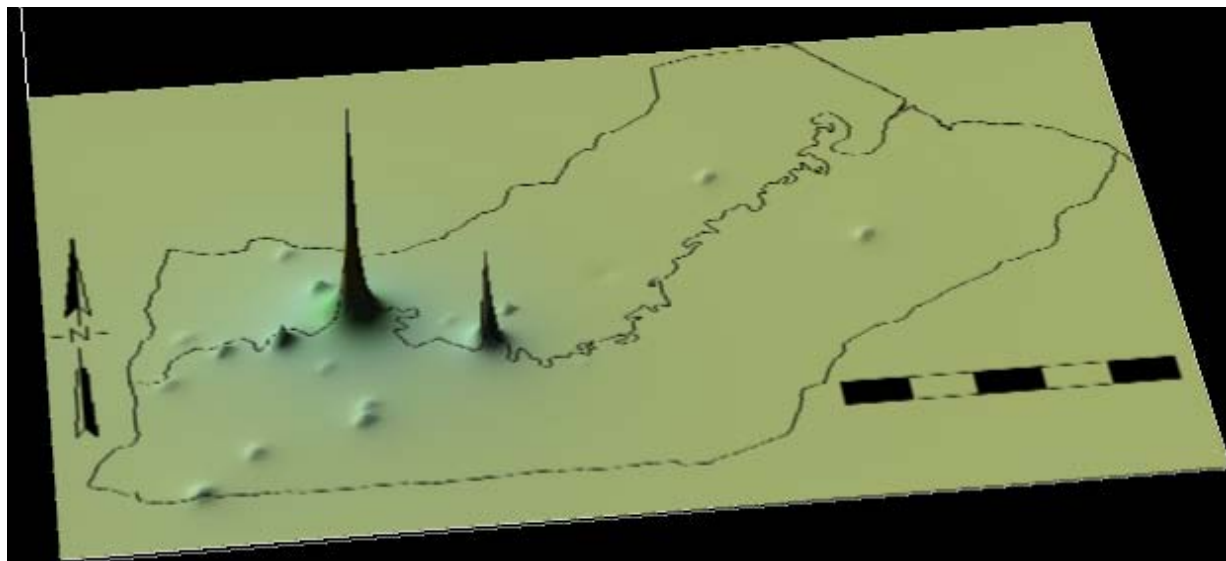


Figure 4.36. Relative settlement density (DAI/C) for the Colonial Period.

DISCUSSION

Two of the most widely used sources of information in identifying social ranking in archaeology are settlement patterns and mortuary features (Adams 1965; Johnson 1977; Johnson and Earle 2000; Peebles and Kus 1977; Saxe 1970; Steponaitis 1981; Tainter 1978; Wason 1994; Wright 1977, 1984). In the Río Parita Valley, previous investigations of archaeological mortuary remains and the present settlement survey provide valuable data in assessing how social ranking was expressed. Settlement patterns in the Río Parita Valley change dramatically over time. The emergence of a large nucleated village in the valley starts early in the sequence, but becomes a stable feature beginning with the Cubitá phase (A.D. 550-700) and the growth of He-4 producing a three-tiered site hierarchy. Although the majority of mortuary information was obtained through careless or haphazard means, available data suggests that high-status burials, indicative of social rank, were not present in the Río Parita Valley until the Macaracas phase (A.D. 900-1100). The reported mortuary remains from He-4 are obviously not as rich as Sitio Conte in terms of numbers and categories of artifacts. When compared to other burials from the Central Region, however, He-4 is relatively closer in character to Sitio Conte (Cooke, et al. 2003a:136-137). He-4 is one of only three sites in Panama (Barriles, Sitio Conte/El Caño) where there is ritual or ceremonial architecture and is considered a special site by Cooke, et al. (2003b:10). The age/sex profiles for the analyzed skeletons are similar to those found at Sitio Conte (Briggs 1989:75) with adult males dominating the assemblage. Due to the massive amount of looting at the site, we may never know if elaborate graves similar to Sitio Conte existed at He-4 (Cooke, et al. 2003a:127). References to large caches of gold from the site (Biese 1967; Cooke, et al. 2003a:136-137), deep multi-occupant graves (Dade 1972), complex burials (Bull 1965), and the presence of salient artifacts of high rank (manatee bone batons and specific gold objects; Briggs 1989:137; Bull 1965, 1968; Cooke, et al. 2003a:114; Ladd 1964; Mitchell and Acker 1961:Plate XI:k; Stirling 1950:233) suggest that the burial mounds at He-4 represented much more than just a local cemetery.

The La Mula phase, at first glance, appears to exhibit many of the features indicative of complex societies and social ranking. By far the largest site in the valley at this time, La Mula-Sarigua was the focus of the region's population producing a very strong primate rank-size distribution as the apex of site-size hierarchy (Figures 4.3, 4.5). The lower order La Mula phase sites, however, are small low-density sites (most likely, isolated hamlets) that were part of a two-tiered, rather than the three-tiered settlement hierarchy seen with the Cubitá and later phases (Figures 4.14, 4.19, 4.26, 4.32). Mortuary features are usually simple constructions lacking much in the way of grave goods (Cooke and Ranere 1992a:283). Additionally, there is no evidence for any labor investment in civic-ceremonial structures or features as seen at He-4 several centuries later. Demographic nucleation at and around the site of La Mula-Sarigua

appears to have been strongly influenced by ecological, geological, and economic factors as the area is rich in marine, riverine, and estuarine resources, arable land, and lithic raw material. The standardization of ceramic and lithic artifacts suggests that at least part-time craft specialization existed (Hansell 1988:245) that was possibly part of a regional exchange network that traded lithic tools and coastal resources (e.g., fish, salt) for breadboard metates and polished stone axes. There is no evidence to suggest that this exchange was controlled by specific groups or individuals leading Cooke and Ranere (1992a:281) to support a scenario of kin-based transmission of goods, or the result of personal extraction and processing at the raw resource locations. Although there is little information about the activities at La Mula phase third-order sites, La Mula-Sarigua appears to represent a site characterized by a difference in degree not kind, as features indicative of the presence of social ranking are not present at the site.

At the beginning of the Tonosí, the environs around La Mula-Sarigua were transformed geomorphologically. The availability of rich estuarine and coastal resources decreased as the coastline prograded farther away from the site. At this time, the salt flats began to emerge creating a relatively inhospitable environment for habitation with high evapotranspiration and air-borne salt deposits (Clary, et al. 1984; Richard Cooke, personal communication; Hansell 1988:28). Additionally, the large chert outcrop within the site boundaries of La Mula-Sarigua may have become exhausted. All of this resulted in a major demographic dispersal throughout the valley. The Tonosí is the only prehispanic phase of the Later Occupation Sequence in the Río Parita Valley without a demographic concentration into one site. What we do see is several small second-order sites evenly spread throughout the Río Parita floodplain with no indication that any supra-hamlet integration existed, but rather these seem autonomous communities. In other areas (i.e., Río La Villa), on the other hand, the abundance of Tonosí phase materials suggests that Cerro Juan Díaz was a large settlement. It is possible that, as a result of a political shift, population gravitated from La Mula-Sarigua to Cerro Juan Díaz (11 km away), but there is no meaningful change in overall population levels from the La Mula phase to the Tonosí phase in the Río Parita Valley (Table 2.1, Figure 2.20). No mortuary data is available for the Tonosí phase from the survey zone, but from other sites in the Central Region, it appears that differences in social status are becoming more pronounced. From this information, however, social ranking has not emerged and differences in social status still appear to be based on achievement.

The Cubitá phase is marked by a population explosion and the formation of the large nucleated village of He-4, previously a Tonosí hamlet, that dominates the site-size hierarchy in the valley (Table 2.1, Figures 2.20, 4.11, 4.12). For the rest of the pre-Columbian sequence, population concentrates in and around He-4 with varying levels of population density. With the establishment of He-4, population in the valley becomes integrated into a single social unit as illustrated in the rank-size graph and the well-defined site-size hierarchy (Figures 4.13, 4.14). As will be discussed in Chapters 5 and 7, He-4 is located

away from the floodplain, 14 km from the coast, and in some of the least productive soils in the survey zone (CATAPAN 1970:II). The location of He-4, therefore, in contrast to that of la Mula-Sarigua, cannot be easily explained by its proximity to rich resources. Unlike La Mula-Sarigua, He-4 exhibits features indicative of a central place. High-status burial mounds at He-4 are the best evidence for communal/ritual activity in the Río Parita Valley with graves containing some of the wealthiest mortuary finds outside of Sitio Conte (Cooke et al 2003a:136-137). It is not until the Macaracas phase, however, that we have evidence for high-status burials.

Cooke, et al. (2000:172, 2003a:127-128, 134, 136-137) and Linares (1977:76-77) claim that Sitio Conte was a macro-regional necropolis serving the needs of high-status males from different communities from the Central Region. While the burial mounds are in regular use at He-4, high-status mortuary activity ceases at Sitio Conte (~ A.D. 950), which has led Cooke, et al. (2000:172) to hypothesize that Sitio Conte's role as a macro-regional necropolis for elites was transferred to He-4 during the Macaracas phase—the only two sites that contain what would be called high-status burials in the Central Region. Cooke, et al. (2000:172, 2003a:126-127) propose that whether or not the territories controlled by Chiefs, such as Natá or Parita, were chiefdoms in the anthropological sense, there was a larger social unit to which all of these chiefdoms, or confederations of culturally and genealogically related villages, belonged. Powerful elites from all over the Central Region ended up at El Caño/Sitio Conte—the cultural and ritual epicenter of the chiefdoms ensconced in the rivers that flow into the Parita Bay (Cooke, et al. 2003a:127). Other cemeteries in the Central Region (i.e., Cerro Juan Díaz [Díaz 1999:68]), on the other hand, were used only by commoners.

Although there is an overall similarity in the settlements during the Cubitá to El Hatillo phases, an examination of the rank-size plots (Figure 4.4) suggests that these ceramic phases can be divided into two distinct groups. Despite the reduction in overall population, the rank-size plot of the Conte phase does not represent a significantly different settlement dynamic than the Cubitá. The Macaracas, Parita, and El Hatillo phase rank-size distributions, on the other hand, are closer to log-normal and are significantly different from the settlement dynamics from the Cubitá/Conte group. It is important to note that with the appearance of high-status burials during the Macaracas phase, there is a significant change in the settlement dynamics (Figure 4.4), which possibly represents an increase in socioeconomic or political integration in the valley, or on a larger spatial scale.

The first burials in the Río Parita Valley, after A.D. 250, occur during the Conte phase (Ladd 1964:206; Stirling and Stewart 1949:375, 394). These burials were all located at lower-order sites with none at He-4. Some grave goods were associated with the physical remains, but nothing on the scale seen at Sitio Conte. It is possible, following the ideas of Cooke, et al. (2000:172, 2003a:126-127) and Linares (1977:76-77), that ranking in the Río Parita Valley might have emerged during the Conte phase, or

earlier, but elites with the proper “credentials” were interred at Sitio Conte rather than within the valley (Cooke, et al. 2003a:27). Thus, it might be more appropriate to say that although evidence of high-status burials does not appear in the Río Parita Valley until the Macaracas phase, it is possible that social ranking was present several centuries earlier.

There are two critical points of social change during the Late Occupation Sequence in the Río Parita Valley. There is a sharp settlement pattern change at the beginning of the Cubitá phase with a probable central place (He-4) integrating the region. The emergence of social ranking at this time can not be confirmed through burial evidence, but by the Conte phase, at least, Sitio Conte may include high-status burials from the Río Parita Valley. Therefore, it is possible that chiefdoms emerged by the Cubitá or Conte phases. The other settlement pattern change occurs in the Macaracas phase as secondary centers build up and create more of a log-normal rank-size pattern. He-4 is a high-status necropolis by then, so the presence of ranking is unequivocal. Chiefdoms beyond a doubt emerged by the Macaracas and continued up until the death of Chief Parita in A.D. 1519 (Espinosa 1994b:63-64).

5. DEMOGRAPHY and WARFARE

[I]n Italy for thirty years under the Borgias they had warfare, terror, murder, bloodshed but they produced Michelangelo, Leonardo da Vinci, and the Renaissance. In Switzerland, they had brotherly love, they had five hundred years of democracy and peace. And what did that produce? The cuckoo-clock. (Orson Wells as Harry Lime in the film *The Third Man*, cited by Wenke 1990:298)

The effects of population growth leading to social circumscription long have been a popular explanation for sociopolitical development (Boserup 1965; Carneiro 1970, 1981, 1990). Others have questioned this causal association and suggest that population growth can be a result of increased complexity and elite needs of surplus (Cowgill 1975b; Drennan 1987; Earle 1987; Spencer 1990). Population growth and pressure are important initial components of both the Control of Local Resources and Warfare models (Cooke and Ranere 1992a:274; Ranere and Cooke 1996:75; Redmond 1994b). Helms (1994:57), on the other hand, disavows the role that population pressure played in the development of chiefly societies in Panama. For the Warfare model, population growth led to decreasing access to limited resources (i.e., alluvial farmland) that created greater disparities in social status and wealth, and resulted in increased conflict and hostilities within and between neighboring river valleys (Linares 1977:31). Archaeologists, who I have placed in the Control of Local Resources Model camp, have demonstrated a dramatic increase in population towards the end of the first Millennium B.C. throughout Panama (Cooke and Ranere 1984, 1992a; Drolet 1980; Hansell 1988; Ichon 1980; Linares and Sheets 1980; Piperno and Pearsall 1998; Weiland 1984), which appear to have led to increased restrictions on resources. Instead of strictly espousing that this just resulted in conflict, Cooke and Ranere (1992a:275; Cooke 2004) claim that communities in different ecological zones also increased their access to restricted items through trade and co-operation. In evaluating these claims, it is necessary to examine demographic trends and resource locations in the Río Parita valley and how they correspond to key changes in settlement patterns and expression of social status through mortuary ritual—the Cubitá and Macaracas phases.

Population pressure would be the result of demographic growth, which would show as an increase in the number and density of sites in the region and increases in the densities of surface artifacts within sites. If large settlements emerged, for example, but numerous small settlements disappeared simultaneously, population centralization would be indicated but not necessarily the kind of regional demographic growth that might lead to population pressure. My survey data indicate that although population began to nucleate during the La Mula phase, the kind of growth that might lead to population pressure was not present until

the Cubitá phase. It should be noted, however, that centralization could have been a response to aggression. To fully address the role that population growth played in the rise of settlement hierarchies, it is necessary to evaluate the resource potential of the Río Parita Valley. In other words, population growth does not necessarily mean that population pressure existed if population levels are much below the carrying capacity of the valley. In order to assess the carrying capacity of the survey area, a conversion of DAI/C into actual persons, crop yield estimates, and daily requirements per person are needed. Carrying capacity in the Río Parita Valley does not just include domesticated crops, but wild plant resources, like palms (which were widely used and an important source of calories and protein; Cooke 2004; Piperno and Holst 1998; cf. Smith 1980 for a discussion on the “wild” status of palm fruit), wild animal meat (Andagoya 1994:31; Cooke and Ranere 1989), and the abundant coastal and estuarine resources (Cooke 1988, 1992a; Cooke and Tapia 1994a, 1994b; Jiménez 1999; Jiménez and Cooke 2001). The model used here in formulating a carrying capacity for the Río Parita is not strictly based on domestic crops (i.e., maize), but incorporates the daily resources (wild and domestic) used by the modern indigenous Guaymí of Panama.

DEMOGRAPHIC PATTERNS IN PRE-COLUMBIAN PANAMA

Demographic estimates for contact and pre-contact Panama rely heavily on ethnohistoric accounts and vary considerably. Castellero Calvo (1995:39) estimates a total indigenous population for Panama of 150,000 to 250,000 on the eve of the conquest; Steward and Faron (1959:457) state it was 225,000, whereas Sauer (1966) and Bennett (1968) suggest 600,000 persons. As with many areas in the Americas, European contact produced radical changes in indigenous societies. Conflict and warfare, enslavement, transportation to other colonies, disruptions in socioeconomic systems, and the introduction of new pathogens rapidly devastated native populations (Cooke, et al. 2003b:3; Dunnell 1991; Guzmán 1956:13-20; Roosevelt 1979; Sauer 1980; Wolf 1982). The drastic reduction of indigenous Panamanian population and culture is confirmed by the decline in numbers of Native Americans censused during the sixteenth century (Castillero Calvo 1995:39), evidence of Hispanicization (Breece 1997:196), and the return of forests in areas previously cultivated by Native Panamanians (Cooke, et al. 1996; 2003b:3; Sauer 1966:287-288). Additionally, Castellero Calvo's (1995:39) analysis of census data from A.D. 1519-1522 produced an estimate of only 13,000 Native Panamanians between Natá and western Panama—remarkably lower than the estimates listed above.

Population Estimates

The best demographic information available for the pre-Columbian sequence of Panama derives from the Proyecto Río Santa María (Cooke and Ranere 1984, 1992a; Ranere and Cooke 1996; Weiland 1984) and from the Volcán Barú area of western Panama (Dahlin 1980; Linares and Ranere 1980; Linares and Sheets 1980). Based on excavations at Sitio Pittí in western Panama, Linares and Sheets (1980:53) revealed that each household (including a garden) was around 2500 m² in area. An estimate of five people per household produced, at A.D. 600, a total regional population of 2, 432 and an average of 39 people/km² (or a density of 20 people/ha of occupation; Dahlin 1980; Linares and Sheets 1980).

In the Santa María drainage basin (Figure 1.1), the number of sites increased from the Early to the Late Preceramic periods, and this trend continued into the Early Ceramic A Period (Monagrillo [Cooke and Ranere 1992a]). Occupation had spread through a variety of environmental zones by the last third of the first millennium B.C. when La Mula-Sarigua, in the Río Parita Valley, and Sitio Sierra in the Río Santa María Valley became large nucleated villages (Cooke and Ranere 1992a; Drennan 1996b; Hansell 1987). The gravitation and concentration of the regional population in broad highland valleys and the lower courses of rivers and streams, that flow into the Pacific in proximity to fluvio-estuarine systems, have been connected to increased population and increased cultivation that led to environmental degradation in upland areas (Cooke and Ranere 1992a:273-275, 297; Cooke, et al. 1996; Cooke, et al. 2003b:3; Piperno and Pearsall 1998:209-227, 286-297). If this were the case, the environs of La Mula-Sarigua and Sitio Sierra would have provided attractive opportunities for a burgeoning population (Cooke and Ranere 1992a:277-278; Hansell 1988:28).

Sitio Sierra, was systematically surveyed with a maximum extent of 45 ha (Figure 1.1; Cooke 1979, 1998a). Using estimates similar to Linares and Sheets (1980) of 2500 m² for each household, Cooke (1998a:104; Cooke and Sánchez 2004:II:6-7) estimates a maximum population of 900 for Sitio Sierra during the Late Occupational Sequence (most likely between A.D. 500 to 700; Cooke and Ranere 1989:299). During the Río Santa María survey, 13 large Late Ceramic sites, found every 3 km in an area that corresponded to the ethnohistoric chiefdom of Escoria (Cooke 1998a:104, 1993; Helms 1979:52, 57-58), suggests that the area of this chiefdom was, more or less, 44 km along the Río Santa María. These 13 large sites with an average of 600 inhabitants each would produce an estimated 7,800 people in the territory of Chief Escoria at contact with a population density of 44 people/km² (Cooke, et al. 2003b:8). Cooke (1998a:104; Cooke, et al. 2003b:8) acknowledges that these estimates are crude, but that estimates between 5,000 and 15,000 are reasonable for each ethnohistorically defined chiefdom based on Spanish accounts (Espinosa 1864:488, 1873:41-42). Cooke's estimates, however, are based on artifact scatters of

the Late Ceramic II Period (A.D. 700 to 1522; Weiland 1984:46), and do not relate just to the contact period, but to a substantial portion of the pre-Columbian sequence.

Hansell's excavations and survey of La Mula-Sarigua, undertaken during the Proyecto Santa María, were completed between 1983 and 1985 and provide useful estimates in evaluating regional population from the entire Río Parita Valley. For the La Mula phase, Hansell (1988:225) calculates the population of La Mula-Sarigua as 580-700 persons based on similar estimates for early communities in the New World (10 people/ha; Damp 1984; Flannery and Marcus 1983; Marcus 1976; Renfrew 1973; Roosevelt 1980; cf. Hassan 1981). Following Winter's (1976:228) use of 5 persons per house cluster in the Valley of Oaxaca, Hansell estimates 16.6 and 26 people/ha at La Mula-Sarigua with a range of 963 to 1820 people (Hansell 1988:225).

The contact period site of Natá (Figure 1.1) provides an interesting opportunity to develop a population estimate based on both archaeological and ethnohistoric information. Espinosa (1994a:48) noted that "so many were the houses there [Natá] that I believe that there was no one of us who was not fearful to see such a great town" (translated by Roosevelt 1979:71). Espinosa (1994a:48) estimated that the town had 1500 inhabitants, which was made 18 years after the first Spanish landfall in Panama. European contact and their diseases, therefore, might have already had a negative effect making this an underestimation of previous indigenous population levels (Cooke and Ranere 1992a:Note 13). In 1527, eight years after Espinosa's second entrada visit, Oviedo (1944:VIII:9) observed that there were only 45-50 houses made of wood and palm thatch in this settlement suggesting that Native Panamanian population had decreased substantially (Cooke 1998a:80-81; Linares 1977:73). Despite the possibility that population estimates from Natá under-represent the indigenous population at the time of contact, Espinosa's accounts are informative and credible.

According to Oviedo (1944:III:131), the houses at Natá varied in size and function from very large multi-family structures with separate interior subdivisions to smaller square domestic dwellings; the roofs of these structures were capped with a ceramic vessel with a tall neck. Helms (1979:8), citing Anghiera (1912:I:309), Lothrop (1937:14), and Young (1971:39-41), suggests that nucleated villages were the dwelling places of the chief and his family and servants (*bohíos*); the majority of the common people lived in dispersed settlements. At Cerro Juan Díaz several features were located, including clay floors associated with post-holes, which were probably dwellings. Their precise functional interpretation, however, awaits the analyses of all excavated materials (Richard Cooke, personal communication). One circular structure excavated by Carvajal (Carvajal, et al. 2004) has been interpreted preliminarily as a mortuary house. Excavation of two houses at Sitio Sierra revealed that they were approximately 8 m by 4 m in size spaced 8-10 m apart (Cooke 1979; Isaza 1993:Figure 13). Floors at Cerro Juan Díaz are evidenced by fired-clay floors that easily break up into small pieces and do not retain their shape upon

excavation (personal observation). Two of the roof apex caps, mentioned above, were found at Cerro Juan Díaz (Carvajal, et al. 2004) and are similar in form to those illustrated by Oviedo (1944; Carvajal, et al. 2004; Torres de Araúz 1972b:Figure 13). During the Río Parita survey, a ceramic object similar to the roof apex caps recovered at Cerro Juan Díaz was found at the site of He-2.

Although Cooke (1972, 1979; Breece 1997:58) did not systematically survey the site of Natá, he estimates the village area in pre-Columbian times as 400 ha, which would give an average of 3.75 people/ha using the Spanish estimate of 1500 people (Espinosa 1994a:48). This is noticeably lower than one would expect considering the present artifact density at these large chiefly centers. Combining Cooke's (1972, 1979) size estimate and Oviedo's (1944:VIII:9) house estimate would produce about one house for every 8-9 hectares—not exactly a dense village, or a village of any kind. Cooke (1972, 1979) walked across the entire site pinpointing clusters of materials, identifying them as individual localities, and assumed they were contiguous; he defined the size of pre-Columbian Natá as the perimeter that connected their outer edges. We do not know, however, if these “clusters” were indeed contiguous or if the 400 ha size includes the pre-Columbian habitation of Natá or a combination of settlements. Likewise, Espinosa (1994a:48) does not explain if his estimate applies to Natá and other settlements in its periphery, or just to the main chiefly compound (*bohío*).

A more recent 5 km² archaeological survey of the modern town of Natá and its vicinity revealed that pre-Columbian and colonial settlement were not continuous throughout (Breece 1997:85, 104). Based on Breece's descriptions of zones of artifact concentration (Breece 1997: 104, 154: Figures 13, 23-47), it appears that 100 ha is a more appropriate site size for Natá at contact and corresponds to the sizes of other sites (i.e., Cerro Juan Díaz at 100 ha [Cooke, et al. 2003b:23; Isaza 2004]). If we use the smaller estimate of 100 ha for the town of Natá, we would come up with an average of 15 people/ha. Although this is still low for a nucleated village, it seems more reasonable and falls close to population estimates for other areas of Panama (20 people/ha [Volcán Barú, Linares and Sheets 1980:53]; [Sitio Sierra, Cooke 1998a:104; Cooke, et al. 2003b:8]; 10-26 people/ha [La Mula-Sarigua, Hansell 1988:225]).

As mentioned in Chapter 2, relative demographic estimates for the Río Parita Valley are based on the area and density of occupation (DAI/C) in an attempt to avoid relying just on site area (see Cooke, et al. 2003b:10). We could just use the 15 people/ha for all occupied area in the survey zone to come up with a quick estimate, but we know that the density at the smaller third-order sites was lower than at the larger and more densely packed first and second-order sites (Table 4.3). Using the general settlement densities from highland Chiriquí (39 people/km²; Linares and Sheets 1980) or from the Río Santa María Valley (44 people/km²; Cooke, et al. 2003b:8) would produce a total population for the Lower Survey Zone of 3,560 and 4,017, respectively. Using these settlement densities, however, does not account for temporal or

spatial differences in population densities. Thus, it is more satisfying to incorporate the information we have from DAI/C to correct for different settlement densities in obtaining regional population estimates.

To obtain a correspondence between the population density estimates from Natá and the DAI/C values from the Río Parita survey, the area (ha) and DAI/C of He-4 were examined. He-4 is the most appropriate site to use in this calculation, as, like Natá, it was a first-order site. For each ceramic phase, the area (ha) of He-4 was multiplied by the minimum (3.75 people/ha) and maximum (15 people/ha) from Natá to produce a total population estimate for He-4 for each phase. These estimates were then divided by the corresponding DAI/C value for He-4 for that phase. Therefore, it is now possible to talk about DAI/C values as referring to actual people. Using the minimum and maximum estimates from Natá, multiplied by the area of He-4, for each phase, and then dividing that by the corresponding DAI/C, we have an average of 13 and 52 people per 1.0 DAI/C, respectively. These minimum-maximum values can be applied to every collection unit from the survey in calculating a range of population estimates for sites from each phase of the Late Occupation Sequence in the Río Parita Valley.

CARRYING CAPACITY

Modern or historic crop yields can be a valuable tool for understanding pre-Columbian agricultural productivity (Carmack 1989:33; Langebaek 1995:65-66; Milner and Oliver 1999:88; Steponaitis 1978, 1981). A straight one-to-one application, however, is usually not possible, given the use of new technology, fertilizers, and pesticides in modern agriculture. Modern crop yield reports from Panama focus more on exports (i.e., coffee and bananas) than on subsistence cultigens (maize, beans, and yuca). A more productive source of analogy comes from ethnographic descriptions of the modern Guaymí indigenous group of western Panama (Linares 1980b:11-12; Sinclair 1988; Young 1968, 1971, 1976, 1980a, 1980b; Young and Bort 1976). Rather than relying on crop yields and daily requirement estimates of a few select crops, Sinclair (1988) and Young (1968, 1971, 1980a, 1980b) detail the necessary annual agricultural production and wild resource procurement required for the subsistence and social needs of individual Guaymí families from Bocas del Toro, Chiriquí, and Veraguas provinces.

Each Guaymí family needs a 4.25 ha farm that is used for two years and then abandoned to fallow for 12 years; thus, based on fallow times each family of five requires a total of 29.75 ha using swidden agriculture (Young 1968:172). The Guaymí use two cycles of swidden agriculture to cultivate maize, rice, yuca, sugar cane, bananas, squash, beans, and other tubers (Young 1971:60). Apart from seed necessary for next year's crop and maize for chicha production, there is little agricultural surplus for market

exchange (Sinclair 1988:37). Young (1980a:227-228) argues that the importance placed on ritual in Guaymí society made it important for farmers to strive for a surplus of maize for chicha, which could have been used to supplement subsistence needs during times of low yields. As will be discussed in Chapter 7, a similar overproduction could also have played an important role in providing a surplus to host ritual feasts and exchanges (*balsería*) in prehispanic times (Oviedo 1995:39).

A widely-used ethnographic estimate of maize consumption is one metric ton of maize per year per peasant household of five individuals, or .458 kg per person per day (Blanton, et al. 1982:158; Coe and Diehl 1980:81; Langebaek 1995:67; Parsons 1976). This accords well with the Guaymí estimate of .453 kg per person per day (Sinclair 1988:Figure 4; Young 1968:207). Available information of the Guaymí's average annual production for the major cultigens per hectare is 204 kg of maize, 45 kg of rice, and 34 kg of beans (Sinclair 1988:Figures 4, 5; Young 1968:172). When rice is scarce for planting, maize, yuca and beans become more important to the diet (Sinclair 1988: 29-31; Young 1968:207). Guaymí agricultural production relies on the use of machetes, digging sticks (*coas*), and axes, but not fertilizers or pesticides, and thus, can be considered relatively "traditional" (Young 1980b:496). The agricultural estimates for the Guaymí are considerably below what has been calculated for other areas of the Americas. Milner and Oliver (1999:88) suggest that maize yields from 34 accounts of Eastern Woodlands and Plains groups were between 650 and 1300 kg/ha. Coe and Diehl (1980:80) determined that annual production of maize per hectare near San Lorenzo Tenochtitlán, Mexico ranged from 1,800 to 4,050 kg depending on the varieties grown. Milner and Oliver (1999) do not mention what soil types are represented by their sample, whereas Coe and Diehl's (1980) estimate relates to the rich river alluvium. Carmack (1989:33) notes that each hectare of cultivated land in the town of Buenos Aires, Costa Rica, produces 134 kg of maize and 20 kg of beans without the use of mechanized equipment (i.e., tractors)—below that of the Guaymí and the other estimates. Carmack's estimate, however, is for an agricultural system where 55% of lands are used for raising cattle and cultivation is predominantly an indigenous affair on relatively poorer lands.

It must be remembered that we are assuming that soil fertility and the genetic make up of cultigens did not change for more than 1500 years. Available information demonstrates that not only is maize a very ancient cultigen in Panama (being used at least by 5000 B.C. [Cooke 2004; Piperno and Pearsall 1998:286-287; Piperno, et al. 1985; Piperno, Bush and Colinvaux 1991]), but also that from about the La Mula Phase onwards it comprised several varieties with from 4 to 12 rows of grains and kernels of different sizes (Bird 1980, 1984; Cooke 1998:101; Galinat 1980:Table 1). Young (1971:66) does not specify what variety of maize is cultivated by the Guaymí, so it is difficult to apply a correction factor to account for the developmental trajectory of Panamanian maize.

Milner and Oliver (1999:88) note that a carrying capacity estimate that focus only on one crop disregards other important resource contributions to the diet (i.e., fish and game), which in certain areas

can provide as much as maize alone (600-1000 kg of fish annually per ha of wetlands for Cahokia). Norr (1991, 1995; Cooke 1998a:114; Cooke, et al. 1996) noticed from human bone isotopic analysis at El Caño, Cerro Girón, and Sitio Sierra that although maize consumption increased considerably from about 300 B.C. to A. D. 500, the diet, overall, was mixed between cultigens, wild game, and aquatic resources (see also Cooke 1998; Cooke and Ranere 1989; Piperno and Pearsall 1998). This is supported by Espinosa (1994a:48; Linares 1977:73) who noted that during his visit to Natá in the sixteenth century, the Spanish seized an infinite amount of maize and dried fish, many geese and turkeys, over 300 smoked deer, and large quantities of other “Indian” foods, which were stored at this *bohío*. Other crops cultivated in pre-Columbian and contact Panama included sweet potatoes (*Ipomoea batatas*), melons (*Cucurbita* sp.), yuca (*Manihot esculenta*), beans (*Phaseolus vulgaris*) (Andagoya 1865, 1994; Cooke 1998; Espinosa 1994b:65, 68; Oviedo 1995; Piperno and Pearsall 1998; Sauer 1966). Wild plant species that supplemented the diet included palm fruit (*Attalea*, *Elaeis*, *Acromia*), nance (*Byrsonima*), and zapote (*Zapotaceae*) (Cooke 2004; Cooke and Ranere 1992a; Piperno and Pearsall 1998; cf. Smith 1980). The abundance of white-tailed deer, fish, and shellfish remains at Central Region sites reveals that these wild resources were important dietary elements (Carvajal 1998; Cooke 1988, 1992a, 1992b, 1998, 2004; Cooke and Ranere 1989, 1992b; Cooke and Tapia 1994a, 1994b; Jiménez 1999; Jiménez and Cooke 2001).

Excavations at Cerro Juan Díaz (Carvajal 1998), La Mula-Sarigua (Hansell 1988:179-180, 229), and Sitio Sierra (Cooke and Ranere 1989:301; Cooke and Tapia 1994a, 1994b; Jiménez 1999) have shown that the exploitation of estuary, mangrove, and beach zones (for shellfish, nearshore and littoral fish, and crabs) was very important to the diet (see also Cooke 1992a; Cooke and Ranere 1994, 1999). In fact, at Sitio Sierra fish made up 70% of the vertebrate sample—a site that is 12-13 km from the coast (Cooke and Ranere 1989:301; Cooke and Tapia 1994a, 1994b; Jiménez 1999). This suggests that the drying and salting of fish was an important activity by coastal people who then traded this resource to pre-Columbian Panamanians who lived away from the coast (Cooke and Sánchez 2004:II:17; Jimenez and Cooke 2001; Oviedo 1853:III:140). Recently, Ilean Isaza (2004) recovered large amounts of fish bones from the sites she investigated throughout the lower course of the Río La Villa. Likewise, the abundance of shell recovered from surface collections during the Río Parita survey (Figure 5.1) suggests these same resources provided much of the subsistence needs of the valley’s past residents, as they do today (Cooke and Tapia 1994a).

Overall, 249 collection units had shell remains; however, only two came from the Upper Survey Zone (Figure 5.1). Mollusks recovered from surface collections are native to four different habitats within the survey zone (Table 5.1). The “ocean” refers to areas along the coast that are still underwater during low tide. The “mud flats” are areas that are under water during high tide, but are exposed during low tide.

Mollusks native to the “estuary-mangrove” or the “floodplain” come from their respective zones as illustrated in Figure 2.2. The majority of all mollusks, regardless of native habitat, were distributed throughout the Lower Survey Zone and did not concentrate at any one site type (Figure 5.1).

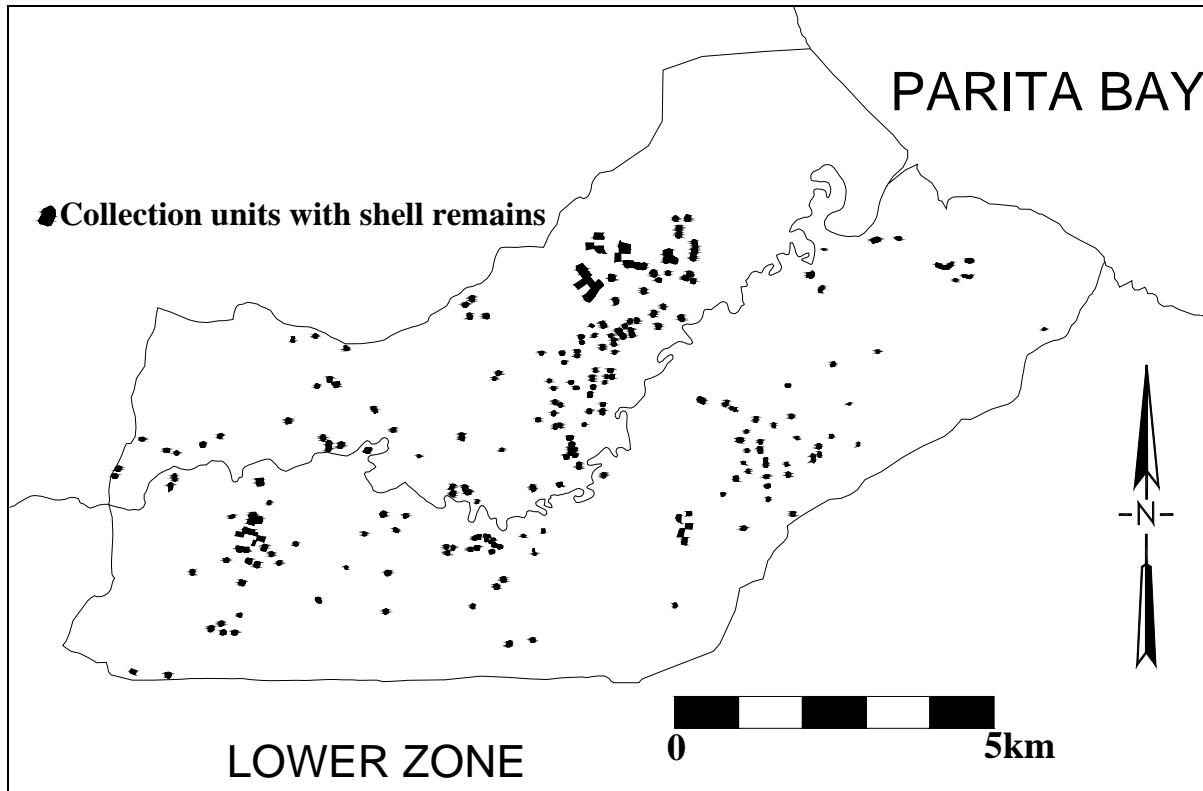


Figure 5.1. Distribution of all marine shell recovered from the surface collections.

Surface remains recovered in this survey provide little, if any, data on the exploitation of terrestrial faunal resources by the inhabitants of the Río Parita Valley. Additionally, it was difficult to distinguish whether these recovered faunal remains were modern or prehistoric. Several lower hindquarter white-tailed deer elements, however, were recovered from a disturbed archaeological context just north of the burial mounds at He-4 and were associated with ceramics dating from A.D. 250 to 1522. The rest of the faunal assemblage contained some crocodile scutes, freshwater turtle-shell fragments, and long-bone fragments from bovids/cervids. This limited faunal assemblage, unfortunately, does not allow a comprehensive evaluation of hunting activities in the Río Parita Valley as has been done at other sites in Panama (Cooke 1992b; Cooke and Ranere 1989, 1992b).

In the neighboring Río La Villa and Río Santa María valleys, however, archaeozoological data demonstrates that indigenous peoples ate a wide variety of animals from a number of different habitats.

The most abundant mammals are white-tailed deer (*Odocoileus virginianus*), armadillo, opossum, rabbit (*Sylvilagus*), and raccoon (Cooke 1992b, 1998; Cooke and Ranere 1989, 1992b; Linares and White 1980). Reptiles were also consumed with great frequency, i.e., iguana (*Iguana iguana*), freshwater turtles, *Kinosternon* mud turtles, and frogs and toads, especially *Leptodactylus insularum* (formerly *L. bolivianus*) and *Bufo marinus* (Cooke and Ranere 1989, 1992b). Birds were an important element in the diet and also were kept as pets and used for ritual purposes (Cooke and Ranere 1989, 1992b). The most widespread birds in middens at Sitio Sierra and Cerro Juan Diaz, included savanna, secondary growth, river- and lake-shore, and coastal species, such as egrets and herons (*Ardeidae*), bobwhite quail (*Colinus*), grackles (*Cassidix*), and doves (*Columbidae: Leptotila, Zenaida, Columbina*) (Cooke and Ranere 1989, 1992b). At Cerro Juan Diaz boobies (*Sula*) and macaw remains are also abundant (Cooke and Ranere 1989, 1992b).

Table 5.1. Native habitat and distribution in the survey zone of recovered mollusks (identifications by Diana Carvajal and Mikael Haller).

Mollusk Type	Native Habitat	No. of Lots	Distribution
<i>Anadara grandis</i>	Estuary-Mangrove	171	Entire Lower Survey Zone
<i>Pitar (Lamelliconcha) paytensis</i>	Mud Flats	32	Entire Lower Survey Zone
<i>Ostrea cochapila</i>	Ocean	64	Entire Lower Survey Zone
<i>Strombus gracilor</i>	Ocean/Mud Flats	13	Entire Lower Survey Zone
<i>Prothotaca (Leukoma) asperrima</i>	Mud Flats	22	Entire Lower Survey Zone
<i>Anadara (Anadara) similis</i>	Mud Flats	38	Entire Lower Survey Zone
<i>Spondylus princeps</i>	Ocean	1	Shell pendant (Figure 6.13)
<i>Cerithidea valida</i>	Ocean/Mud Flats	5	< 4 km from coast
<i>Polymesoda</i> sp.	Floodplain	12	Entire Lower Survey Zone
<i>Olivella (Lamprodona) volutella</i>	Mud Flats	1	Salt Flats
<i>Malea ringens</i>	Ocean	3	Salt Flats
<i>Chione (Ilichione) subrugosa</i>	Mud Flats	2	Salt Flats

Detailed information on soil types is only available for the Lower Survey Zone where the overwhelming majority of pre-Columbian settlement occurred. Soils in the Río Parita Valley have been divided into four fertility classes, or ranks, (Table 5.2; Figure 5.2; CATAPAN 1970:II) that correspond to high, moderate, and low productivity, and non-arable. The mangrove-estuary zone, salt flats zone, and areas with high elevations are considered not suitable for cultivation and make up 22.5% of the Lower Survey Zone. Low productivity soils (8.1%) are predominantly found in the southwest of the Lower Survey Zone in the same area as He-4. Moderate soils make up the majority of the Lower Survey Zone (63.3%) and include most of the Lower Central Plain physiographic zone (Figure 2.2). High productivity lands (6.0%) are found in the upper floodplain zone where nutrient rich sediments are deposited annually replenishing the soils and where adequate drainage prevents long-term inundation.

The soil classification used in the Río Parita Valley provides rankings and not precise productivity values. Therefore it is not possible to simply state that moderate productivity soil is twice as productive, or that high productivity soil is three times as productive as low productivity soil. The Guaymí practice swidden agriculture in low fertility soils with the same classification as low fertility soils in the Río Parita Valley (CATAPAN 1970:I:228; 1970:III:Plates 6-137A, 6-137D, 6-137G, 6-137H; Sinclair 1988:Maps 1, 5; Young 1971:Map 1). Taking the most conservative soil productivity estimate for the Lower Survey Zone results in treating all soil types as similar to the low productivity soils of the Guaymí. High productivity soils in the upper floodplain zone, however, are fertilized by annual flooding and are considered not to have needed the 12-year fallow period. Multi-cropping may have been practiced in the alluvial zones (Cooke and Ranere 1992a:274), but without concrete evidence for this, it is assumed that only one major cycle was practiced.

If 4.25 ha of cultivated low productivity land is required to provide a Guaymí family with a year's supply of agricultural products (and other resources), we can conservatively apply this number to high productivity zones in the Río Parita Valley to say that each 4.25 ha of cultivated land would support at least one family of five year-in and year-out, since no fallow period would be required. In low or moderate productivity land, allowing for two years of cultivation followed by 12 years of fallow, we can conservatively say that each 29.75 ha of land would support at least one family of five. These can be taken as estimates of the minimum numbers of people the land in the Río Parita Valley can support, for several reasons. First, they are based on the lowest productivity soils, without allowing for higher yields each year for more fertile soils. Second, moderate productivity land is assumed to require as long a fallow period as low fertility land. Only the most productive land is assumed not to require a fallow period, and even there only one crop per year is assumed. Third, abundant food resources in the form of game, fish, and shellfish are not adequately represented in the calculations. It is these minimal carrying capacity estimates that are used below in assessing demographic pressure.

Table 5.2. Percentages of soil types for the Lower Survey Zone of the Río Parita Valley.

SOIL TYPES	km²	Percentage of Total Area
Non-arable	20.58	22.5 %
Low Productivity	7.40	8.1 %
Moderate Productivity	57.80	63.3 %
High Productivity	5.51	6.0 %
TOTALS	91.29	99.9 %

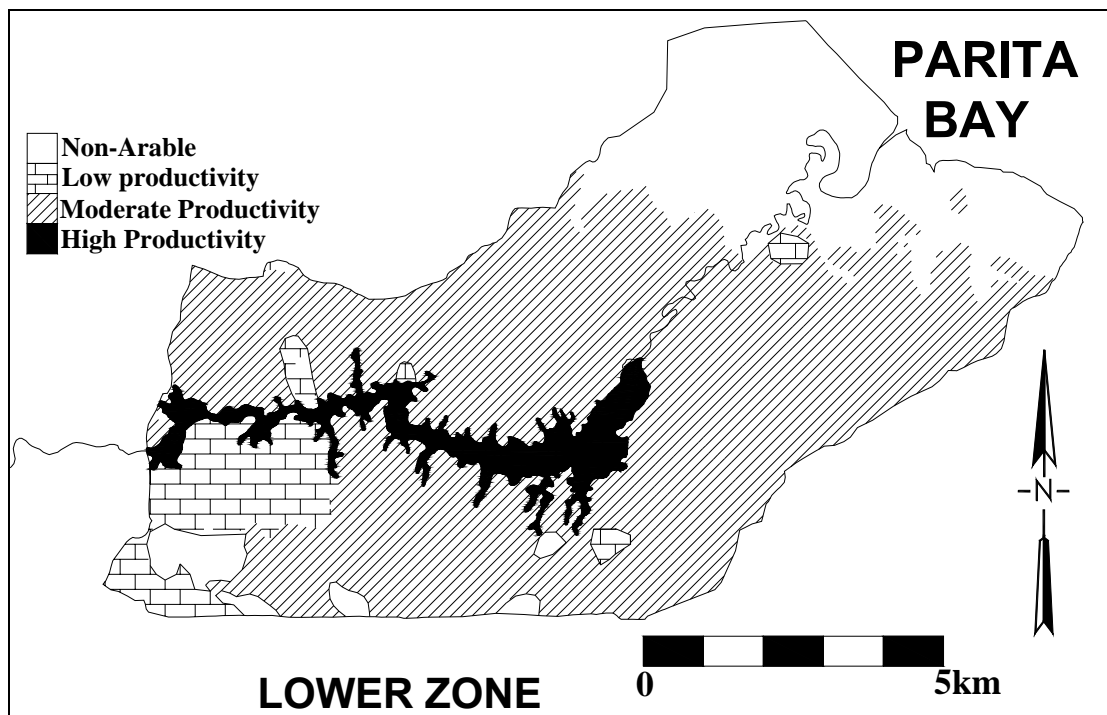


Figure 5.2. Soil productivity in the Lower Survey Zone.

DEMOGRAPHIC PATTERNS IN THE RÍO PARITA VALLEY

There was little change in overall population levels for the La Mula and Tonosí ceramic phases, despite radical settlement relocations upriver from the coast. With the Cubitá phase, population increases substantially from the Tonosí period, and the emergence of He-4 as a first-order site suggests that we have the presence of a site-size hierarchy. Afterwards, population levels maintain essentially the same level, fluctuating only modestly when compared to the Tonosí to Cubitá phase transition (Table 2.1, Figure 2.20).

Using the maximum values ($1.0 \text{ DAI/C} = 52 \text{ people}$), population estimates for site types from the Río Parita survey were calculated from the DAI/C values for each phase (summarized in Table 4.3). During the La Mula phase, La Mula-Sarigua had a population of 123 people with a second-order site nearby (18 people), and a dispersed pattern of smaller settlements that averaged around three people per site. Tonosí phase second-order sites were small, ranging from 7 to 19 people, whereas third-order sites are still small (2.5 people) and, most likely represent individual families. Sites of the Cubitá phase grew considerably to between 17 and 51 people for second order sites, 302 people for He-4, and third-order sites averaged seven people—an increase of 300%. With the substantial drop in overall population during the Conte phase, there is no corresponding reduction in second-order site sizes, which contain 25 to 52 people. He-4 is reduced slightly in population to 276 people and third-order sites average six people per site. Despite the 25% reduction in overall population, all Conte phase sites contain similar numbers of people to the Cubitá phase, but the number of third-order sites decreases.

Population levels remain stable during the Macaracas phase, but a shift in settlement location occurs. He-4's population drops almost in half to 157 people, with second-order sites ranging from 46 to 69 people. Third-order Macaracas sites have an average population of nine people per site—the highest during the Late Occupation Sequence. It appears that there is a restructuring of the valley's population as He-4 size is reduced in half and second and third-order sites gain inhabitants, which produces a highly log-normal rank size plot (Figure 4.20). The Parita phase represents a return to regional population levels seen during the Cubitá phase (Figure 2.20), and population is overwhelmingly focused on He-4, which had 244 inhabitants. Second-order sites range in population from 36 to 98 people, which are similar to the Macaracas phase, but double that of Conte phase. Third-order Parita phase sites average seven people per site. He-4, during the El Hatillo phase, is still the largest site in the survey zone, but its population reduces in half to 120 people. Two second-order sites, only 600 m apart, are approximately 2 km from He-4 and have a combined population of 92 people, whereas third-order El Hatillo sites average five people. These site population estimates, along with carrying capacity values, will be the basis for site-catchment analyses in Chapter 7.

POPULATION PRESSURE

In addressing the effects of population pressure in the Río Parita Valley, population estimates will be compared to the carrying capacity for the two critical times in the development of social ranking in the Río Parita Valley—the Cubitá and Macaracas ceramic phases. Although La Mula-Sarigua is considered a first-order site, it is not until the emergence of He-4 during the Cubitá phase that we have a settlement pattern suggesting a three-tiered site-size hierarchy existed. There is a corresponding population surge at the beginning of the Cubitá phase (Figure 2.20, Table 2.1) suggesting that population pressure might have contributed to the development of social ranking in the Río Parita Valley. When high-status burials appear at He-4 during the Macaracas phase, there is no meaningful change to the overall population levels in the valley, suggesting that if population pressure contributed to the development of social ranking it occurred several centuries earlier.

The overall settlement explosion during the Cubitá phase results in a 653% increase in population. Taking a mid-point date for the Tonosí and Cubitá ceramic phases, there would have been a constant population growth rate of 2.9 % per year, where the Tonosí phase population would have doubled in 35 years or quadrupled in 70 years. The growth rates for the next four periods after the Cubitá are -.14 %, +.01 %, +.14 %, and -.27 %, respectively. This illustrates that the Cubitá settlement explosion was quite different from the relatively stable population levels of later ceramic phases. The Cubitá phase population growth rate is almost four times that of the modern growth rate for the District of Parita, which was .88% from 1950 to 1990 (Almendras, et al. 1993). This population increase, however, is similar to the modern Guaymí who underwent an annual population increase of 2.1 % from 1960 to 1980 (Sinclair 1988:72).

The minimum and maximum demographic estimates for each ceramic phase (Table 5.3) are based, respectively, on Cooke's (1972; Cooke and Ranere 1992a) estimate of 3.75 people/ha for Natá, and the modified estimate of 15 people/ha. In calculating carrying capacity for the Lower Survey Zone, the total area of different soil ranks was converted into the maximum number of people it could support using the productivity values described in the previous section. High productivity soil (551 ha), moderate productivity soil (5780 ha), and low productivity soil (740 ha) could have supported 648, 971, and 124 people, respectively. From these estimates, therefore, the Lower Survey Zone could have supported a total of 1743 people without the use of intensive agricultural practices—above the maximum population estimate of 1190 for the Cubitá phase (Table 5.3).

The estimated carrying capacity of the Río Parita survey area was, thus, well above the estimated population for any phase during the prehispanic sequence. This conclusion has been reached using the maximum possible population estimate and the minimum possible carrying capacity estimate. The wide estimated gap between population and carrying capacity was, consequently, in all probability really even

wider. It seems impossible to argue that regional-scale population pressure on subsistence resources existed in the Río Parita Valley at any time during the prehispanic sequence. The social changes of the Cubitá and Macaracas phases, then, cannot reasonably be attributed to population pressure. Even though population surged in Cubitá times, it stayed well below the level at which regional population pressure would have been felt.

Table 5.3. Absolute population estimates for the Río Parita Valley by ceramic phase.

PHASE	DAI/C	MINIMUM	MAXIMUM	MEAN
La Mula	3.79	49	197	123
Tonosí	3.04	40	158	99
Cubitá	22.89	298	1190	744
Conte	17.04	222	886	554
Macaracas	17.39	226	904	565
Parita	22.38	291	1164	728
El Hatillo	9.86	128	513	321

Although regional population pressure and resource stress were not present and not factors in the emergence of social ranking during the Late Occupation Sequence, it should be noted that the best and most stable lands make up only 6% of the survey zone. Settlements in the Río Parita Valley, however, are not distributed so as to take advantage of the valley's entire resource potential. In calculating carrying capacity for the valley, we are assuming that everyone had equal access to land and the resulting agricultural resources, which probably was not the case. With the unpredictable rainfall in the dry tropical forest environment of the Río Parita Valley, the high productivity soils would have been the most desired, as they were closest to a permanent water source. Although there is no ethnohistoric or archaeological evidence for irrigation (Cooke 1998a:68-69), pot irrigation could have been practiced without leaving much evidence, and the soils closest to the river would have benefited from a higher water table. Differential ownership of, and access to, these lands could have created artificial population pressure in dry years. These themes will be addressed further in Chapter 7 with site catchment analysis.

WARFARE AND CONFLICT

Ethnohistoric accounts of conflict and aggression during the sixteenth century suggest that warfare was rampant throughout the Central Region of Panama. There is still debate as to the main purpose of warfare, but it is thought that it provided new territory, slaves, and tribute, and was an avenue for increasing a chief's and his followers' prestige (Oviedo 1944:III:17, 129-130, 138, 140, 157; Helms 1979; Redmond 1994b). Boundary disputes were noted by Andagoya (1945:396) to have been the cause of repeated conflict for Cueva chiefs of eastern Panama. In the Central Region, an objective of warfare was to see which chief "terná mas tierra é señorío" (Oviedo 1944:III:129). This is illustrated by Chief Parita's southern expansion incorporating other chiefdoms from a large area from which he could draw warriors from a larger pool of subjects (Andagoya 1865:30; Espinosa 1873:25, 32-33, 60; Helms 1979:59-60). This "paramount" chiefdom was a loose confederation of regional polities that put up much resistance to Chief Parita's authority and required constant bribes to consolidate power (Espinosa 1864:495-496, 1873:60). Upon Chief Parita's death, the rule of this territory was not inherited by his successor, but resulted in a "civil war" to see who would replace him (Espinosa 1994b:71).

Chiefs were described as war leaders, who conducted diplomacy, organized war bands, arranged tribute, and settled conflicts (Andagoya 1865:13, 26-27, 30; Anghiera 1912:222; Espinosa 1994a:56; Lothrop 1937:26; Oviedo 1853:III:129-130; Roosevelt 1979:75). The organizational capabilities of chiefs during war are best illustrated by a war party encountered by the Spanish along the Caribbean coast, which numbered three or four thousand (Oviedo 1944:IX cited in Lothrop 1937:4-6), but, more likely, these war parties numbered in the several hundred as mentioned by Espinosa (1873:25). Using canoes on river and coastal waterways increased the movement of troops and also facilitated trading (Cooke 1972:459; Cooke and Sánchez 2001:38; Espinosa 1994a:56).

Warriors used bow and arrow in some areas of eastern Panama, but the only evidence for their use in the Central Region of Panama was for Chief Urracá in the Cordillera Central (Anghiera 1912; Espinosa 1873:34, 38; Oviedo 1944:III:127; Figure 1.1). Linares (1976), Cooke and Ranere (1989:309) note that the lack of arboreal species in the zooarchaeological sample from Central Panama suggests that certain technologies (i.e., blowgun) were not used for hunting. Atlatls, lances, and wooden clubs studded with shark teeth were used by warriors in battle who wore cotton armor with the higher ranks displaying gold plaques and other jewelry (Andagoya 1865:484; Cooke and Ranere 1989:309; Espinosa 1864:4,97, 516, 1873:34, 38; Linares 1977:Figure17). Gold breastplates, helmets, or greaves worn by chiefs (*quevis* and *sacos*) and captains (*cabras*) in battle, signaled their position to their own troops, and to the enemy (Cooke and Sánchez 2004:II:26; Cooke, et al. 2003a:120-121; Oviedo 1853:III:118).

Ethnohistoric descriptions (Oviedo 1944:III:129) based on the situation in lands where the Cueva language or koine was in general use (eastern Panama) noted three warrior classes: *quevis*, or chiefs, were the apex of this military hierarchy, followed by *sacos*, or lesser chiefs, and *cabras*, or captains, making up the lowest rung (Lothrop 1937:10-12, 14, 22, 64, 202; Oviedo 1995:28-29). The way in which the principal occupants of some of the graves at Sitio Conte were placed and prepared, and the presence of several bodies with limited numbers of grave goods—often buried face down and in a primary, extended position—drew Lothrop's (1937:22) attention to descriptions of burial rites made by the soldiers who occupied central Panama between A.D. 1515 and 1522 (Espinosa 1994b:63-64). For example, Lothrop (1937:22) inferred that the facedown individuals could have been war captives or the women of chiefs who were buried with them—a custom described by the Spanish for other parts of Panama (Andagoya 1945:394; Espinosa 1994b:63-64; Oviedo 1944:III:154-156). The limited mortuary data from He-4 cannot be used to substantiate a similar military hierarchy, but one item from an unprovenienced context, a gold helmet (Cooke, et al. 2003a:Note 58; Roosevelt 1979:Figure 18), is considered to have been reserved exclusively for the higher social ranks (Briggs 1989:78, 137; Lothrop 1937:125; Mason 1940:17; Oviedo 1853:III:118; Roosevelt 1979:72). A metal helmet was described as part of the funerary dress of Chief Parita (Espinosa 1994b:63-64; Lothrop 1937:46), and one was recovered from the principle occupant of Grave 5 at Sitio Conte (Lothrop 1937:Figures 107, 108).

Ethnohistoric accounts state that a slaves' status would be marked by tattoos or by having their front teeth knocked out (Andagoya 1994:28-35; Anghiera 1965:1:235, II:384; Balboa 1994:22-26; Oviedo 1944:III:8, 129, 322, 1995:32-33). Several necklaces of human incisors found in He-4 burials (Stirling 1949) suggest that certain high-status people had acquired many slaves in battle, or as tribute, and possibly supporting the existence of a strong association between warfare and status. As mentioned in the previous chapter, one El Hatillo phase burial urn at He-4 contained a necklace of 737 perforated human incisors, which would have required a minimum of 184 individual people (Ladd 1964:245; Stirling and Steward 1949:394). From the available mortuary information, however, there is no documentation of trauma, wounds, or weapons from the excavated graves at He-4. There is, in fact, little evidence for trauma and wounds from warfare in the Central Region's skeletal assemblage as suggested for individuals at Playa Venado by Lothrop (1954; Cooke, et al. 2003a:137; Díaz 1999). At Cerro Juan Díaz, a mortuary feature dated by associated charcoal to between 750 ± 80 B.P. (cal A.D. 1165 [1275] 1400) (I-18681) and 650 ± 110 B.P. (cal A.D. 1195 [1305] 1450) produced several offerings of human maxillary and mandibular bones, whose teeth had been extracted post-mortem (Carvajal, et al. 2004; Cooke, et al. 2003b). An El Hatillo phase burial unit recovered from Cerro Juan Díaz (Carvajal 2003; Carvajal, et al. 2004; Cooke, et al. 2003b:24) contained several jars with the human remains consisting of mandibles and maxillae lacking teeth. As mentioned earlier, the necklaces found at He-4, thus, might have been

extracted post-mortem from deceased ancestors and not the result of marking slaves. The only artifacts found during the survey that might suggest conflict were a possible arrow-shaft straightener found in He-4 (similar to Linares 1977:Figure 17e found at Sitio Conte). There is no documentary evidence, however, for the use of arrows in the Central Region, but this artifact might have been used for straightening atlatl darts.

Defense was an important consideration in settlement location. *Bohíos* were located on top of high terraces (Andagoya 1865:41, 44-45), protected by palisades and walls (Espinosa 1864:515), and in one chiefdom, there was a standing regiment of warriors housed in special barracks (Anghiera 1912:310). Settlements encountered from the Río Parita survey, however, were situated, generally, on level ground with little or no dense occupation in areas that might be defensible. The one exception, Site 26, was situated on a small hill (10 m in height) overlooking the Río Parita. In sharp contrast to nearby hills, the top was fairly level with six smaller peaks (mounds?) with angular sides that appeared to have been artificially modified. Although little material was recovered from the site, it dates to the entire span of the Late Occupation Sequence except the El Hatillo phase. Amateur excavations (Elliott 1965) revealed that the hill and the mounds had a bedrock core suggesting that this hill had been modified, but not constructed. Likewise, Elliott (1965:67) failed to recover much archaeological material from the site and claimed, thus, that it was ceremonial in nature. Alternatively, this site could have been a defensive settlement, but it would appear to have been more of a refuge than a permanent fortress as described for the Río Tonosí Valley (Ichon 1980). Additionally, there were no defensive structures or features at any of the Río Parita Valley sites that might suggest something similar to the walls, palisades, or moats that protected some contact-period *bohíos* (Andagoya 1865:41, 44-45; Espinosa 1864:515). It is plausible that these features no longer are visible on the surface and require sub-surface investigation.

The settlement density maps for the Late Occupation Sequence (Figures 4.11, 4.15, 4.18, 4.24, 4.29) display a lack of settlement in the southeastern portion of the survey zone, whereas settlement focused instead on the site of He-4 to the southwest. Although ethnohistoric accounts claim that the Río Parita and Río La Villa valleys were both under the dominion of Chief Parita (Andagoya 1945; Espinosa 1873:31-33, 1994b:65; Sauer 1966:261, 281), the dearth of settlement might indicate a buffer zone existed between the two valleys and suggest earlier hostilities (Cooke and Ranere 1992:294; Helms 1979:38-69; see Sheets 1980 for a similar idea for the Volcán Barú region). This might also explain the lack of settlement in the Upper Survey Zone that would have separated the Chiefdoms of Parita and Quema (or Suema) to the west (Andagoya 1913:202; Cooke 1993:112, 116; Espinosa 1994a:65-66; Helms 1979:52, 59-60). An alternative explanation is that these areas might have been set aside as hunting preserves for white-tailed deer as described for contact Panama (Andagoya 1994:31).

SUMMARY

Population estimates used in Panamanian archaeology are, for the most part, based solely on area of occupation and do not account for differences in density of material. Incorporating the DAI/C was an attempt to circumvent this bias by combining area with the density of occupation (Drennan, et al. 2003b; see also Cooke, et al. 2003b:10). My analyses of carrying capacity demonstrate that demographic change did not play an important role in the emergence of chiefly societies in the Río Parita Valley. Despite the population surge during the Cubitá phase—when possibly social ranking emerges based on settlement hierarchies—carrying capacity was never reached and, thus, population pressure was not present. When firm evidence for the emergence of social ranking occurs with the mortuary goods and interments from the burial mounds at He-4, population levels do not change much from the preceding Conte phase. Even using the highest population and lowest carrying capacity estimates, population levels do not come close to suggesting that any demographic pressure existed or that it had any “real” affect on the emergence of chiefly societies.

Although warfare appeared to be endemic in contact-period Panama, Oviedo (1944:VIII:23, 1995:105-106) noted that when the Cueva-speaking peoples of eastern Panama were not fighting, they were involved in trading and feasting. For many lowland societies of the intermediate area, inter-societal relationships alternated between warfare and exchange (Redmond 1994b:120). There is also mention of war councils accompanied by ritual ball games played with sticks (*cañas*), feasting, dancing, and singing (Espinosa 1864:470, 510, 1873:41; Oviedo 1944:III:127, 130, 159; Redmond 1994b:40). This is reminiscent of the *balsería* game practiced by the modern and historic Guaymí and might suggest that the game’s origins were for training warriors, or as ritualized warfare as a replacement for the destructive alternative (Young 1980a:228; Young 1976:47-52; Young and Bort 1976:86). Additionally, after defeating Chief Parita in A.D. 1516, Chief Escoria from the Río Santa María Valley married a sister of his former foe (Oviedo 1853:XXIX:10:47-48). Whether this was considered spoils of war, or if this marriage was arranged to quell previous hostilities, it does illustrate that conflict and co-operation should not be seen as antagonistic, but rather different manifestations of the same social interaction (Cooke 2004; Cooke and Ranere 1992a:275; see Drennan 1996c:31). This is a rather different pattern of warfare from that resulting from population pressure and resource scarcity.

The similarities between the ethnohistorical descriptions of warfare and the mortuary evidence from Sitio Conte have led scholars to push back the presence of social ranking and warfare from the sixteenth century to, at least, A.D. 700 (Briggs 1989; Cooke 1984a; Cooke, et al. 2000; Drennan 1991; Linares 1977; Lothrop 1937). Apart from the possibility of one defensible settlement, however, there is little archaeological evidence to support the presence of warfare in the Río Parita Valley at any time. We know

that warfare or conflict resulting from population pressure (Carneiro 1970, 1981, 1990, 1998; Redmond 1994a, 1994b; Steward and Faron 1959), cannot have contributed to the rise of chiefdoms, as there is no reasonable possibility of population pressure in the Río Parita Valley for any phase. On the other hand, it is possible that cycling between cooperation and sporadic raiding (Cooke 2004; Cooke and Ranere 1992a:275; Redmond 1994b:120) would not leave archaeological evidence that a regional surface survey, like this one, would find (Redmond 1994b:130-131). It thus remains a possibility that the pattern of raiding and trading described for the sixteenth century characterized earlier periods as well. In this case, warfare would have been part of the dynamic of earlier chiefdoms, although not in the way envisioned by the population pressure and resource scarcity model.

6. EXCHANGE AND CRAFT PRODUCTION

Cuando los indios no tienen guerra, todo su ejercicio es tratar y trocar cuanto tienen uso con otros. (Oviedo 1849-1855:III:140)

All of these things were found there and it is believed that these things have come from inland through trade and commerce that those Indians carried on with other tribes. The Indians more than any people in the world are inclined to barter, sell, and trade things. Their dugouts go from one place to another, and they carry salt where it is needed, and in exchange they receive gold or cloth or cotton thread, slaves, fish, or other things. (Oviedo 1995:105-106)

Elite involvement in craft production and exchange has been a popular avenue of research in the development of social ranking (Blanton, et al. 1996; Brumfiel and Earle 1987; Costin 1991; D'Altroy and Earle 1985; Flannery 1968; Renfrew 1974; Service 1962; Spencer 1993). Blanton, et al.'s (1996) network strategy is characterized by the participation in individually centered political and economic exchanges of marriage partners, prestige goods, and even knowledge (Helms 1988). Spencer (1993:44-45) associates societies with hereditary leadership (chiefdoms) with the regularized and articulated internal (faction building) and external (extra-factional ties) dimensions of authority. He argues, for example, that the *external* dimension in the Tehuacán Valley, Mexico involved the interregional trade in imported obsidian, whereas the *internal* dimension involved feasting and labor tribute Spencer (1993:51). Likewise, the network strategy combines trade with external contacts and control over local followers with the manipulation of the production, exchange, and consumption of valuable goods (Blanton, et al. 1996:4-5). Both Blanton, et al.'s (1996), Spencer's (1993), and others' (Clark and Blake 1994; Marcus and Flannery 1996:93-110) models for the emergence of hereditary authority stem, in part, from the descriptions of Big Man societies of Melanesia (Strathern 1979). Sahlins (1963) has argued on the other hand that Big Man societies were an evolutionary "glass ceiling" that prevented the trans-generational accumulation of wealth and power.

Information on craft specialization from the Central Region of Panama is still inadequate for a detailed discussion of the processes of exchange and production. Standardization, however, is present in Paleoindian bifacial tools (Ranere and Cooke 1996), La Mula phase pointed flakes (Hansell 1988:246), and, beginning with the Late Occupation Sequence, polished and ground stone tools and ceramic wares (Cooke and Ranere 1992a:274, 278, 281; Cooke and Sánchez 2000; Hansell 1988:126, 232, 245; Sánchez 2000:127-128, 130, 132, 135). Hansell's (1988:245-247) investigation of La Mula-Sarigua demonstrated that there were cryptocrystalline workshops at the site, but that breadboard metates were imported as finished goods. Archaeological inquiry has shown that by the Cubitá phase, production, overall, had

become increasingly standardized and macro-regional exchange in prestige and utilitarian goods had developed (Cooke and Sánchez 1997, 2000; Sánchez 2000:130; Sánchez and Cooke 1997). Recently, Mayo (2004) identified and investigated a shell workshop at Cerro Juan Díaz, which has provided important information about production and organization of this craft. In order to better understand how trade and specialization influenced social change, we need more information on where other production centers were located and who was producing and exporting these goods. Results from the Río Parita survey provide more avenues of future research, rather than conclusive statements on exchange and craft production. Nevertheless, data obtained from this survey can address certain aspects of utilitarian and prestige production and exchange, both of which are important components of the models for sociopolitical development in the Central Region of Panama.

LONG-DISTANCE EXCHANGE

Long-distance exchange has been proposed by several researchers as a popular causal factor for the emergence of differential social inequality in the Central Region of Panama. The descriptions of fantastic gold artifacts (Espinosa 1994b:63-64) and the artifacts themselves (Biese 1967; Bull 1968; Cooke, et al. 2003a; Hearne and Sharer 1992; Ladd 1964; Lothrop 1937; Mason 1941, 1942; Roosevelt 1979) have fueled this line of thought. Helms (1979, 1992, 1994) has championed the idea that Central Panamanian elites made voyages to present-day Colombia in order to obtain objects imbued with esoteric knowledge. She proposes that access to esoteric knowledge was of prime importance in securing elevated social status, which was displayed through iconography on gold artifacts. Helms' (1979) argument, based on the rich ethnohistoric accounts of gold and tumbaga objects (Andagoya 1865, Espinosa 1994b:63-64; Oviedo 1944) and the mass of gold grave goods recovered from Sitio Conte (Hearne and Sharer 1992; Lothrop 1937, 1942; Mason 1941, 1942), is that these gold objects were manufactured in Colombia and were directly transported to the Central Region of Panama (Sauer 1966:276-277). Cooke, et al. (2003a:94, 120), on the other hand, claim that gold objects were meant to be worn by elites to “advertise [their] prowess, military skill, and lineage” (Cooke, et al. 2003a:130)—the opposite of esoteric knowledge.

Material evidence for long-distance trade of Central Panamanian goods is limited. Excavations at the site of La Pitahaya on the central Pacific coast area recovered 108 sherds identified to a Central Region origin based on style (Cooke 1980), and demonstrate that exchange between these two areas reached its height from ca. A.D. 700 to 900. La Pitahaya, however, is actually only around 130 km from the Central Region's Gulf of Montijo (Lothrop 1950). Additionally, Richard Cooke (personal communication) has

never seen in sherds lots and whole vessel samples obtained in the vicinity of Parita Bay, a single sherd, indisputably made in western Panama, in the Central Region. Exchange in ceramics between these two areas, therefore, does not appear to have been intense. Dredging of the Chichén Itzá's cenote recovered two gold bells that, based on style, were thought to have been made in Veraguas, Panama, which Lothrop thought was a center of gold production (1952; Cooke, et al. 2003a:111). Warwick Bray (1977, 1996, 1997) warns us that all of the gold objects from the Maya area belong to his International Style, which could have come from anywhere between Costa Rica and Colombia. Overall, the recovery of goods in the Central Region crafted outside of Panama is limited to only a handful of artifacts (Cooke, et al. 2003a:115-116).

Linares (1977:71) and Cooke and Ranere (1992a:285; Cooke 1984a, 2000:7; Cooke and Sánchez 1997) have demonstrated that a common stylistic tradition existed throughout the Central Region suggesting participation in an interaction sphere. Cooke and Ranere (1992a:284-285) acknowledge that gold working technology most likely came to Panama from Colombia, but advocate a "down-the-line" diffusion, rather than direct contact. Cooke, et al. (2003a) also argue, as opposed to Helms, that soon after the introduction of the technology around A.D. 100 to 200, goldwork was most likely manufactured locally, based on standardized and in situ development of iconography, the presence of Panamanian gold ore deposits, and some evidence of local production (Cooke and Ranere 1992a:285-6; Espinosa 1994b:66; Sánchez and Cooke 1997; see Cooke, et al. 2003a for a detailed discussion).

Cooke and Ranere (1992a:286; Cooke, et al. 2003a:) have shown that the raw materials for all of the grave goods procured in the Sitio Conte burials, apart from manatee bone, could have been found within the immediate environs of the site. Macro-regional exchange is supported archaeologically by the presence of manatee bone at Sitio Conte and He-4 ([Bull 1968]; Ladd 1964:270; Lothrop 1937:170), available only from the Caribbean, and ethnohistorically with gold ores being exchanged for finished textiles across the isthmus (Oviedo 1944:VII:7). The importance of this macro-regional exchange is that it was among people that were most likely socially and politically connected, as opposed to Helm's long-distance prehistoric exchanges between the culturally different Central Panamanians and Colombians (Cooke 1984b; Cooke, et al. 2003a:134; Griggs, et al. 2003b).

All recovered artifacts from the Río Parita survey, except polished stone axes and legged metates, were probably manufactured within the survey zone as the raw materials for chipped stone, some ground stone, ceramics, and shell artifacts are all locally available. According to Helms (1994:58), controlling trade and travel routes over land, "at important river junctions, or at seaports" would have produced the greatest access to long-distance contacts. He-4's location along a seasonally navigable river 11 km away from the coast does not appear to have been in the best location to control long-distance sea trade, but was well placed to control, or take advantage of, local and regional trade networks with adjacent polities.

Cooke, et al. (2003a:113-115) argue that trade was not just oriented towards one resource (i.e., gold) and that many resources from many different areas were desired (e.g., manatee and embalming agents from the Atlantic, *Spondylus* from the coast, gold ores and ground stone material from the interior).

LOCAL EXCHANGE AND CRAFT PRODUCTION

Within each of the Central Region's river valleys, extending from the coast to the highlands, there was much resource variation. Between these river valleys, generally, there was much resource redundancy; however, variation is evidenced through differential rainfall patterns, relative amounts of resources, and the presence of some "special" resources. In the Lower Survey Zone of the Río Parita Valley, for example, high productivity soils only make up 6% of the total area (Table 5.2) and the large (10 ha) chert deposit within the site boundaries of La Mula-Sarigua is a rare occurrence in the Central Region (Ranere and Cooke 1996). Hansell (1988:105-116) has demonstrated that this concentrated resource was used to manufacture small multi-purpose household tools. The demographic attraction to this critical resource is no better illustrated than by the lack of any settlement in the salt flats area on the other side of the Río Parita during the Late Occupation Sequence (Figures 4.1, 4.7, 4.11, 4.21). Both areas would have been next to the high productivity of estuarine, coastal, and alluvial resources, yet only the area around La Mula-Sarigua had direct access to a chert resource. The area across the Río Parita, nevertheless, was an important locale for habitation during the Monagrillo period (2900-1200 B.C.; Figure 3.2; Willey and McGimsey 1954), which suggests that the demographic concentration in and around La Mula-Sarigua reflects a change in the importance of this lithic resource for tool production. The manufacture of chipped stone tools was also an important activity at Sitio Sierra where we have the only evidence for prismatic blade production (Weiland 1984:38), but without direct access to a chert outcrop.

The increased energy investment and standardization in ceramic and subsistence tool production led Hansell (1988:245) to suggest that there was at least part-time craft specialization at La Mula-Sarigua. Since the raw materials for the La Mula phase breadboard metates, made from volcanic rocks (porphyritic tuff in texture) and polished axes, are not locally available and there is no evidence for their manufacture, Hansell (1988:214, 248-250) advocates, therefore, that this site might have been the head of a regional trading system, exchanging locally made small chert tools for imported polished stone axes and breadboard metates. Likewise, at Sitio Sierra and Cerro Juan Diaz there is evidence for the re-sharpening of polished stone axes, but none for their manufacture (Cooke 1977; Cooke, et al. 2003a:115). Several sites in the Cordillera Central appear to have been quarries and processing areas for the production of

stone axes during the Late Occupation Sequence (Figure 1.1; Cooke and Ranere 1992a:281; Cooke, et al. 2003a:115; Griggs 2000; see Linares 1980d for a similar idea for western Panama). These data suggest that central place functions existed at La Mula-Sarigua where agricultural, lithic, and coastal/estuarine resources were traded inland for stone axes and grinding tools that may have been controlled or administered by individual managers or social groups (Cooke and Ranere 1992a:283). The lack of evidence for internal social divisions (Hansell 1988:187-190, 213, 237-238), communal features (Hansell 1988:211), and areas of redistribution (Hansell 1988:247), however, has led Cooke and Ranere (1992a:281) to suggest that trade and exchange during the La Mula phase was based more along kin lines, or personal expeditions to the areas of raw resources, than controlled by a few individuals at La Mula-Sarigua.

The distribution of similar artifact forms and styles, starting with the Cubitá phase, appears to indicate increased socioeconomic interaction in the Central Region based on shared cultural traditions (Cooke and Sánchez 1997, 2000; Sánchez and Cooke 1997). Lacking much needed material analyses, however, it is not known for sure if the standardization in pottery and lithics, at this time, were the result of direct trade or sharing of cultural ideas (Cooke and Ranere 1992a:281). In later phases, local craft specialization and trade appear to have developed and diversified as a result of increased utilitarian and sumptuary demands.

Many of the resources previously thought to have been exotic are now shown to be of local origin. Contrary to the ideas espoused by Helms (1979) and Sauer (1966), gold ore deposits are present in Panama (Cooke, et al. 2003a; Espinosa 1994b:66). Many of the shell pendants crafted from *Spondylus* shell are common at Cerro Juan Díaz and Playa Venado during the Cubitá phase (Bull 1961; Cooke and Sánchez 1997, 2000; Lothrop 1954). A recent discovery of populations of *Spondylus calcifer* around a rocky islet located near Cerro Juan Díaz has been accepted by Cooke, et al. (2003a:135) as a caveat against assuming that *Spondylus* used at Cerro Juan Díaz necessarily came from distant locations, as Cooke proposed earlier (1998b). Nevertheless, several resources had to be obtained from outside the local area (i.e., manatee bone [Cooke, et al. 2000, 2003a; Ladd 1964:270, Plate 1; Lothrop 1937:170]).

In the sixteenth century, the Spanish documented many items that were exchanged throughout Panama, including maize, salt, shell, gold ores, finished goldwork, unspun cotton, textiles, blankets, hammocks, salted fish, and deer—even dogs and slaves are on record as trade items (Cooke and Sánchez 2004:II:17, 29; Espinosa 1994a:49, 1994b:65; Linares 1977:73; Oviedo 1994:III:140). This information has been used by advocates of the Control of Local Resources Model, to claim that craft production and exchange at the local level were the most important features of Central Region societies (Bray 1992; Cooke and Ranere 1992a:286; Cooke, et al. 2003a:103, 108, 130, 133, 135; Linares 1977:71-72). Ethnohistoric sources suggest that local trade and exchange in each chiefdom centered on the main *bohío*,

which functioned as a market (Espinosa 1994a:49 for Natá); exchange outside of the local territory, most likely, was regulated directly by the chief or his entourage (Linares 1977:73). The variety of exchange goods suggests that each chiefly territory included several ecologically different zones supplying the necessary goods for survival and trade (Linares 1997:73).

As we have seen in previous chapters, ceramic sherds have provided the basis for determining settlement chronology in the Río Parita survey. Other artifacts recovered in the surface collections, however, could not be dated with such accuracy. Of the non-ceramic artifacts, only La Mula unifacial points and breadboard metates could be identified to a specific phase. Although the remaining artifacts were more difficult to place in any chronological framework, general patterns were discernible.

Chipped Stone

Surface collecting resulted in the recovery of 1287 lithic artifacts from 327 collection units. Chipped stone tools from the survey zone appear similar to the inventory recovered from La Mula-Sarigua (Hansell 1988:105). Generally, chipped stone tool production was an expedient process that emphasized speed and focused on the 10 ha chert deposit near the coast. For much of Hansell's large tool assemblage, flaking was simple and there was little evidence for the preparation of cores or platforms; however, the unifacial points had standardized bases, suggesting that hafts were also standardized and these tools were produced with much care, control, and precision (Hansell 1988:105-112). From the lithic sample recovered in the Río Parita survey, it was possible to identify several chipped stone tools and the refuse from production, including La Mula unifacial points, scraper planes, cores, other tools (wedges, knives, choppers), flakes, and bifacial material; the latter was discussed in Chapter 3.

La Mula phase points are unifacially removed from carefully prepared cores (Hansell 1988:105, Plates 42, 43; Ranere and Cooke 1996:67). None of Hansell's (1988:107) unifacial point sample, however, showed any sign of impact fractures indicating their use as projectile points. These lithics had a wide distribution throughout La Mula-Sarigua indicating, "that the production of unifacial points may have been in the hands of most households" (Hansell 1988:235). Use-wear analysis of her sample revealed that these "points" were used as scrapers, knives, perforators, and graters—similar functions have been proposed for other tool assemblages throughout the Central Region (Ranere and Cooke 1996:67; Table 6.1). At Sitio Sierra, similar points were associated with female burials (Cooke and Ranere 1984:10; Hansell 1988:107; Isaza 1993:79-84), which may indicate that these tools were involved with female activities.

A total of nine La Mula phase unifacial "points" were recovered from the survey zone (five complete and 4 fragments; Figure 6.1). The majority (six) were located within the La Mula-Sarigua site boundaries. The remaining three were found at third-order sites upriver (Figure 4.1); one point each was found at the

future village sites of He-4 and He-2, and the remaining one was from a settlement in the floodplain. The sample of La Mula phase points recovered from the Río Parita survey shows evidence of use wear, retouch, and only one with grinding. Overall, they are very similar to the larger sample recovered at La Mula-Sarigua (Table 6.1).

A total of 48 scraper planes were recovered from surface collections. They comprised three types: those with plane angles less than 30° (n=4), those with plane angles between 30° and 60° (n=27), those with plane angles greater than 60° (n=13), and those with a combination of scraper planes on the same tool (n=4). Overall, scrapers recovered from the Río Parita survey are smaller in size than the scrapers recovered by Hansell at La Mula-Sarigua (Table 6.2), but are similar in form (Figure 6.2; Hansell 1988:Plate 44). Additionally, Hansell's scraper plane angle averaged 70° (1988:Table 8, 9)—higher than the Río Parita survey assemblage. Scraper planes from the Río Parita survey were found spread through the Upper and Lower Survey Zones, in different physiological zones, and at different site types (Figure 6.3). As all scraper types were present at all site types, the activities associated with them were not restricted to one particular area or type of settlement. The uniformity in size (length and width) of the Río Parita survey scrapers (Table 6.2) suggests that they were initially prepared in a similar manner, and then modified for desired tool type as increases in height correspond to increases in scraper plane angle. It is not known what these scrapers were used for, but, based on experimental archaeology and use wear analysis of lithics from western Panama, Ranere (1980:124-125) claims that the majority of chipped stone tools appear to have been used in working wood. Likewise, Hansell (1988:112) proposes that the wear patterns of the La Mula-Sarigua assemblage suggest that they were used in woodworking activities. The raw material for the Río Parita assemblage was a mixture of red and yellow jasper, chert, and petrified wood; all located at or near the 10 ha chert outcrop.

Table 6.1. Comparison of complete unifacial point assemblages from the Río Parita survey and La Mula-Sarigua (Hansell 1988:106-112, Tables 2-5; measurements based on Hansell 1988:Figure 35).

Point Assemblages	Length(μ)	Width(μ)	Thickness (μ)	Shoulder (μ)	Notch (μ)	Base (μ)
Río Parita survey; n=5	4.1 cm	2.3 cm	.7 cm	2.5 cm	1.8 cm	1.6 cm
La Mula-Sarigua; n=196	4.7 cm	2.5 cm	.8 cm	2.5 cm	1.8 cm	1.7 cm



Figure 6.1. La Mula phase unifacial points from the Río Parita survey (all except bottom right).

Table 6.2. Scraper planes from the Río Parita survey (not including multi-plane scrapers).

Scraper Type (n=44)	Length (μ)	Width (μ)	Height (μ)	Plane Length (μ)
< 30°	3.4 cm	2.6 cm	.8 cm	1.6 cm
30° < x < 60°	4.0 cm	2.6 cm	1.3 cm	1.9 cm
> 60°	4.0 cm	2.7 cm	1.5 cm	1.5 cm
La Mula-Sarigua (Hansell 1988: Tables 8, 9; n=190)	6.0 cm	6.4 cm	3.7 cm	n/a

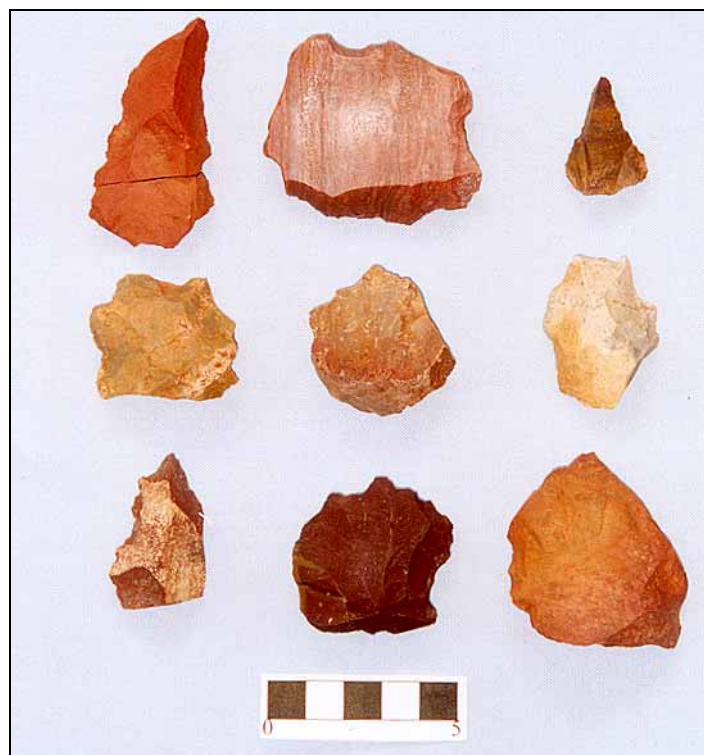


Figure 6.2. Chipped stone tools from the Rio Parita survey (starting on the left: [Top row] knife [broken], rejuvenation tablet scraper, graver; [Middle row] denticulate scrapers; [Bottom Row] Denticulate tools.

Non-utilized flakes, or manufacturing debris, make up the bulk of the recovered lithics produced of red and yellow jasper, chert, chalcedony, and petrified wood. The majority of these flakes were recovered near La Mula-Sarigua and Figure 6.4 displays the overwhelming concentration of lithic artifacts at, or near, the chert outcrop. The peaks in Figure 6.4 are non-utilized flakes, which suggests that finished tools were used throughout the survey zone, but most of the manufacturing (at least initially) occurred at La Mula-Sarigua. A similar idea was deduced by Hansell (1988:105, 137) from her investigation of La Mula-Sarigua. These artifact distributions suggest that starting in the La Mula phase, the chert outcrop was heavily used with specialists doing most of their manufacturing nearby. Hansell's (1988:232) investigation of the spatial layout of artifacts at La Mula-Sarigua, however, revealed that chipped stone production appears to have taken place at all probable household locations and, thus, "access to on-site quarry resources was not restricted."

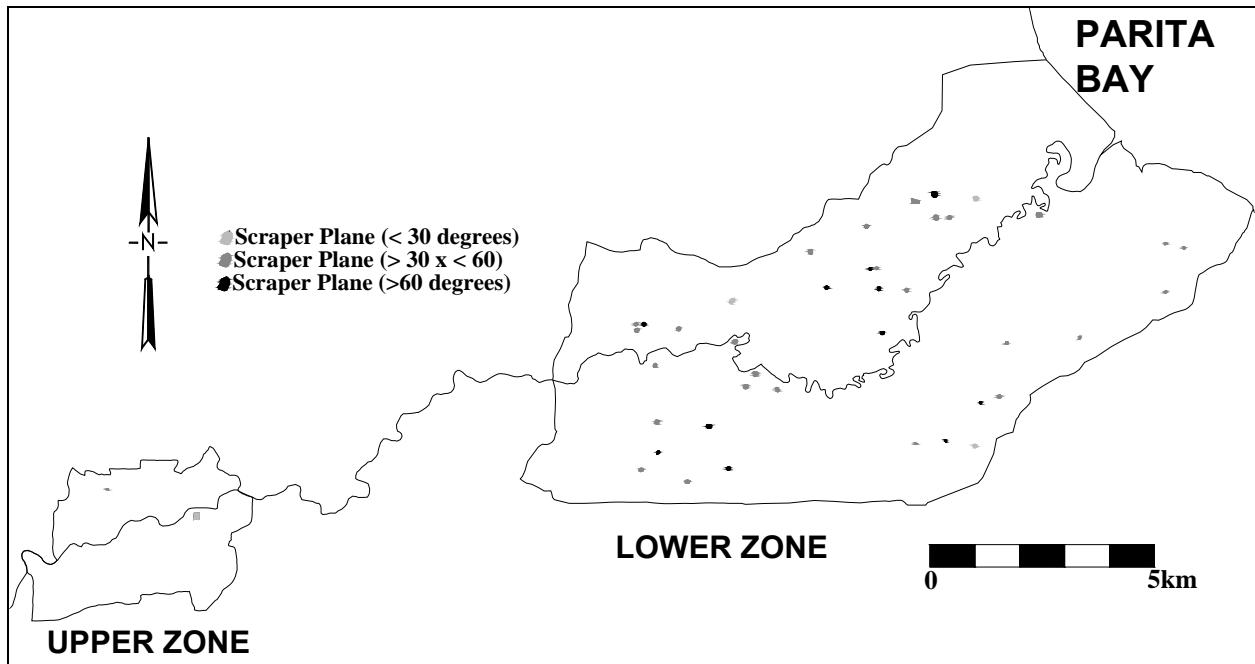


Figure 6.3. Distribution of scrapers from the survey zone.

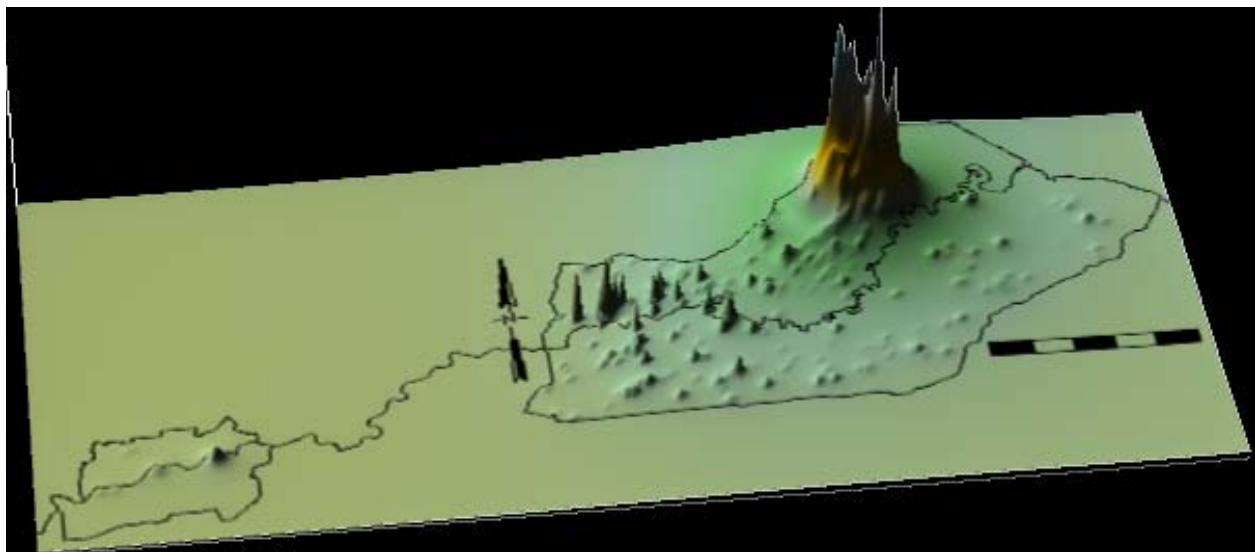


Figure 6.4. Distribution of all chipped stone artifacts in the survey zone.

Manos and Metates

Due to the weight of ground stone artifacts, it was not possible to collect all metates and manos encountered during survey. Additionally, in order to speed up collecting surface samples, not all ground stone artifacts dimensions were measured; but when ground stone artifacts were found, they were recorded and an attempt was made to identify the type of metate and to take photographs. A total of 86 collection units had manos or metates (Figure 6.5). The metates could be divided into slab (~ 65%) or legged (~ 35%). A third metate type was recovered in the survey zone: these breadboard metates, and their accompanying manos, are currently believed to be restricted in time (the first millennium B.C. [Cooke and Ranere 1992a:277]) and were replaced by legged metates sometime during the La Mula phase (Hansell 1988:217; Ranere and Cooke 1996:67). Breadboard metates are flat, without legs, and, as with the manos, are made from a volcanic tuff (Hansell 1988: 124, Plate 50). Hansell (1988:126) notes that many of the specimens she recovered from excavations at La Mula-Sarigua were highly similar in shape suggesting standardization of the manufacturing process. The lack of any manufacturing debris at La Mula-Sarigua led Hansell (1988:126, 245-247) to suggest that breadboard metates were not produced at the site, but imported. Breadboard metates at La Mula-Sarigua (n=67 [66 of which were fragments]) clustered into two discrete areas at the site, which Hansell (1988:217) identified as “major food processing areas.”

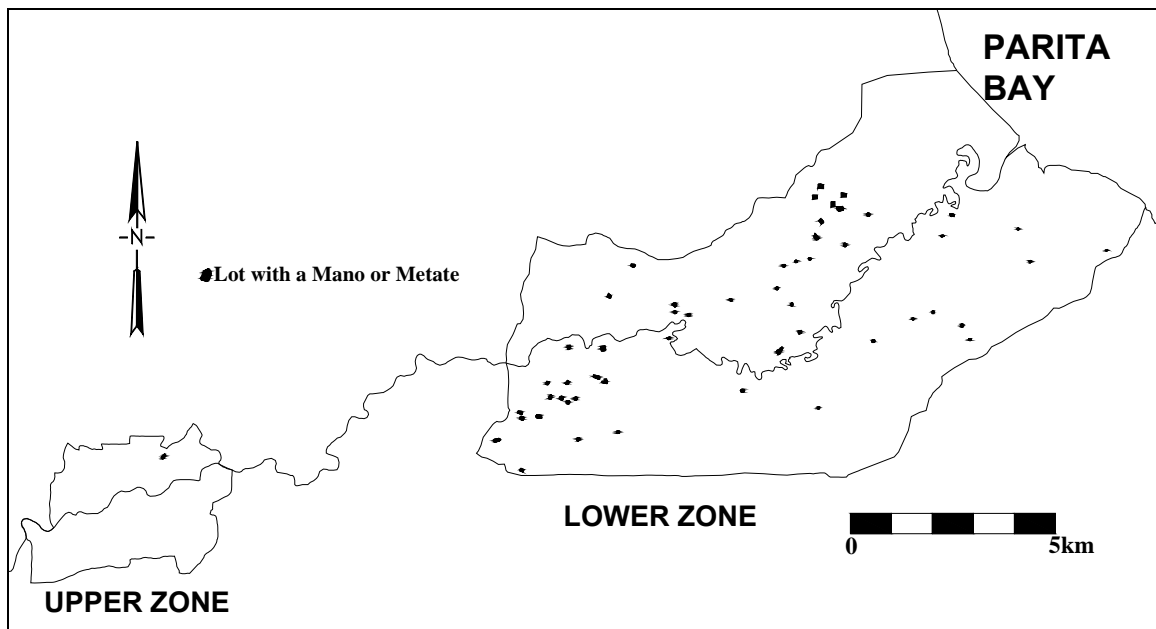


Figure 6.5. Distribution of manos and metates in the Río Parita survey zone.

Legged metates were prepared grinding platforms with three or four pecked legs, either conical or tapered in profile (Figure 2.10b). Three-legged metates had a more circular grinding platform, whereas four-legged metates were rectangular in shape. Slab metates, on the other hand, were large boulders that had little shaping prior to use (Figure 6.6; Ichon 1980:Figure 121 b, c, Plate LX). Slab metates are identical to the locally available andesite and vesicular-basalt boulders, usually found adjacent to sites throughout the survey zone, and suggest that they were obtained from these local sources. Upon visual inspection, the raw material used in manufacturing legged metates appears to be the same as local outcrops of andesite or vesicular basalt, but, as will be mentioned later, the standardization of legged metates throughout the Central Region and the lack of manufacturing debris in the Río Parita Valley suggest that they were made by specialists outside the valley. Both slab and legged metates appear in all parts of the survey zone. On the other hand, only one breadboard metate fragment and one volcanic tuff mano were identified, both located within the site boundaries of La Mula-Sarigua. Although little information is available concerning dimensions of the identified ground stone tools, legged metates show considerable standardization in form. The standardization and high labor investment of these items suggest that these legged metates were produced by specialists, possibly for a pre-established market as described by Oviedo (1944:VII:7; Espinosa 1994a:49) for Natá. The amount of labor involved in manufacturing a legged metate suggests that they served more than just a functional purpose, possibly, associated with fertility rituals.

Elaborate large legged-metates, from western Panama, might have been used for grinding maize and/or as seats/thrones (Cooke 1998c:103). They have a standard iconographic style depicting jaguar, captive, and, war iconography that led Linares, Sheets, and Rosenthal (1975:141) argue that the “captive” and war iconography on legged metates found at the ceremonial site of Barriles in western Panama suggests an association between social rank, warfare, and maize agriculture. The legged variety of metates found in the Central Region, on the other hand, lacks an explicit representational iconography, and Cooke (1998c:103-104) speculates that this difference in ideological emphasis may derive from social (i.e., “ethnic”) differentiation some time in the past. With the presence in the Central Region of several gold effigy pendants located on top of jaguar metates in funerary contexts, Cooke, et al. (2000:171, 2003a:119, 136; Cooke 1998c:111) posit an association between the Initial Group goldwork (A.D. 200-700), felids, agriculture, and fertility. Additionally, several individuals were encountered in mortuary contexts positioned on top of legged metates from the Central Region (He-4 [Bull 1965; Mitchell and Acker]; He-1 [legged metates associated with interments, Ladd 1964:204-205]; Río Tonosí Valley [Ichon 1980:Figure 60]), further supporting the ritual association of these ground stone tools.

Manos, generally, were bar-shaped and made from andesite or basalt material similar to that of metates. A curious mano (Figure 6.7) appears to have been wider than the flat-top legged metate it was

used on, thus producing an almost right angle of wear on the grinding surface, and is thought to date to the Late Ceramic II Period (Ilean Isaza, personal communication). A similar shaped stone was described by Einhaus (1980:Figure 15/11 f) as an anvil; however, the ground stone artifact in Figure 6.6 was definitely not used as an anvil as there is no evidence of indirect percussion, but rather a smooth polish indicative of grinding. The other alternatives are that that this mano was intentionally shaped this way before use or that this ground stone item was not a mano, but, in fact, served as a grinding platform.

A total of 29 metates from the survey zone could be identified to type (slab versus legged, not including the single breadboard metate fragment). Both slab and legged metates were found at all site types (Table 6.3), but their distribution between site types is very uneven with high significance ($X^2 = 7.13$, $.05 > p > .02$, $V = .5$), supporting the idea that legged metates were associated with activities performed at first and second-order sites. The wide distribution of manos and slab metates throughout the zone and at all site types suggests that the primary, and redundant, function at all sites was the processing of agricultural resources. The distribution of legged metates, however, does suggest an association with activities, possibly ritual in nature, predominantly occurring at the larger first and second-order sites.

Table 6.3. Distribution of metate types at different site types in the Río Parita survey zone (with expected values in parentheses).

Metate Type	First-Order Sites	Second-order Sites	Third-order Sites
Slab	6 (7)	4 (6)	11 (9)
Legged	3 (3)	4 (2)	1 (3)

The standardization and abundance of legged metates in the Central Region (La Mula-Sarigua [Hansell 1988:Plate 52 c, d]; Río Parita Valley [He-1 associated with Conte ceramics, Ladd 1964:201, Plates 22, 23; Stirling and Stewart 1949:375]; Río Tonosí Valley [Ichon 1980:Figure 53, 121]; Veraguas [western Central Region, Dade 1959:Figure 5; Lothrop 1950:30, Figure 30; Stirling 1950:240] and western Panama (the less elaborate ones; Einhaus 1980:Figure 15/8; Sheets, et al. 1980:Figure 14/7) suggests that they were made by specialists, who, as is claimed for the breadboard metates of the La Mula Phase (Hansell 1988:126, 245-247), manufactured them outside of the Río Parita Valley. On the other hand, raw material for slab metates occurs close to all settlements and these ground stone artifacts most likely were locally manufactured. Due to the small sample of measurable specimens from the Río Parita survey and from La Mula-Sarigua (Hansell 1988:127, Table 23), a comparison of metates between the two sites was not possible.



Figure 6.6. Slab metate recovered from the Río Parita survey zone.



Figure 6.7. Deeply worn mano from the Rio Parita survey zone.

Polished Stone Axes

Two forms of polished stone axes were recovered from the survey zone—pear-shaped and trapezoidal (Figure 6.9)—which are similar to axes found throughout Panama (Bull 1965:Plates IX, XIIId; Hansell 1988: Plate 53; Ichon 1980:Figures 55, 123; Ladd 1964: Plates 18, 20; Lothrop 1950:Figure 26; Ranere and Rosenthal 1980:Figure 16/3). As mentioned in Chapter 4, pear-shaped stone axes appear to be associated with first-millennium B.C. pottery, whereas trapezoidal axes are associated with Tonosí phase and later ceramics (Cooke and Ranere 1992a:277; Hansell 1988:207). Lothrop (1950:27) noted that the pear-shaped axes were not encountered in the Province of Veraguas (western Central Region), which might indicate that there was limited occupation, or that they did not use these axes, in Veraguas at that time. Finding no evidence at La Mula-Sarigua for the manufacture of stone axes, Hansell (1988:124) concluded that they were obtained from outside of the Río Parita Valley. Likewise, there was no evidence for axe production at Sitio Sierra and Cerro Juan Díaz, but debris suggesting that only re-sharpening took place (Cooke 1977; Cooke, et al. 2003a:115). Recent surveys have identified several areas of the Cordillera Central that are littered with lithic debris, which are most likely quarries and processing sites for the production of stone axe preforms during the Late Occupation Sequence (Figure 1.1; Cooke and Ranere 1992a:281; Cooke, et al. 2003a:115; Griggs 2000; see Linares 1980d for a similar claim for western Panama). It is not known, however, if obtaining these stone axes reflects direct trade between two different groups, or if individuals or groups would quarry and shape these axes themselves during overnight expeditions. The high degree of standardization in axe form suggests the former.

Ranere (1980a:122) and Sheets, et al. (1980:405) suggest that in highland Chiriquí the required skills and labor investment of manufacturing polished stone axes indicate a specialist activity. Polished stone axes were manufactured by first chipping out the preform, then flaking the poll and grinding the body, and finally polishing the bit (Einhaus 1980:448; Ranere and Rosenthal 1980:477). Through experiments, Einhaus (1980:463-4) concluded that just to repair a small portion of damage on the bit of a stone axe would have taken several hours of work and that the first signs of use wear did not appear until after the two-hundredth stroke. When an axe was no longer repairable, more often than not it was used in some kind of percussion activity as evidenced by many damaged axes recovered from the Río Parita survey zone; the same process was noticed by Hansell (1988:130) for 72% of her La Mula-Sarigua assemblage.

A total of 38 used polished stone axes were recovered from the survey zone. They were associated, through relative dating, with every phase of the Late Occupation Sequence, and found in all orders of sites. Axes were found in all parts of the survey zone except the salt flats, the mangrove-estuary zone, and the Upper Survey Zone (Figure 6.8). These axes, made from fine-grained andesite or basalt (labeled basalt altered to serpentinite by Ladd [1964:147]) or a dark igneous basaltic rock, were used to clear forests for

cultivation and for woodworking (i.e., canoes used in trading and transporting warriors; Cooke and Sánchez 2001:38; Einhaus 1980:466; Ichon 1980:Plate VI). During Spanish contact, Anghiera (1965:289) was impressed with the Native Panamanians' ability to hollow out a canoe without iron tools, but only using sharpened river cobbles. Oviedo (1944:VIII:136, 138) noted that stone axes were also used to butcher captured game (Einhaus [1980:463] in an experiment easily severed the head of a duck with a re-sharpened stone axe).

Along with the 38 utilized axes, there were three axe preforms with no sign of wear and unshaped bits (Figure 6.10) and 23 small fragments ($<2 \text{ cm}^2$) from stone axes (12 with, and 11 without polish). Ranere (1980:476-479) suggests that fragments with polish are the remnants of shaping the axe, and pertain to the manufacture of the tool before use, whereas axe fragments without polish indicate re-sharpening of the tool after the original polish had worn (Carneiro 1979:41; Linares 1980c:242). Axe preforms and axe fragments with polish should, therefore, indicate areas of axe production; however, they are just as likely to have been bits that were bashed off the axe while it was being used (Cooke 1977). Additionally, Ranere (1980a:132-133) does caution that this is not always the case as some parts of these axes lack polish. Nevertheless, using Ranere's (1980:476-479) system produces interesting results.

Of the 15 artifacts with potential evidence for axe manufacture (fragments with polish and preforms), 11 are located in first-order and second-order sites with four located at third-order sites. Of the 12 stone axe fragments without polish, and thus evidence of re-sharpening, three are from La Mula-Sarigua and nine from third-order sites. The stone axes recovered from the Río Parita survey were measured according to Hansell's (1988:Figure 36) and Ranere and Rosenthal's (1980:472-473) system. Although there are some differences, there is overall similarity between the assemblages from the Río Parita survey and Hansell's (1988) investigation (Table 6.4).

If we assume that fragments with polish equate to production, rather than use, then we find that both axe manufacturing and re-sharpening debris was found with ceramics associated with all phases from the Late Occupation Period and at all site types; but the distribution of this evidence between site types is very uneven with high significance ($X^2 = 7.32$, $.01 > p > .001$, $V = .58$; Table 6.5). This small sample suggests that while polished axes were used throughout the survey zone, their manufacture took place at larger settlements (first and second-order sites), possibly as the result of specialized labor, whereas re-sharpening of axes took place mainly at third-order sites.

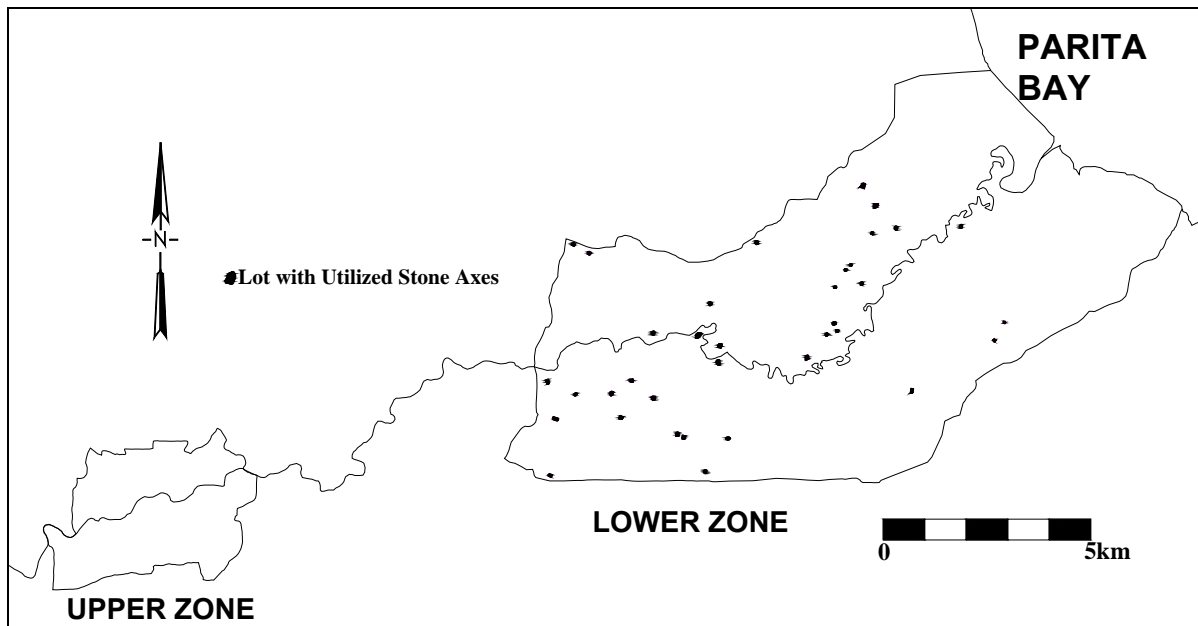


Figure 6.8. Distribution of utilized stone axes in the Río Parita survey zone.

Table 6.4. Comparison of complete stone axes from the Rio Parita survey and La Mula-Sarigua (Hansell 1988: Tables 26, 31).

Mean Measurements	Río Parita Survey		La Mula-Sarigua	
	Pear (n=2)	Trapezoidal (n=25)	Pear (n=4)	Trapezoidal (n=5)
Length (μ)	7.6 cm	9.6 cm	8.6 cm	10.5 cm
Bit width (μ)	4.8 cm	4.9 cm	4.8 cm	4.8 cm
Bit thick (μ)	1.9 cm	2.1 cm	1.2 cm	1.2 cm
Butt width (μ)	2.4 cm	3.7 cm	2.0 cm	2.5 cm
Butt thick(μ)	1.7 cm	2.1 cm	1.2 cm	1.6 cm
Bit angle (μ)	40 °	33 °	n/a	n/a



Figure 6.9. Stone axe types from the Río Parita survey zone: left) pear; right) trapezoidal.

Table 6.5. Distribution of axe manufacturing and re-sharpening artifacts at different site types in the Río Parita survey zone (with expected values in parentheses).

Artifact	First and Second-Order Sites	Third-order Sites
Manufacturing	11 (8)	4 (7)
Re-sharpening	3 (6)	9 (6)



Figure 6.10. Stone Axe preforms from the Río Parita survey zone.

Cooke and Ranere (1984:12) have tentatively suggested that control of the manufacture of axes might have been one mechanism for political advancement (see Welch 1996 for a similar argument for Moundville). Even if it turns out that fragments with polish are the result of use and not production, the best evidence for manufacturing recovered from the survey zone, preforms, comes from first and second-order sites. The parent material used to manufacture axes was not found anywhere in the survey zone and was most likely imported into the Río Parita Valley as axe preforms and then shaped for use (Cooke, et al. 2003a; Griggs 2000).

Spindle Whorls

Many pre-Columbian items were fabricated from spun cotton; textiles were turned into mantles, other clothing, and even burial shrouds as described for chief Parita and others (Cooke, et al. 2003a:120; Espinosa 1994b:63-64; Lothrop 1937:Figure 150). Cotton was used for making two kinds of hammocks, one finely woven, and the other in the form of a net, both of which had colorful decoration (Cooke and Sánchez 2004:II:20; Oviedo 1944:III:130-131). The use of nets for fishing still needs to be further investigated (Cooke and Ranere 1989: 1999:118; Cooke and Tapia 1994a:288), but it appears that nets, made from cotton, cayuba, or henequen, were first used for littoral fishing during the Early Ceramic

Period (3000 to 200 B.C.; Cooke 1992a:38; Cooke and Sánchez:II:17). Oviedo (1853:III:136) documented that nets were also used for hunting deer and other animals. The Spanish noted that Natá was an important production center of textiles and hammocks that were traded for goods and raw resources as far away as the Cordillera Central (Figure 1.1; Cooke 1972, 1998a:102-103; Cooke and Ranere 1992a:285; Cooke Sánchez 2004:II:20; Espinosa 1994a). Many spindle whorls recovered archaeologically from Natá corroborate this observation (Breece 1997:Table 9; Cooke 1972; Cooke and Sánchez 2004:II:20).



Figure 6.11. Spindle whorls recovered from the Río Parita survey zone.

Five ceramic spindle whorls were recovered from surface collections in the Río Parita Valley survey (Figure 6.11). The 12 spindle whorls obtained from Panama Viejo (Biese 1960) are generally quite different in shape and decoration from the Río Parita sample, but the one at the bottom left of Figure 6.11 was similar to a whorl found by Mitchell and Acker (1961:Plate XI:h) at He-4. Of the five spindle whorls recovered from the survey zone, only two were associated with datable ceramics—ranging from Cubitá to El Hatillo phases. In support of this chronological range, Cooke, et al. (2000:166; 2003a:124) infer, from

a radiocarbon date of a feature with cotton fibers attached to a gold bead, that the spinning of cotton can be identified in the Central Region by A.D. 700 (see also Sander and Mitchell 1960). Collection units with spindle whorls were found at three third-order sites and two second-order sites (Figure 6.12). None, however, were found at He-4 or La Mula-Sarigua, suggesting that cotton spinning, at least, was not concentrated at the first order sites. In support of this claim, Hansell (1988) does not mention encountering any spindle whorls from her investigations at La Mula-Sarigua.

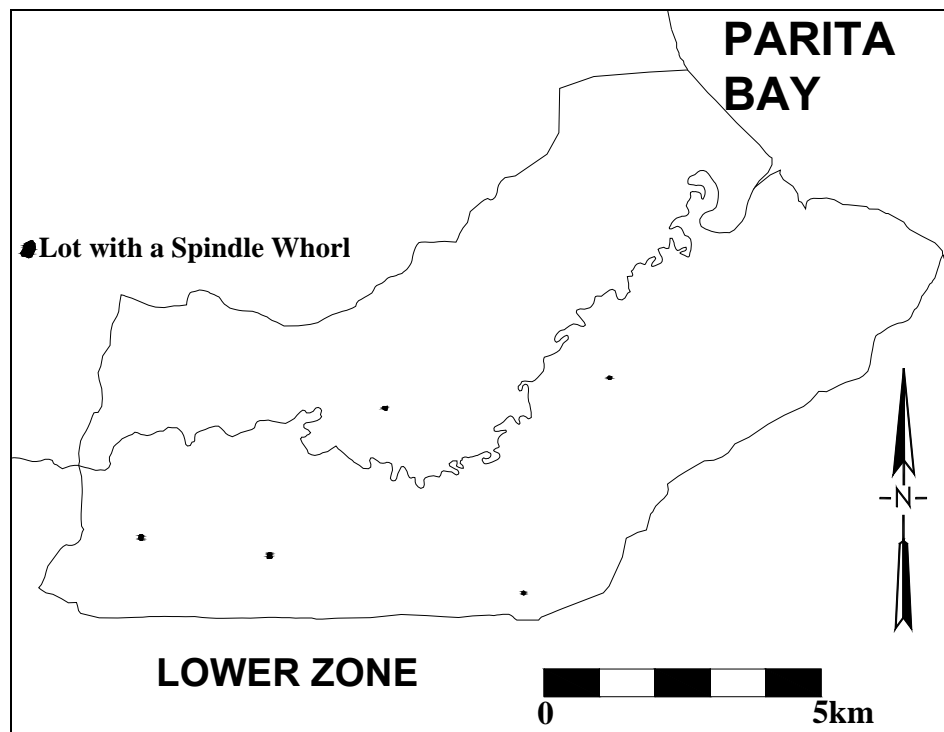


Figure 6.12. Collection lots with spindle whorls from the Río Parita survey.

Shell Working

Shell working was an important activity throughout the Central region. The best evidence comes from the Río La Villa Valley where recently Ilean Isaza (2004) found evidence for a shell workshop similar to the one excavated by Julia Mayo (2004) at Cerro Juan Díaz. Shell pendants are a common grave item at Cerro Juan Díaz, being particularly concentrated in the “sub-oven” graves deposited between cal A.D. 150 and 700; they came in many different shapes and were made from several different species (Cooke 1998b, 1998c; Cooke and Sánchez 1997, 2000, 2001; Cooke, et al. 1998; Mayo 2004). Shell artifacts in

similar form and quantity were encountered at He-4 in mortuary contexts (Bull 1965:Plates X, XI; Ladd 1964:Plate 19 n-v) and in the Río Tonosí Valley (Ichon:Figures 86-89). Hansell (1988:184, 212) recovered three *Anadara* shell tools from La Mula-Sarigua, which appear to have been used for scraping or percussion activities, but nothing in the way of jewelry production.

The shell workshop at Cerro Juan Díaz investigated by Mayo (2004) revealed production techniques that included grinding, cutting, incising, percussion (direct and indirect), and perforation (Mayo 2004:100-168). The workshop contained production debris from several species of shellfish (*Anadara grandis*, *Spondylus* spp., *Pinctada mazatlanica*, *Strombus galeatus*, *Conus patricius*, and *Melongena patula*) in the manufacturing of shell beads, pendants, and other artifacts. Shell pendants from the large inshore bivalve *Anadara grandis* (Figure 2.11) are common at Cerro Juan Díaz (Mayo 2004:Table 5) and El Caño (Cooke, et al. 200), and a cache of pendants was recovered at La Cañaza in the Río Tonosí Valley (Ichon 1980:Plate 55). Likewise, *Spondylus* was an important shell for craft production and is found in large quantities at Cerro Juan Díaz and Playa Venado during the Cubitá phase (Bull 1961; Cooke 1998b, 1998c; Cooke and Sánchez 1997, 2000, 2001; Lothrop 1954; Mayo 2004:138).

Anadara grandis is a large inshore bivalve that was also consumed for food and provided an important source of protein to pre-Columbian inhabitants of Panama (Carvajal 1998). Once the meat was consumed, the large shell would have been a readily available raw material. The ventral portions of the shell are detached into slender pieces, which are then worked into shell pendants. Mayo (2004:127, 137, Plates 13, 39) noted a similar production process for the manufacture of “eye-tooth” beads made from *Anadara grandis* by indirect percussion at Cerro Juan Díaz.

Anadara grandis was the most frequently recovered shell remain (171 collection units) from the Río Parita survey. There were 33 *Anadara grandis* artifacts, recovered from surface collections, that might relate to the production of these pendants; 7 were almost whole shells with longitudinal cuts on the ventral part where blanks had been removed, and 26 were pendant blanks (Figure 2.11, right). Of these shell-working artifacts, five were from He-4, 10 from second-order sites dated between Cubitá and Macaracas, and 18 were found in third-order sites. As with other craft activities, the fabrication of *Anadara grandis* pendants occurred at all site types and the difference between site types with respect to proportions of worked *Anadara grandis* artifacts between site types is not very significant ($X^2 = 3.39$, $.5 > p > .2$; Table 6.6). The raw material for *Anadara grandis* shell pendants was available to residents throughout the Lower Survey Zone (Figure 5.1), and the production of shell pendants might represent a part-time craft specialization by farmers. The absence of finished *Anadara grandis* shell pendants from within the survey zone, limits discussing the distribution of this craft good. It should be noted that the edible meat of *Anadara grandis* only makes up 9-10% of its body mass suggesting that the wide

distribution of the shell could reflect more of a desire for its use in craft activity (and possibly for lining house floors) than as a subsistence resource (Richard Cooke, personal communication).

Table 6.6. Distribution of worked *Anadara grandis* fragments at different site types in the Río Parita survey zone (with expected values in parentheses).

	First-Order Sites	Second-order Sites	Third-order Sites
Worked <i>Anadara</i> fragments	5 (5)	10 (5)	18 (22)
Total artifacts	7181	6988	30769



Figure 6.13. *Spondylus* frog pendant from Site 196 of the Río Parita survey zone.

Many *Spondylus* shell artifacts have been recovered at Cerro Juan Díaz, Playa Venado (Cooke 1998b, 1998c; Cooke and Sánchez 1997, 2000), and in the Tonosí Valley (Ichon 1980). During the Río Parita Valley survey, at a second-order site (Site 174; Table 4.2) dated to A.D. 250 to 1300, one of the survey teams recovered a *Spondylus* shell pendant in a systematic collection (Figure 6.13). Unlike the longitudinal pendants, this was shaped into the form of an anuran with a perforation through the neck. This is very similar to grave goods found in the Tonosí Valley (Ichon 1980:Figure 88) and at Cerro Juan Díaz (Cooke and Sánchez 1997:Figure 8), which have been dated to the Cubitá phase. Cooke (1998b) originally proposed that the nearest source for *Spondylus* shells to Cerro Juan Díaz was Isla Iguana, a coral-fringed islet off the southern tip of the Azuero Peninsula. Since then, however, the discovery of a surviving population of *Spondylus calcifer*, which provides purple beads unlike the pink ones made from *Spondylus princeps*, on an islet located 10 km from Cerro Juan Díaz has induced Cooke to question his

original hypothesis (Cooke 2003; Cooke, et al. 2003a:135; Cooke and Sánchez 2001:33). Thus, although *Spondylus* is not located within the Río Parita survey zone, it could have been obtained without much travel.

Several tools found in the Río Parita Valley are similar to those described by Mayo at the shell workshop from Cerro Juan Díaz. The percussion impact scars on a hammerstone (Figure 6.14, bottom right) found at La Mula-Sarigua are similar to those on several hammerstones encountered by Mayo (2004:Plates 86, 88-90; Georges Pearson, personal communication). This hammerstone was found in a collection unit that dates to the Macaracas/Parita phase. Additionally, a tabular chopper/knife fabricated from petrified wood (Figure 6.14, top left) is comparable to the tabular scraper type made from petrified wood recovered by Mayo (2004:Plates 68, 78). All of the tools in Figure 6.14, however, were found in collection units without any shell production remains.

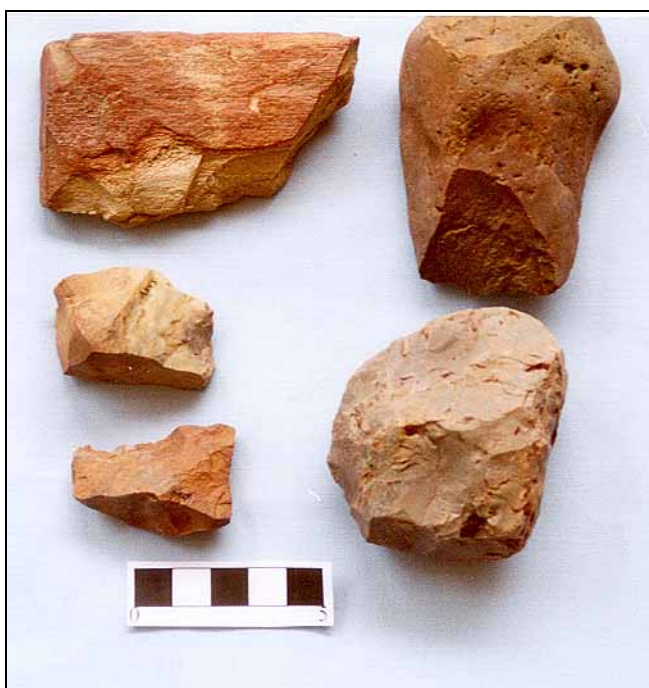


Figure 6.14. Possible shell working tools recovered from the Río Parita survey.

Pottery

Only limited information is available concerning the production locations of ceramic wares for the Central Region of Panama. The technical qualities of the La Mula polychromes—fine clays, absence of grit tempers, the large size of some collared vessels, the carefully smoothed interiors and the polished

exteriors—suggest qualities of craftsmanship indicative of localized production, rather than the generalized, expedient production typical of the Monagrillo pottery (Cooke 1995; Cooke and Ranere 1992a:278). The abundance of these sherds at La Mula-Sarigua suggests that this site was a center of ceramic production (Cooke and Ranere 1992a:287, 281). Tonosí phase ceramics are noted for their white or very light Kaolin slips, use of a polychrome tradition with four colors—the first in Panama—distinct vessel forms like jars with double bodies, and intricate patterns on the rims of flaring jars (Sánchez 2000:128-129). Cubitá ceramics are characterized by a blending of the Tonosí and Aristides traditions in the sense that they represent an evolution of these styles (Sánchez 2000:129). Cubitá ceramics possess a homogeneous decorative style over most of the Central Region, which suggests that with the Cubitá phase we see the increased participation in social and economic networks resulting in increasing social differentiation (Cooke and Sánchez 2000). For the rest of the pre-Columbian sequence ceramic styles are fairly uniform and reflect continued contact between communities of the Central Region. Fine polychromes are found across the Central Region in contexts that are clearly domestic in nature. As one travels further from the coast, polychromes are less frequent. Across the Cordillera Central (Figure 1.1), however, red and buff wares are similar to those found in the Central Region (Cooke, et al. 2003a:113; Cooke and Ranere 1992a:247, 1996:71-76; Griggs, et al. 2003b). Richard Cooke (personal communication) suggests that the distribution and standardization of ceramic wares in the Central Region reflects that fine wares were manufactured only at a few localities.

At La Mula-Sarigua, Hansell did not find any conclusive evidence for the existence of ceramic workshops. The distribution of different La Mula phase wares located at distinct areas possibly suggests that these wares were manufactured at different parts of the site (Hansell 1988:235-237). No ceramic “wasters” were recovered from the Río Parita survey, but one Conte/Macaracas phase pot from He-4, lacking any paint, appears not to have been finished. Additionally, an unfinished vessel dated to the Conte phase, found near He-4, had a platform prepared for a handle that was never attached. These might indicate that at least some Late Ceramic Period production occurred within the Río Parita Valley, possibly in and around He-4.

Gold

One of the central debates between supporters of the Control of Local Resources and the Control of Esoteric Knowledge Models is whether gold artifacts, found abundantly in Central Panama, were produced locally or if they were imported from Colombia. The details of this debate are discussed above, but there are several important points to address here. Although no metal objects were recovered during the Río Parita survey, there is information that supports the existence of local production. Cooke, et al. (2003a:133; see also Espinosa 1994b:66) note that a recently closed mine with widespread gold ore

deposits, located at Cerro Quema, is only 45 km from He-4. It is, therefore, possible that the gold pendants discovered in the burial mounds at He-4 were produced locally from nearby sources (Cooke, et al. 2003a:133). In fact, one of these gold pendant that was not finished further supports gold artifact production at He-4 (Cooke, et al. 2003a:Figure 9d). The majority of the metal objects from He-4 are part of the Parita Assemblage that dates to A.D. 750, or later, which has similar iconographic elements as other media (ceramics, bone) from the Conte and Macaracas phases. It is possible that the introduction of Parita Assemblage gold pendants correspond to the settlement and mortuary practice changes in the valley during the Macaracas phase.

Other Tools

Other tools found during the Río Parita survey (Figure 6.15) include a chisel (made from the same material as polished stone axes), two polishing stones, a used stone-axe-bit scraper, and a ground stone axe (Figure 2.10a; similar to the one found at Casita de Piedra [Ranere 1980b:3.0-14]). This axe is included here and not with the other axes as, unlike the polished stone axes, which were produced through chipping, grinding, and polishing, this ground stone axe (Figure 2.10a) was manufactured only by grinding. The chisel was recovered from a collection unit, dating to the Cubitá to El Hatillo phase, at He-4, and had polish on the body and bit with percussion damage to the bit. Likewise, a polishing stone (Figure 6.15, upper left) was found at He-4 near the burial mound area. This polishing stone had six different facets and was made from fine-grained basalt and might have been used in the polishing of stone axes, ceramics, or some other activity. The other polishing stone (Figure 6.15, bottom left) came from He-2. The rest of these tools were found in collection units at small sites dating predominantly to the Late Ceramic II Period. None of these tools were located with any shell remains or other evidence of craft production, but they illustrate the diversity of craft industries that existed in the Central Region and that more investigation is needed to determine the level of specialization that existed.



Figure 6.15. Other tools recovered from the Rio Parita survey.

SUMMARY

Artifacts recovered from the Río Parita survey illustrate that there were a wide variety of pre-Columbian activities (Table 6.7), and their distribution suggests that some of these activities were spatially restricted. The most common activities throughout the valley were the processing of foodstuffs (manos, slab metates), woodworking (scraper planes, polished stone axes), and food preparation (ceramics). Since the production of the tools used in almost all of these tasks occurred at all sites and site types, it is most likely that these were the least specialized activities. Conversely, the use of legged metates, metal objects, and the production of polished stone axes occurs primarily at first and second-order sites. The production of shell jewelry was not concentrated at any one location. With the distribution and quantity of spindle whorls, it is not discernible if spinning cotton was an activity that was specialized, or a part-time craft conducted by many. The production of chipped stone tools is overwhelmingly concentrated at the chert outcrop within the confines of La Mula-Sarigua. There is less evidence for the manufacture of pottery, but a few sherds suggest that He-4 might have been a production center.

Table 6.7. Craft activities in the Río Parita Valley based on recovered artifacts.

Artifact	Activity
Scraper planes	woodworking?
Unifacial points	cutting, perforating, scraping
Manos, Metates	grinding seeds, maize
Legged Metates	grinding seeds, maize; ritual?
Stone Axes	woodworking (canoes), clearing trees
Spindle whorls	spinning cotton; textiles, nets
Shell pendants	jewelry, burial attire
Pottery	utilitarian, ritual?
Gold	costume, burial attire

Starting with the Late Occupation Sequence, new artifacts, based on different technological needs, come to dominate archaeological assemblages. Increasing regional standardization in pottery, polished stone axes, ground stone (legged and breadboard metates), and chipped stone demonstrates that not all goods were produced locally and exchange between different communities became increasingly important. It is not until the Cubitá phase, however, where the standardization and spatial range of goods (utilitarian and prestige) suggests that a well-integrated interaction sphere existed throughout the Central Region (Cooke and Sánchez 1997, 2000; Sánchez 2000:130; Sánchez and Cooke 1997).

It is evident from data acquired in mortuary contexts that, some time after the introduction of La Mula pottery, personal costume items made out of shell, stone, bone, and metal entered the cultural record and came to be owned in quite large numbers by several individuals (mostly as composite items, such as necklaces, belts, aprons etc.[Cooke 1988c:107-108; Cooke, et al. 2003a:117-118]). Contrary to the ideas of the Control of Esoteric Knowledge Model (Helms 1979, 1992, 1994), there is limited evidence for long-distance exchange in the Central Region (Cooke, et al. 2003a:115-116). The stylistic similarities between chronologically dated ceramics and gold artifacts, the presence of gold ores in Panama, and some evidence of manufacture suggest local production of metal objects soon after the initial appearance of metallurgy—indisputably introduced from northern South America at the beginning of the Christian era (Bray 1996, 1997; Cooke 1984a; Cooke and Ranere 1992a:285; Cooke and Sánchez 1997; Cooke, et al. 2000; Espinosa 1994b:66; Linares 1977:71; Sánchez and Cooke 1997).

There is some evidence to suggest that stone axe preforms were imported from highland quarries into higher-order sites of the Río Parita Valley where the production process was completed, and the finished

axes distributed or exchanged to commoners (Cooke, et al. 2003a:115; Cooke and Ranere 1984:12; Griggs 2000). As one of the functions of these tools was the clearing of forests for cultivation, it appears that elites would have been, thus, indirectly involved in subsistence production (Welch 1996).

The majority of craft goods recovered from the Río Parita survey (e.g., shell pendants, slab metates, chipped stone) were locally made from raw materials found in the valley. Several craft items (i.e. polished stone axes and legged and breadboard metates) were initially, or completely, manufactured outside of the Río Parita Valley. Although the raw material for manatee bone artifacts, recovered from previous investigations at He-4, would have had to come from the Atlantic coast, this is not a long distance (100 km) from the Río Parita Valley. The absence of long-distance imports, therefore, implies that long-distance trading was not an important factor in the development of social ranking. On the other hand, local, regional, and macro-regional exchange provided the inhabitants of the Río Parita with all of their material and social needs.

The increase in the standardization of Cubitá phase craft goods (i.e., ceramics and shell jewelry) suggests a corresponding increase in trade or interaction between peoples of the Central Region and, thus, greater opportunities for acquiring prestige and wealth (Cooke and Sánchez 1997, 2000, 2001). The evidence for craft production and exchange in the Río Parita Valley suggests that elites were involved in the production and use of some items. The settlement surge and emergence of a site-size hierarchy during the Cubitá phase in the Río Parita Valley, thus, was probably influenced by the increase in macro-regional exchange and interaction in the Central Region.

There is no indication from this survey, or previous investigations in the Central Region, that a similar change in craft production occurred during the Macaracas phase. Many gold pendants from the “Parita Assemblage,” however, were recovered from the burial mounds at He-4, including one that was unfinished. With a gold ore resource nearby (45 km), it is possible that production of high-status gold artifacts at He-4 coincided with the appearance of high-status burials in the Río Parita Valley, but, for right now, this is speculation.

He-4, situated in the middle of the Azuero Peninsula, might have given its inhabitants a strategic location to take advantage of the exchange of different resources between communities in the region. If the site functioned as an exchange node for the region, it might have been easier for individuals, or groups, to regulate trade and/or production and increased their access to prestige and wealth. Some evidence of craft production at He-4 supports the idea that workshops at the site produced goods that were used locally and might have been exchanged for non-local items. It is possible that exchange was facilitated by ceremonial exchanges, such as the *balsería*, or an established market as described for contact-period Natá (Espinosa 1994a:49). The rise of He-4 to dominate the Río Parita Valley coincides with increasing macro-regional interaction during the Cubitá phase. Its location would have made it a

likely candidate for the region's exchange node, where individuals or groups at He-4 would have found it easier to regulate trade and/or production and profited from it. Nevertheless, detailed excavations, like those at Cerro Juan Díaz, and material analyses of raw and finished products are needed to substantiate these claims.

7. CONTROL OVER SUBSISTENCE RESOURCES

La dicha tierra y provincia de Paris [Chief Parita] está en la costa de esta Mar del Sur; toda la costa que se incluye en ella es muy buena, por que es toda de arenas y de grandes pesquerías, así de pescados como de mariscos, tiene dos ríos grandes, allende de otros arroyos y esteros pequeños, el uno que se dice del Asiento Viejo, y el otro que se dice el Río de los Mahizales ...tienen los dichos ríos muy buenas riberas y de grande posición para maizales y yuca y todo los bastimentos de indios, especialmente melones de los indios, que se hallan allí los mejores y más sabrosos que se han visto en todos estos reinos...son infinitos venados...y de puercos...y pavos. (Espinosa 1994b:65)

Elite control of subsistence resources in the rise of complex societies has been a main component of several popular models in archaeology (Blanton, et al. 1996; D'Altroy and Earle 1985; Earle 1977, 1997; Sahlins 1958, 1963, 1972; Service 1962, 1975; Steponaitis 1978, 1981; Webster 1992; 1997; Webster, et al. 2000). Chiefs and other elites were thought to have taken a managerial role in the redistribution of subsistence resources (Sahlins 1972; Service 1962, 1975). Earle (1977), however, claimed that chiefs were not part of a managerial elite, but rather mobilized surplus to finance their political aspirations and activities (see also Peebles and Kus 1977). Financing elite activities from staple production (staple finance) is considered a main avenue for aspiring elites to accumulate surplus (D'Altroy and Earle 1985; Earle 1997). On the other hand, D'Altroy and Earle (1985; Earle 1997) posit that an alternative route for aspiring elites was to control or manipulate regional and long-distance exchange of valuable non-subsistence goods (wealth finance). Scholars working in Panama have debated whether elites were involved in subsistence production and, if so, how important it was to the emergence of social ranking.

Helms (1979:34) argues that the best manner for Panamanian chiefs to obtain rewards for their loyal followers and to display their resourcefulness lay in the ability to control exchange networks, rather than agricultural resources. This is based on her opinion that elites were not involved in the organization of subsistence activities, which were the concern of individual domestic groups (Helms 1994:56).

Archaeologists working in the Central Region, however, have suggested that manipulating local exchange networks and producing subsistence goods may have served as avenues of opportunity for prehispanic corporate groups or individuals (Cooke and Ranere 1992:282, 284-285; Cooke and Sánchez 2004:I:36-37, II:30-31; Cooke, et al. 2003b:10; Hansell 1988:251; Linares 1977:73). The latter scenario stems from ethnohistoric and ethnographic accounts of the production and storage of subsistence resources, ceremonial activity and other social gatherings (i.e., *balsería*), and the exchange of resources.

In the epigraph of this chapter, Espinosa (1994b:65) described the boundaries of *París'* chiefdom (Chief Parita) as including the lands surrounding the Río Parita and the Río La Villa valleys, which

provided a bounty of fish, shellfish, deer, and agricultural produce. It is not clear, however, whether the resources within this territory belonged solely to the chief and the ruling descent group, to individual families, or to settlements or lineages as corporate groups. Nevertheless, specific ethnohistoric accounts suggest that elites were involved in subsistence production and acquired large surpluses. Oviedo (1853:III:132-133) documented that *cabras*, the lowest status elites, were involved in organizing some of the agricultural activities in eastern Panama, most likely because agricultural lands and serfs were their reward for military service (Helms 1979:34). Anghiera (1912:307 cited by Cooke 1998a:73; Sauer 1966:235) and Oviedo (1853:XXIX:3-5; Sauer 1966:231, 235) recount an occasion on which Balboa and his eight hundred soldiers stayed in Pocorosa's *bohío* for thirty days subsisting off the chief's local stores of maize. Likewise, Espinosa (1994a:48; Linares 1977:73) noted that an infinite amount of maize and dried fish, many geese and turkeys, over 300 smoked deer, and a large amount of other indigenous foods were stored at Natá. These last two examples attest to the storage capabilities of chiefly centers.

Archaeological evidence indicates that by end of the third millennium B.C., populations in the Central Region concentrated into alluvial valleys subsisting on several key cultigens, wild game, and coastal and estuarine resources (Carvajal 1998; Cooke 1984a, 1988, 1992a, 1998a, 2004; Cooke and Ranere 1989, 1992a, 1999; Cooke and Tapia 1994a, 1994b; Hansell 1988; Ichon 1980; Jiménez 1999; Jiménez and Cooke 2001; Piperno and Pearsall 1998; Weiland 1984). When compared to Mesoamerica, these valleys are quite narrow and scholars have suggested that the limiting factor in producing enough food for increasing populations would have been the availability of high quality arable land that would have been available in each territory (Cooke 1984a, 1998a; Cooke and Ranere 1984, 1992a; Lange 1984:48-49; Linares 1977:31). Ethnohistoric accounts (Espinosa 1994b:65, 68), on the other hand, suggest that overall agricultural production around the Parita Bay was more than adequate.

Although a population surge occurred during the Cubitá phase in the Río Parita Valley (Figure 2.20, Table 2.1), I have argued above that population during the Late Occupation Sequence never reached carrying capacity. This does not necessarily imply, though, that access to the more productive subsistence resources, such as the best agricultural land, was uncontested or unrestricted. High productivity land in the Lower Survey Zone accounts for only 6% (551 ha; Table 5.2) of the total area, and modern investigations have determined that only 280 ha of land in the entire Río Parita Valley are potentially irrigable (CATAPAN 1970:II:Appendix 9E; IRHE 1990). Thus, access to high productivity lands could have been an important factor in the development of status and wealth disparities in the Río Parita Valley. There is no evidence, however, for any prehispanic agricultural production using irrigation (Cooke 1998a:68-69). In this chapter, the resource catchments of individual sites (or small groups of sites) are compared to the distribution of subsistence resources in addressing how access to necessary resources might have contributed to developing social mechanisms of control.

SITE CATCHMENT ANALYSIS

Information on the actual subsistence resources consumed by the inhabitants of the Central Region is fairly detailed (Carvajal 1998; Cooke 1979, 1984a, 1988, 1992a, 1998a:101, 2004; Cooke and Ranere 1989, 1992a, 1999; Cooke, et al. 2003a; Cooke and Tapia 1994a, 1994b; Hansell 1988; Ichon 1980; Jiménez 1999; Jiménez and Cooke 2001; Piperno and Pearsall 1998; Piperno, Andres and Stothert, 2000; Piperno and Holst 1998; Piperno, et al. 2000). In a country like Panama with much coastline, agricultural products are only one of the subsistence resources that formed part of the prehispanic diet. The diet, overall, was mixed between cultigens, wild game, the products of wild or tended trees, such as palm fruits, and fruits, and many species of fish and shellfish (Andagoya 1994:31, 32; Cooke 1998a; Cooke and Ranere 1989; Espinosa 1994a:55, 57; Piperno and Pearsall 1998). The abundance of white-tailed deer, iguana, fish, and shellfish remains at Central Region sites reveal that these wild resources contributed a substantial portion of the past inhabitants' subsistence (Carvajal 1998; Cooke 1988, 1992a, 1998a, 2004; Cooke and Ranere 1989; Cooke and Tapia 1994a, 1994b; Jiménez 1999; Jiménez and Cooke 2001).

Ethnohistorically documented chiefdoms along the Parita Bay included within their boundaries uplands, fertile river valleys, and coastlines; chiefdoms located farther inland (e.g., Urracá and Quema) lacked direct access to the coast (Cooke 1993; Espinosa 1994b:65-67; Helms 1979:10). The most populated chiefdoms were those located in areas with direct access to fertile soils and estuarine and coastal resources (Andagoya 1994:33). For example, Espinosa (1994b:65) describes the Río Parita and Río La Villa floodplains as having great fecundity for the cultivation of maize and yuca. The most successful chiefly territories, thus, appear to have been able to exploit different ecological zones (Linares 1977:73). As discussed in the previous chapter inland resources (basalt and andesite for polished stone axes and legged metates) might have been bartered to chiefdoms with access to the coast for their local resources.

Methods

Catchment zones were created using the maximum population estimates (52 people per 1.0 DAI/C) and minimum soil productivity. These estimates were used to determine that 4.25 ha of high productivity or 29.75 ha of low or moderate productivity land could provide the subsistence needs of a family of five. Since detailed soil information is only available for the Lower Survey Zone (CATAPAN 1970:II), catchments were not created for the Upper Survey Zone, which, overall, was sparsely populated. A catchment circle was drawn around the center of each site large enough to include the area required to produce the agricultural products needed to sustain the site's inhabitants. Game, shellfish, and fish were included in the analysis, but less systematically than agricultural products.

The catchment analysis was carried out for first and second-order sites (Table 4.2); third-order sites had, on average, catchments of less than 100 m in radius and were usually spaced far enough away from their neighbors so as not to interfere with each other's catchments. When catchment circles did overlap, one of three actions was taken. Where a higher-order site's catchment encroached on that of a third-order site, the latter was incorporated into the former. If a first or second-order site overlapped catchment zones with a second-order site, the "shared" area was divided between the two, which required expanding both catchment circles to compensate for the loss in area. When a second-order site was completely engulfed by the catchment of a first-order site, it was incorporated into the larger site's catchment, as with third-order sites. These different methods were employed for the sake of simplicity, as the large number of third-order sites near higher-order sites would have made dividing "shared" catchments impractical.

Site catchment analysis, as used here, differs from the methods pioneered by Vita-Finzi and Higgs (1970) who drew catchment circles of the same size around all sites regardless of their populations. On the other hand, it is similar to Flannery's (1976a) investigation of Early Formative sites in the ETLA arm of the Valley of Oaxaca and Steponaitis' (1978, 1981) analysis of the Black Warrior Valley and the Basin of Mexico, respectively. The radii of the catchment circles created by Steponaitis depended on the relative size of each site, but only focused specifically on the production of maize. Through excavation, Flannery determined what resources were actually used by the site's inhabitants and then drew a series of ever-widening catchment circles to incorporate different resources. He discovered that a 2.5 km radius catchment provided each site with the necessary land to cultivate maize, squash, chilies, and other cultigens, and to gather construction materials for residences (Flannery 1976a:107-108). These immediate catchments did not infringe on those of neighbors, but the larger catchment circles, needed to acquire some wild plants, game, chert, salt, clay, and exotic goods, overlapped with those of other sites and extended, in some instances, upwards of 200 km in radius. Although it appeared that agricultural factors determined the settlement pattern of these early villages, the regular spacing between sites, regardless of the width of the alluvium, allowed much more land than would have been necessary just to provide enough subsistence goods for their inhabitants. Flannery (1976a:111, 1976c:178), thus, concludes that this spacing was primarily a result of social considerations, most likely to allow for subsistence overproduction, which was then used in the preparation of foodstuffs (i.e., *chicha*) for ceremonies and other social activities. For the Río Parita Valley, a similar idea of a "ceremonial surplus" is used to interpret the distribution of settlements during the Late Occupation Sequence.

Site Catchment Analysis of the Río Parita Valley

The circles illustrated in Figures 7.1 to 7.7 are the sites' immediate catchment zones that would have included sufficient agricultural resources and, for most, game (i.e., deer), construction materials for

houses and other dwellings, and material for slab metates. Sites near the river would have had access to iguana and aquatic birds, whereas some settlements located near the coast (e.g., La Mula-Sarigua) had the added benefit of marine shellfish and fish, salt, and chert within their immediate catchments. As discussed in Chapter 6, exotic materials for all sites would have come from farther away (*Spondylus*, 15 km?; gold ores, 45 km; copper ores, 50-100 km?; manatee, 100 km; stone axe preforms and material for legged and breadboard metates, 50-100 km?).

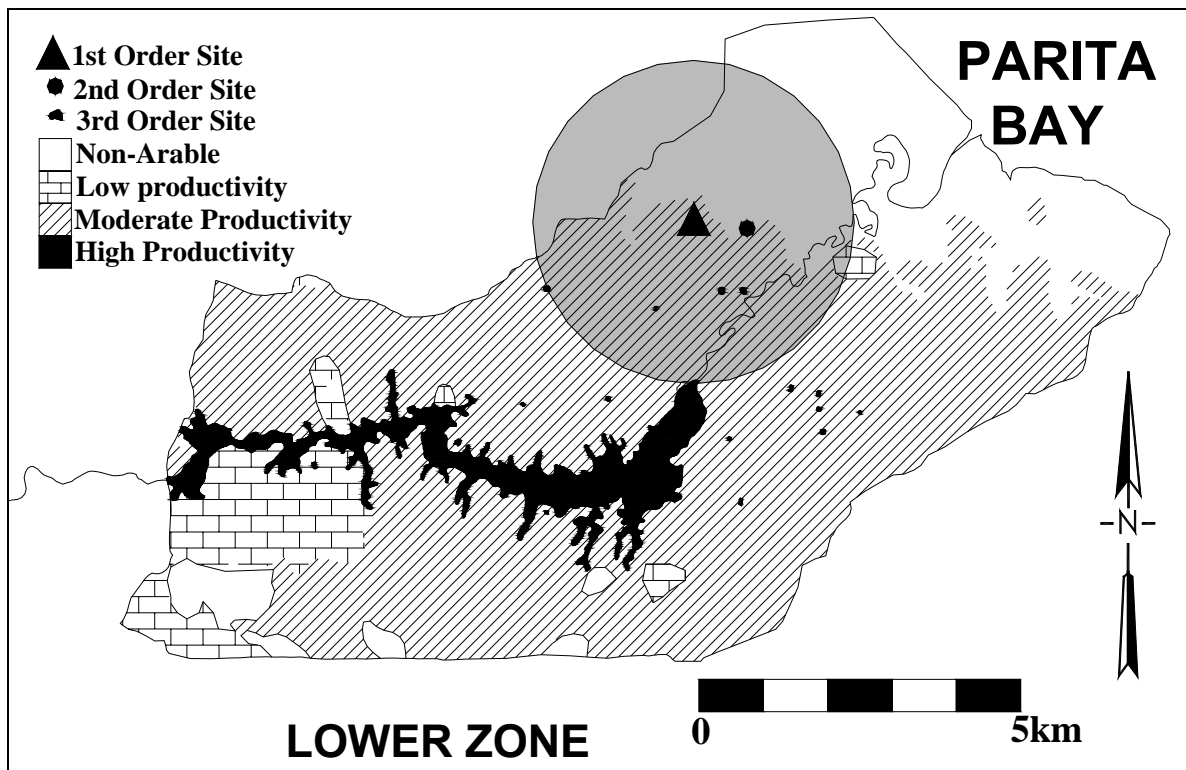


Figure 7.1. La Mula phase resource catchment zones.

During the La Mula phase, population is overwhelming concentrated in and around the site of La Mula-Sarigua (Figures 4.1, 4.2, 7.1). The high productivity soils of the upper floodplain zone were not heavily exploited at this time and third-order sites, scattered throughout the survey zone, might have been special extraction sites to obtain resources not abundantly available within La Mula-Sarigua's immediate catchment zone (i.e., wild plants and large game). Using the modern environment of La Mula-Sarigua, which contains moderate productivity soils and non-arable land, would require a catchment zone with a radius of 2.5 km to provide all of its inhabitants, and the nearby second-order site (Site 317), with

agricultural products (Figure 7.1). This estimate is based on the assumption that current soil productivity levels were the same as 2000 years ago, which is not the case. As mentioned in Chapter 2, much of this area is currently a very active erosional/depositional surface where soil fertility has been reduced considerably. If we allow for more productive soils in the past and account for the addition of nearby aquatic resources (estuarine and coastal), the inhabitants would have had sufficient resources with a relatively smaller catchment. With either estimate, it appears that there was little, if any, resource stress and, thus, little need or capacity to limit access to these subsistence resources.

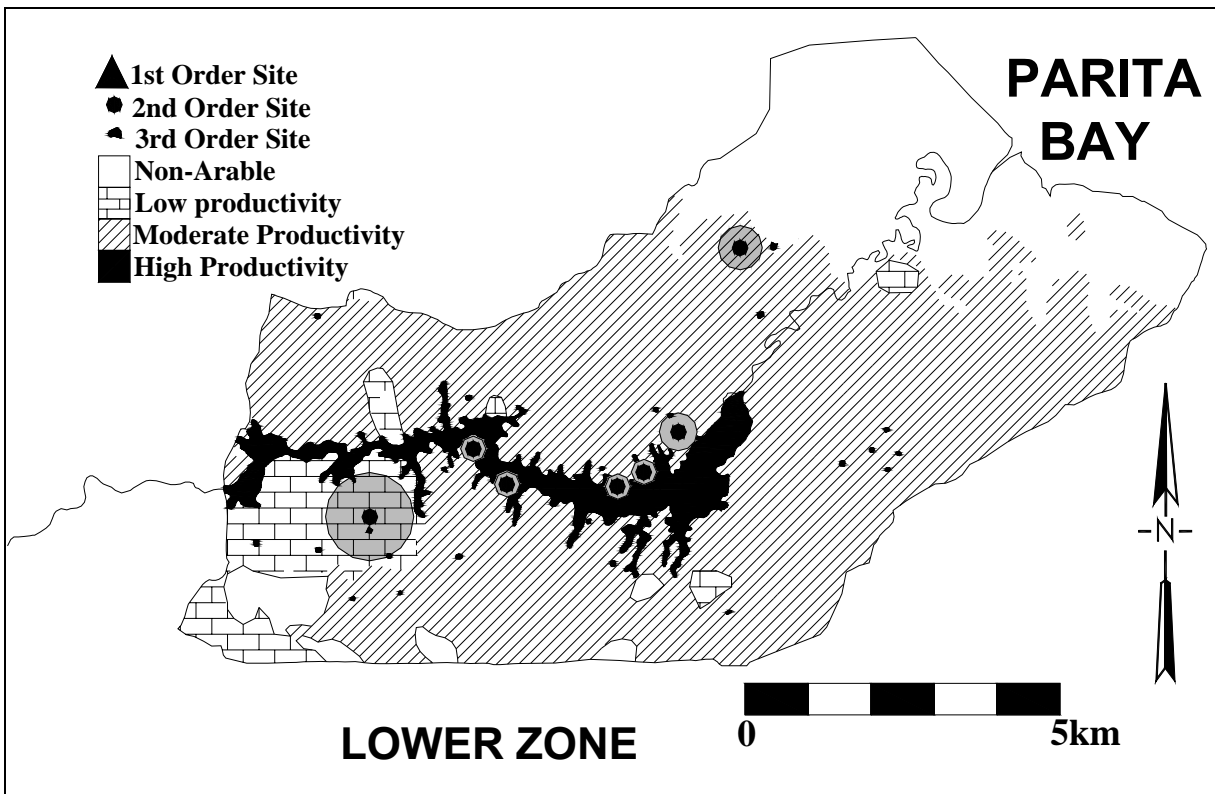


Figure 7.2. Tonosí phase resource catchment zones.

A reversal of the demographic concentration characterizes the Tonosí phase as population is dispersed throughout the valley (Figures 4.10, 7.2). Although the seven second-order sites in the Río Parita floodplain are, on average, 1 km apart, the immediate catchment zone radii needed to supply agricultural products for residents would have been only 200 m for four sites (He-2, Sites 128, 128A, 174), with one (Site 191) requiring 300 m. La Mula-Sarigua, located 3 km from the nearest second-order site, would have needed a 350 m radius catchment circle using modern soil estimates, whereas the hamlet

of He-4, located 2 km from its nearest second-order neighbor in low productivity soil, would have required a larger catchment radius (700 m) to produce enough agricultural resources for its inhabitants. With the low population for this phase, there is plenty of available high productivity land and, thus, catchment zones do not overlap with those of their neighbors.

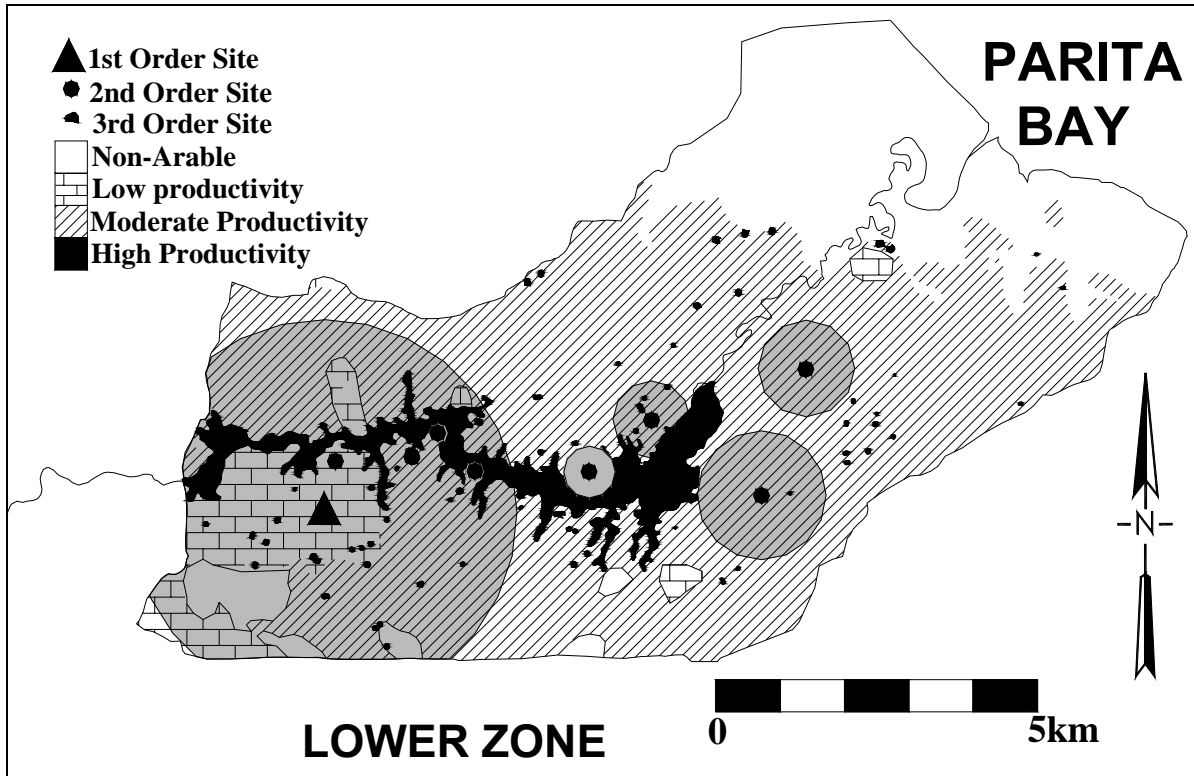


Figure 7.3. Cubitá phase resource catchment zones.

During the Cubitá phase, population surges with the emergence of a three-tiered site-size hierarchy. Second-order sites are around 1.5 km apart, but, because sites grew considerably in population (Table 4.3), the subsistence catchment zone radii increase to 400 m (Site 128), 600 m (Sites 68, 191), and 1 km (Site 48) (Figure 7.3). To sustain the high population density in and around He-4, a catchment of 2.75 km is needed. In addition to many third-order sites, He-4's catchment absorbs four second-order sites (He-2, Sites 174, 184, and 194). Although soil information is limited for the Upper Survey Zone, the location of a second-order site (Site 54; Figure 4.11) in the floodplain, and 2 km from its nearest neighbor, suggests that the inhabitants had sufficient subsistence resources. Despite the substantial increase in population during the Cubitá phase, second-order sites in the high productivity soil zone are still evenly spaced apart with little in-filling by third-order sites.

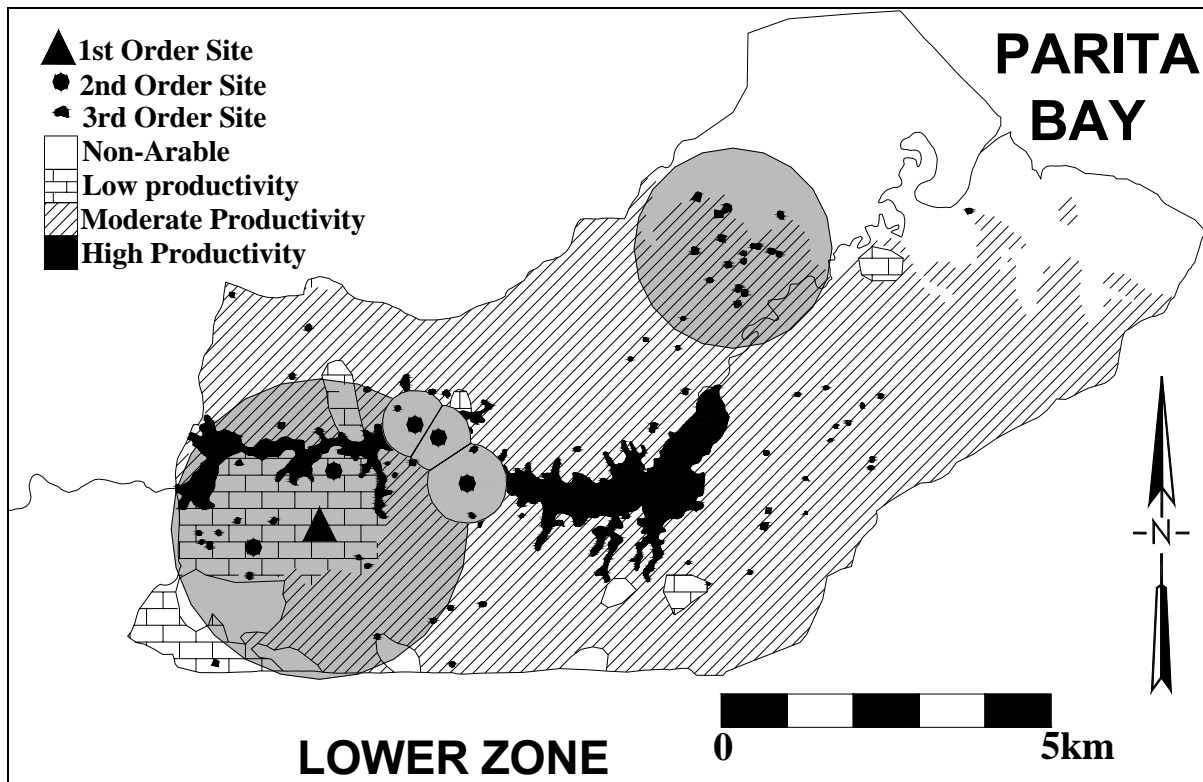


Figure 7.4. Conte phase resource catchment zones.

Even with the substantial drop in overall population during the Conte phase (Figure 2.20, Table 2.1), there is no corresponding reduction in second-order site size; it is the number of third-order sites that decreases (Figures 4.15, 7.4). Second-order sites are closer together than during the Cubitá phase, averaging only 1 km apart. Of the five Conte second-order sites, two have a catchment radius of 500 m (Sites He-2 and 271), one has 600 m (Site 174), and two are included within He-4's catchment zone (Sites 194 and 232). Although He-4 reduced slightly in population, it still required a catchment radius of 2.25 km because of increased demographic nucleation in the area around it. A community catchment zone of 1.5 km without consideration of other subsistence resources, i.e., mangrove, estuarine, and coastal, would have been needed for a group of third-order sites within the former boundaries of La Mula-Sarigua. The majority of the high productivity soil is occupied by third-order sites around 500 m apart allowing for more land for agricultural production than would have been necessary. Second-order sites that were located in the middle of the high productivity zone during the Tonosí and Cubitá phase now disappear or are reduced to third-order sites. Second-order sites do not return to this area until the Parita phase.

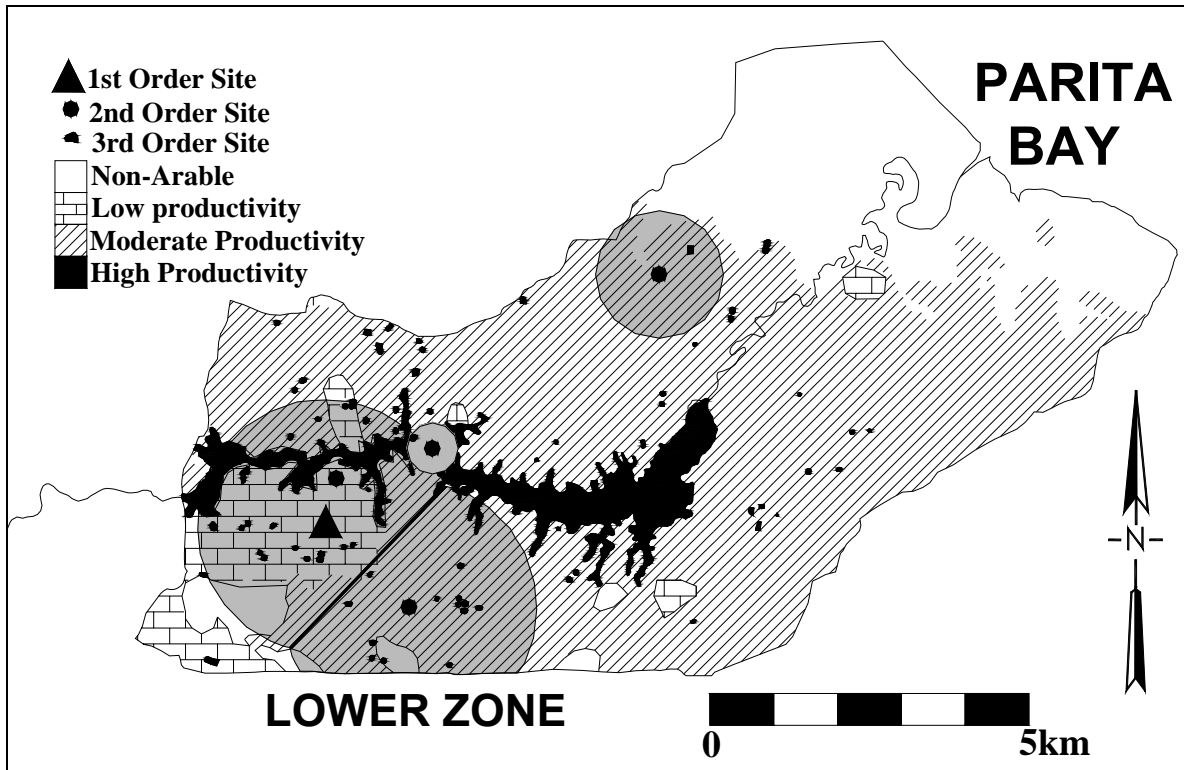


Figure 7.5. Macaracas phase resource catchment zones.

Continuing with the Macaracas phase, population levels remain relatively stable (Figure 2.20, Table 2.1), but a shift in settlement location occurs. He-4's population drops almost in half, whereas that of second and third order sites increases; the latter having the highest values for the entire Late Occupation Sequence (Table 4.3). Despite this drop in population, He-4 still requires a large catchment radius of 2 km, as a nearby second-order site (Site 345), also with a radius of 2 km, results in an overlap (Figure 7.5). He-2 and La Mula-Sarigua need catchments with radii of 400 m and 1 km, respectively, and the other second-order site (Site 194) is part of He-4's catchment. Second-order sites near He-4 are around 1.5 km apart, whereas La Mula-Sarigua is 4.5 km from its nearest second-order neighbor. The reduction of He-4's population does not result in repopulation, but further removal of people from the middle floodplain zone towards the southwest of the Lower Survey Zone (Figure 7.5).

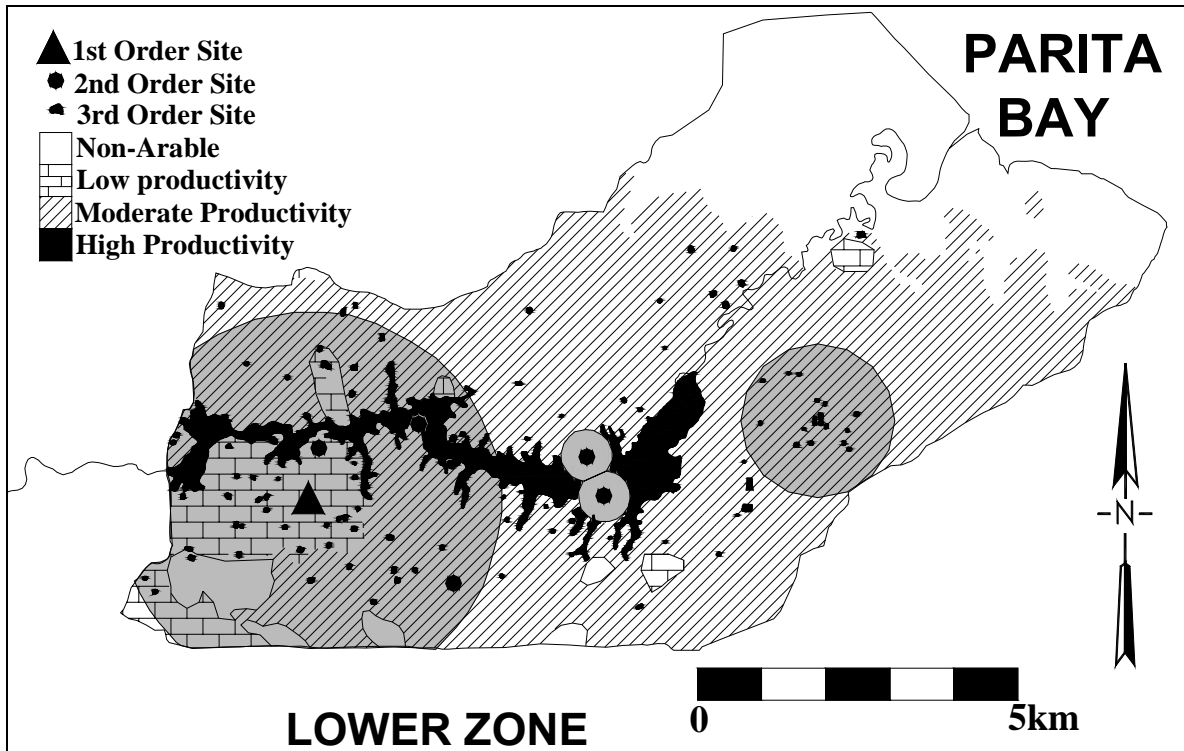


Figure 7.6. Parita phase resource catchment zones.

The Parita phase represents a return to regional population levels seen during the Cubitá phase, but with sites still concentrated towards He-4 (Figures 4.25, 7.6). Two second-order sites (Sites 6, 128), however, emerge in the middle floodplain zone with a catchment zone radius of 400 m for each. The high demographic concentration in and around He-4 results in the need for an extremely large catchment radius of 3 km to meet the subsistence needs of all the residents engulfed by this expansive circle (including second-order sites He-2, 194, and 363). Higher-order sites, in general, are around 1.8 km apart. Third-order sites are located with enough space to avoid overlapping the catchments of their neighbors; however, one group of third-order sites, in the southeastern part of the Lower Survey Zone, produces considerable catchment overlap. This would have made it necessary to cultivate fields that were not adjacent to their settlements resulting in a combined catchment 1.2 km in radius.

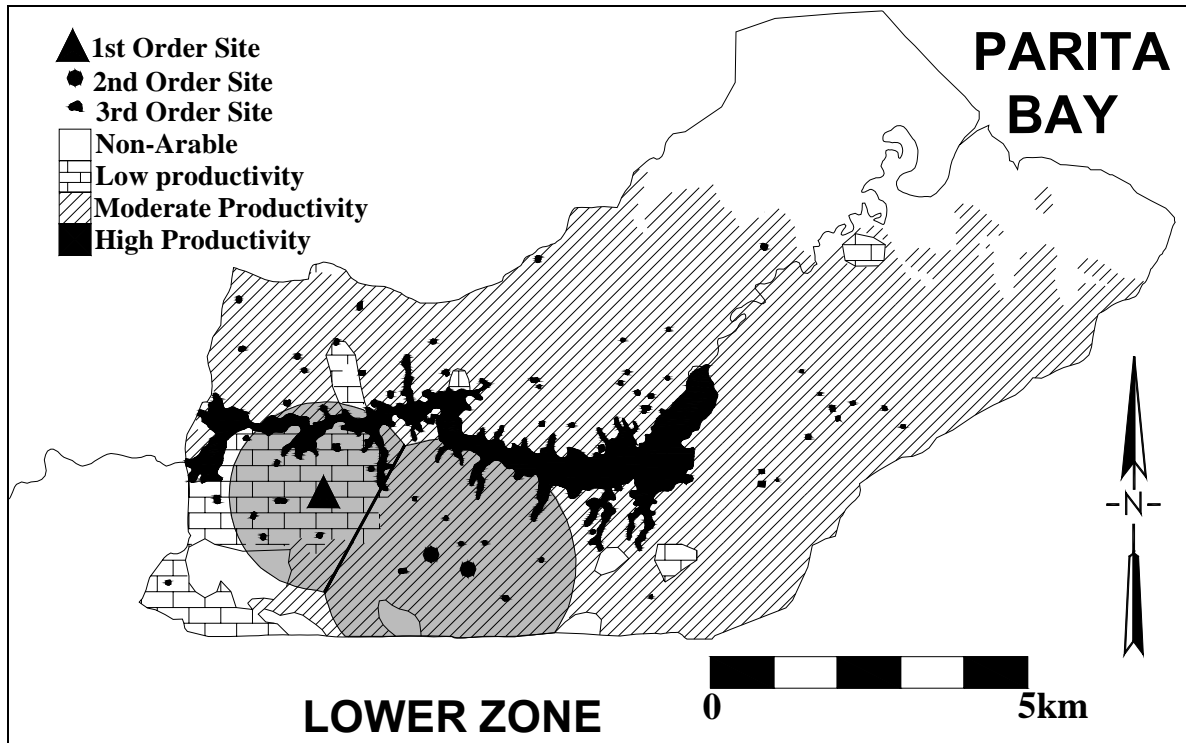


Figure 7.7. El Hatillo phase resource catchment zones.

El Hatillo catchment zones differ considerably from those of previous phases. He-4 is still the largest site in the survey zone, but its population is reduced in half (Table 4.3). Two second-order sites (Sites 355 and 363) are only 600 m apart, 2 km from He-4, and share a catchment zone with a combined population approaching that of He-4. As these three sites are located in relatively poor soil, catchment circles are large and there is some overlap (Figure 7.7). He-4 would have required a catchment of 1.5 km in radius, whereas the two second-order sites combined need a larger catchment of 2 km. Third-order sites are generally spread out throughout the zone. In the southeastern part of the Lower Survey Zone, the same group of third-order sites exists, but the lower population densities produce little catchment overlap. The El Hatillo phase, is the first phase since La Mula to lack any second-order sites in the high productivity soils.

La Mula and Tonosí phase sites in the Río Parita Valley were located so that their immediate site catchments did not overlap with those of neighbors and could have provided the necessary subsistence resources for their inhabitants (Figures 7.1, 7.2). La Mula-Sarigua, during the La Mula phase, also had access to other necessities such as salt, chert, coastal, estuarine, and mangrove resources. For Tonosí phase sites, these resources were located farther away within a shared catchment zone. During all phases,

exotic materials (i.e., gold) and ground and polished stone (e.g., breadboard and legged metates, polished stone axes) came from outside the survey zone. Apart from the limited occupation of La Mula-Sarigua during the Late Ceramic II Period, the majority of settlements did not have certain resources (i.e., salt, chert, coastal, estuarine-mangrove resources) within their immediate catchment zones. Starting with the population surge of the Cubitá phase, there is at least some overlap of catchment zones between sites for each remaining phase of the pre-Columbian sequence. All sites from the Cubitá to the El Hatillo phase had access to land for cultivation. Some sites (i.e., He-4), however, required an extremely large catchment zone suggesting that their inhabitants might have had to have been provisioned by other sites in more productive areas (Steponaitis 1978, 1981).

DISCUSSION

From archaeological evidence, a wide variety of foods made up the pre-Columbian diet, but the key resources were located in the estuary and coastal region (fish and shellfish) and in the floodplain (high productivity soils for agriculture). If the emergence of chiefdoms was based on the control of these key subsistence resources, first-order sites would be expected to be located near them. Contrary to this expectation, the chiefly center of He-4 is located 14 km from the coast in some of the poorest soils in the valley. For both critical times of social change in the Río Parita Valley (Cubitá and Macaracas phases), population gravitates out of the floodplain towards He-4. During the Cubitá phase, this demographic shift is quite dramatic (Figures 4.8, 4.12). In Macaracas, population at He-4 itself declines, although the tendency for regional population to concentrate near He-4 remains strong. The location of He-4 and nearby second-order sites in low productivity soils away from the coast indicates that control of subsistence production in the Río Parita Valley was not the core of elite power or the central element in its emergence.

The ethnohistoric descriptions of *bohíos* full of subsistence resources, however, reveal that elites were involved in accumulating maize (Anghiera 1912:307 cited by Cooke 1998a:73; Oviedo 1853:XXIX:3-5; Sauer 1966:231, 235), dried and salted fish, and deer (Espinosa 1994a:48; Linares 1977:73). Coastal and estuarine resources in the Parita Bay were abundant, easy to harvest, and easy to preserve (Cooke and Ranere 1999; Cooke and Sánchez 2001; Cooke and Tapia 1994a, 1994b). Likewise, white-tailed deer were very abundant in wooded savannas (Espinosa 1994a:55, 57, 1994b:65) and were probably quite common near sites as there was a lot of secondary growth (Cooke and Ranere 1989:296, 306). Andagoya (1994:31; Cooke 1979, 1992b; Cooke and Ranere 1989:306) remarked that some chiefs

restricted tracts of land as game reserves, but the abundance of coastal and estuarine resources as well as game suggests that they would have been very difficult to use as the fulcrum of social control. Settlement locations in the Río Parita Valley, in relation to key food resources, along with the nature of wild resources, therefore, support the conclusion that the rise of chiefdoms was not based on the control of subsistence production.

The occurrence of much feasting between commoners and the elites in the sixteenth-century (Oviedo 1853:III:132-133), however, suggests that elite involvement in the mobilization of subsistence resources was a main avenue for political advancement. The Spanish documented feasting at games, accession and deaths of elites, and pre- and post-war ceremonies (Redmond 1994b:37-49). In the Río Parita Valley, Espinosa (1994b:64) noted an abundance of turkey, iguana, *aje* (sweet potato) and *chicha* available for the funeral feast for the recently deceased Chief Parita. Likewise, a mourning feast was held a year after Chief Pocorosa's death in which his desiccated and wrapped body was taken to the main plaza and he and his possessions were reduced to ashes (Andagoya 1945:395; Redmond 1994b:49). War councils also included drinking, dancing, and song (Espinosa 1873:41; Oviedo 1853:III:129-130). Marriage alliances between past enemies were formalized with feasting, drinking, and games (Espinosa 1873:41, 1864:470). At a feast celebrated by Espinosa and Chief Comogre (Espinosa 1864:470), a game of *cañas* (sticks) was played, which was likely part of other chiefly gatherings (Redmond 1994b:40). Cooke and Ranere (1992a:282284-285; Cooke, et al. 2003b:10), Hansell (1988:247-253), Linares (1977:71-73), and Sánchez (Cooke and Sánchez 2004:I:36-37, II:30-31), based on ethnohistoric descriptions of central places serving as markets for local and regional exchange (Espinosa 1994a:49) and ethnographic descriptions of indigenous ritual ceremonies (the *balsería*; Torres de Araúz n.d.; Young 1971, 1976), suggest that exchange and feasting were sociopolitical opportunities for corporate groups.

Young (1971: 204-212, 1976:51, 1980a:227) claims that financing a *balsería* was important in building prestige, as it enabled the hosting group to capitalize on their generosity and display their prowess in ritual games. Hosting a *balsería* required mobilizing many resources. Young (1971:Table 22) describes the resources for a 1948 *balsería* as amounting to around 18, 000 pounds of maize, beans, and rice, 94 chickens, 33 pigs, 14 cattle and large quantities of crude sugar cakes, *aguardiente*, root crops (*otoe*, sweet manioc, yams), bananas, squash, and tobacco. The host's personal contributions amounted to only around 5% of the total, whereas the majority was contributed by the host's relatives and some friends (Young 1971:208). In mobilizing all of these resources, the host was dependent on his relatives, and only few individuals commanded the "respect" necessary to obtain this support (Young 1971:209-210). Respect and prestige were also obtained through individual skill in arbitrating disputes over "land boundaries, damage to crops, and errant wives" (Young 1971:210). Through their generosity, certain

individuals gained respect from their relatives and friends, which also placed them under an obligation to aid aspiring elites (Young 1971:210).

Pre-Columbian elites had specific laborers who cultivated maize and yuca, hunted peccary and deer, fished, and performed other tasks (Oviedo 1853:III:132-133). Cooke and Sánchez (2004:II:30), however, argue that from the ethnohistoric commentary, it is difficult to say how this played out—whether these duties were obligations, or part of a reciprocal relationship. Nevertheless, mobilizing a subsistence surplus for the use in ceremonial exchanges and other social events could have been just as important prehistorically as it was for the modern Ngöbé (Guaymí) (Cooke, et al. 2003a, 2003b).

Some archaeological information is available to support these ethnohistoric and ethnographic descriptions. Richard Cooke (personal communication) claims that the manner in which the large assemblages of white-tailed deer remains, from several archaeological sites in the Central Region, have been deposited, and the types of bone elements and the damage to them, suggest that they accumulated rapidly, as one would expect after a feast. El Caño (Figure 4.28), one of few sites in Panama with rows of sculpted and unsculpted stone columns and a cobble pavement, is considered a ceremonial center by Cooke, et al. (2000:172; 2003a:126-127, 2003b:9). Similarly, the burial mounds at He-4 are the only formal cemetery within the survey zone. These mounds were arranged around a plaza (Bull 1965; Ladd 1964:25), which suggests that ritual, at least which focused on mortuary activity (Espinosa 1994b:64), was centered at this first-order site.

Game reserves and estuaries were productive resource areas, but, unlike high productivity land, were dispersed and would have been much more difficult to control. If direct control of subsistence production was the base of elite power, chiefly settlements, therefore, should have been located in or very near the floodplain—which was not the case. Survey data, therefore, cannot support elite involvement in restricting access to subsistence resources. On the other hand, survey data cannot deny that subsistence resources were used by elites in furthering their political aspirations, albeit in a completely different manner than direct control. Both control and mobilization of subsistence resources are aspects of the Control of Local Resources Model. From ethnohistoric, ethnographic, and archaeological evidence, however, it appears that elites obtained subsistence surpluses for political and socioeconomic activities by encouraging, rather than controlling production. Competitive generosity through the mobilization of subsistence resources, rather than restricting resource access, appears to have played an important part in legitimizing chiefly authority.

SUMMARY

During the La Mula phase, settlement is concentrated towards productive arable land and estuarine and coastal resources. Although subsistence factors appear to have been important in determining the location of La Mula-Sarigua, these prime resources are not just located in one area, but exist in most places along the Parita Bay coast. The location of a large (10 ha) chert deposit within the boundaries of La Mula-Sarigua suggests that subsistence factors were not the only criteria for selecting settlement locations. It is during the Tonosí phase when subsistence factors (i.e., agricultural) appear to have been the strongest in influencing site location. For the two critical phases for social change in the Río Parita Valley (Cubitá and Macaracas phases), and the later phases in general, increased regional population does not result in higher settlement density in the high productivity soils or near the coast.

Overwhelmingly, population in the Río Parita Valley clusters in or near the first-order sites of He-4 and La Mula-Sarigua. With high-density population in and around He-4 after the Tonosí phase, it appears that settlement locations were influenced more by sociopolitical than subsistence factors. As mentioned in Chapter 6, if elites controlled the production of polished stone axes, used to clear forests for cultivation, they would have indirectly controlled subsistence production (see Welch 1996). He-4's location 14 km from the coast and on some of the poorest soils in the valley, however, suggests that it was not best located to directly control access to subsistence resources.

Helms (1994:57) states that one of the main purposes of warfare was to gain additional lands for cultivation and access to fishing, suggesting that these resources may have been restricted or regulated. The ubiquity of shellfish and fish remains throughout the Río Parita and adjacent valleys (Carvajal 1998; Cooke and Ranere 1999; Cooke and Tapia 1994a, 1994b; Hansell 1988; Isaza 2004; Jiménez 1999) does not support this idea. Additionally, the past abundance of coastal and estuarine resources and game in the Central Region, suggests that they would have been difficult to control. The ethnohistoric descriptions of chiefly larders full of maize (Anghiera 1912:307 cited by Cooke 1998a:73; Oviedo 1853:XXIX:3-5; Sauer 1966:231, 235), dried and salted fish, and deer (Espinosa 1994a:48; Linares 1977:73) and settlement patterns in relation to productive resources imply that, although direct control of subsistence production and the mobilization of subsistence resources are both aspects of the Control of Local Resources Model, only the latter appears to have contributed to establishing elite power.

8. CONCLUSIONS

The greater challenge presented by the effort to compare and understand, not just different societies, but different trajectories is also a much greater opportunity. It forces us to confront the issue of how and why change takes place in each sequence, and at the same time we must address the questions of how and why it takes place differently on the different trajectories. This presses our models to the limit, and in the process shows us quite clearly just where they may be in need of improvement. Such a context (attempting to understand variation in different trajectories) can lead to very promising efforts at model building and to highly productive empirical testing of models. (Drennan 1996c:28)

The development of Panamanian chiefdoms has focused on ethnohistoric descriptions (Cooke 1993; Helms 1979, 1992, 1994; Roosevelt 1979; Sauer 1966), a few spectacular archaeological finds (i.e., Sitio Conte [Hearne and Sharer 1992; Lothrop 1937; Mason 1942]), and on more systematic archaeological investigations (Briggs 1989; Carvajal 1998; Cooke and Ranere 1984, 1992a; Cooke, et al. 1998, 2000, 2003a, 2003b; Díaz 1999; Hansell 1988; Ichon 1980; Isaza 2004; Linares 1977; Linares, et al. 1975; Linares and Ranere 1980; Mayo 2004; Sánchez 1995). In examining the nature of chiefly societies, it was necessary, first, to identify when social ranking emerged in the Río Parita Valley and, then, to determine what role specific sociopolitical, economic, and environmental factors played in its emergence and development. This study adopted a strategy that focused on a regional settlement survey, documenting 1700 years of social change in a 104 km² area of the Río Parita Valley, Panama (Figure 1.1).

SUMMARY OF THE RÍO PARITA SURVEY

Although the settlement history in the Río Parita Valley extends back to the Paleoindian Period, this investigation focused on the Late Occupation Sequence (200 B.C. to A.D. 1522), which commences with the appearance of large nucleated villages (i.e., Sitio Sierra, Cerro Juan Díaz, and La Mula-Sarigua) and extends up until Spanish colonization (Figure 2.12). It is during the Late Occupation Sequence when social ranking is thought to have emerged in the Central Region of Panama (Briggs 1989; Cooke 1984a; Cooke and Ranere 1992a; Cooke, et al. 2000, 2003a; Linares 1977). Survey data from the Río Parita project suggests that there were two critical times of social change in the valley. Although settlement

nucleation starts early in the sequence, it is not until the presence of He-4 as head of a three-tiered site-size hierarchy that chiefdoms appear to have emerged.

Río Parita Settlement Patterns

Two related processes appear to have been involved in the appearance of large nucleated settlements in Panama during the first millennium B.C. On the one hand, the small population scattered along the river valleys and on the coast increased naturally. At the same time archaeology and paleovegetational studies, particularly in Coclé and Veraguas, indicate that there were small farming settlements scattered over the foothills, on the Cordillera Central, and along the central Caribbean coastal plain by 1000 B.C. (Cooke 2004; Cooke and Ranere 1984, 1992a; Cooke, et al. 1996; Drolet 1980; Hansell 1988; Ichon 1980; Linares and Sheets 1980; Piperno and Pearsall 1998; Ranere and Cooke 1996:75; Weiland 1984). Paleovegetational research indicates that slash and burn farming was so extensive in the seasonally dry upland areas of the Central Region that it may have led to a decline in soil fertility (Cooke and Ranere 1992a:273-275, 297; Cooke, et al. 1996; Cooke, et al. 2003b:3; Piperno and Pearsall 1998:209-227, 286-297). This development, in turn, may have spurred movements into unpopulated areas (such as the highlands of Chiriquí, the central Caribbean foothills and lowlands, and the eastern Darién) and a gravitation of the regional population towards the lower course of major rivers in proximity to estuaries (Cooke 2004; Cooke and Ranere 1992a:275; Linares 1980a, 1980b, 1980c, 1980d; Piperno 1994; Piperno and Pearsall 1998:295; Ranere and Cooke 1996:67; Ranere and Hansell 1978). The emergence, by the end of the first millennium B.C., of large nucleated settlements, such as La Mula-Sarigua, Sitio Sierra, and Cerro Juan Díaz, therefore, appears to have been the result of new agricultural technologies (stone axes, grinding stones) and an increased reliance on agricultural and estuarine resources (Cooke and Ranere 1992a; Hansell 1988; Piperno and Pearsall 1998; Weiland 1984).

Population in the Río Parita Valley during the La Mula phase was overwhelmingly concentrated in and around the site of La Mula-Sarigua—the largest in the Río Parita Valley at this time. There is, however, no evidence of any functions that would indicate La Mula-Sarigua was a central place (Cooke and Ranere 1992a:281; cf. Hansell 1988:238). No public architecture was present at the site, and burials display little, if any, differences in grave goods. At Cerro Juan Díaz, there is some suggestion of social differentiation, but it appears to reflect occupation rather than rank (i.e., shamans; Cooke, et al. 2003a:117-118; Cooke 1988c:107-108). The overwhelming majority of people during the La Mula phase lived in and around La Mula-Sarigua, and the lack of a well-defined settlement hierarchy implies limited integration between sites. The high population density at the site, thus, is best explained by the abundant subsistence and lithic resources nearby.

During the Tonosí phase, settlement moves inward from the coast to populate the rich soils of the floodplain. This demographic restructuring in the Río Parita Valley results in the creation of seven small hamlets that appear to be independent communities with no supra-hamlet integration (Figure 4.9). These hamlets remain relatively small settlements throughout the Late Occupation Sequence, but their settlement stability and implied status as founder settlements suggests that they might have served as local community centers. This settlement pattern of small independent sites is similar to that found in the Río Tonosí Valley (Ichon 1980: 78-82, 194), but Cerro Juan Díaz, in the Río La Villa Valley, and Sitio Sierra, in the Río Santa María Valley, had concentrated populations during the Tonosí phase (Cooke 1979, 2004; Cooke and Ranere 1992; Cooke, et al. 1998, 2000:164, 2003a; Isaza 1993; Sánchez 1995). Although it is possible that with paleoenvironmental changes at La Mula-Sarigua, population gravitated outside the survey zone towards Cerro Juan Díaz (11 km away), there is no meaningful change in overall population levels in the Río Parita Valley (Table 2.1, Figure 2.20). Burials recovered from the Central Region still reflect an egalitarian pattern based on achievement and occupation, rather than rank (Briggs 1989:34, 62-63; Cooke, et al. 2000:164, 2003a:117-118; Isaza 1993:82-84). Nevertheless, Tonosí phase mortuary artifact types (i.e., bar pendants of polished agate and onyx, mica, animal bone beads, and tumbaga or gold) become, several centuries later, indicators of social ranking and suggest that disparities in status and wealth were increasing already in the Tonosí phase.

With the demographic explosion during the Cubitá phase, population in the entire Río Parita Valley becomes integrated into a single social unit, as a well-defined size hierarchy emerges headed by He-4, previously a Tonosí phase hamlet (Figures 4.13, 4.14). The settlement pattern of one large site (He-4) dominating the valley continues throughout the rest of the Late Occupation Sequence. A similar population increase occurred in the adjacent Río La Villa (Isaza 2004), but the distribution of several large villages at even intervals of 2 km suggests that no site-size hierarchy emerged there during the Cubitá phase or Late Ceramic II Period. Overall in the Central Region, there is an increase in the use of formal cemeteries and costume grave goods (that were meant to be worn) at Río Tonosí sites and at Cerro Juan Díaz, suggesting that social hierarchies began to develop as social divisions become more rigid. Briggs (1989:63), Cooke, et al. (2000, 2003a), and Díaz (1999) propose, however, that the distribution of mortuary arts argues against there being a social hierarchy based on rank at this time.

Although Conte phase population declines 25% from that of the Cubitá phase, settlement densities and locations remain more or less the same (Figure 4.16). The most noticeable settlement shift is the further clustering of floodplain sites towards He-4, but as the rank-size plots for both phases are the same it does not indicate a change in settlement hierarchy (Figures 4.4, 4.13, and 4.17). At this time, several of the graves found at Sitio Conte belonged to high status males. Another alternative is that elite members of many territories along the Pacific watershed of the Central Region were buried at Sitio Conte, outside the

survey zone, which is surmised to have been a special site imbued with a historical and social significance (Cooke, et al. 2000, 2003a).

The Macaracas phase shows in a well-integrated rank-size plot (Figure 4.20) that it is the closest to log-normal of any phase and represents a significant change from the Conte phase ($A = .088$; Drennan and Peterson 2004). This settlement pattern is a reflection of reduced population at He-4 with a corresponding increase at second and third-order sites; the latter reaching their maximum mean size (Table 4.3). Additionally, La Mula-Sarigua and the area to the southwest of He-4 gain population. It is during the Macaracas phase that high-status graves first appear in the Río Parita Valley at the burial mounds of He-4.

During the Parita phase, population levels return to the high levels seen in the Cubitá phase. Settlement density is the highest in and around He-4 with a continued well-integrated site-size hierarchy (Figure 4.27). Overall, the Parita settlement pattern is statistically similar to the preceding Macaracas phase (Figure 4.4). With the El Hatillo phase, there is a noticeable reduction in regional population (Table 2.1, Figure 2.20). He-4 is still the largest site in the valley, but Sites 355 and 363, combined, almost equal its population. There is, however, no statistically significant change in the rank-size plot (Figure 4.4), and the burial mounds at He-4 are still used for mortuary activity. The reduction in identifiable sherds to the El Hatillo phase may have been the result of differential production or the introduction of European diseases.

This investigation has determined that there are two critical points of social change during the Late Occupation Sequence in the Río Parita Valley. At the beginning of the Cubitá phase, a sharp population increase with He-4 as a central place dominating the valley at the head of a site-size hierarchy, suggest that chiefdom may have emerged. Mortuary evidence, however, cannot substantiate the emergence of social ranking at this time, although it is possible that by the Conte phase, high-status individuals from the Río Parita Valley were buried outside the valley at Sitio Conte. Therefore, chiefdoms could have emerged in the Río Parita Valley by the Cubitá, or Conte phase. The second major settlement pattern change takes place during the Macaracas phase with the rise of secondary centers and the corresponding presence of a much more log-normal rank-size plot. I propose, at this time, He-4 is definitely a high-status necropolis, which demonstrates the presence of social ranking in the valley. Chiefdoms were unquestionably present by the Macaracas and continued up until the death of Chief Parita in A.D. 1519 (Espinosa 1994b:63-64).

Demography and Warfare

Carrying capacity analyses demonstrated that population pressure did not play a role in the emergence of chiefdoms in the Río Parita Valley. Although population surged during the Cubitá phase, when social ranking possibly emerged based on the presence of a settlement hierarchy, population pressure did not exist, as population levels were well below carrying capacity. When unequivocal evidence for the

emergence of social ranking occurs with the presence of high-status burials at He-4, population levels are still well below carrying capacity. Even when the highest population and the lowest carrying capacity estimates are used, demographic levels do not even come close to suggesting that population pressure existed or had any affect on the emergence of chiefdoms.

The similarities between mortuary finds at Sitio Conte and ethnohistoric descriptions from sixteenth-century Panama have led scholars to push back the presence of social ranking and warfare to 700 A.D. (Briggs 1989; Cooke 1984a; Cooke, et al. 2000; Drennan 1991; Linares 1977; Lothrop 1937). Such warfare, however, cannot have resulted from population pressure (Carneiro 1970, 1981, 1990, 1998; Redmond 1994a, 1994b; Steward and Faron 1959), as there is no possibility of population pressure in the Río Parita Valley. This is not to say that warfare was not endemic to central Panamanian chiefdoms, but whatever role it played in the emergence of chiefdoms, it was not the result of demographic stress. Although there was no evidence to support the existence of warfare in the Río Parita Valley, the survey results did not uncover any evidence to unconditionally deny its presence. It is possible that the cycling between cooperation and sporadic raiding described by some (Cooke 2004; Cooke and Ranere 1992a:275; Redmond 1994b:120) would not leave archaeological evidence that a regional surface survey would find.

Exchange and Craft Production

The majority of craft goods recovered from the Río Parita survey were made locally from raw materials found in this valley (e.g., shell, slab metates, chipped stone). Some items (i.e. polished stone axes and legged metates) were initially, or completely, worked outside of the Río Parita Valley, but within the culturally homogenous Central Region. Although the raw material for manatee bone artifacts, recovered from previous investigations at He-4, would have had to come from the Atlantic coast, this is not a long distance (100 km) from the Río Parita Valley. The absence of long-distance imports suggests that long-distance trading was not an important factor in the development of chiefly societies. On the other hand, local, regional, and macro-regional exchange provided the inhabitants of the Río Parita with all of their material needs.

In the Central Region, overall, the increase in the standardization of Cubitá phase craft goods (i.e., ceramics and shell jewelry) suggests that a corresponding increase in trade or interaction between peoples of the Central Region occurred and, along with it, greater opportunities for acquiring prestige and wealth (Cooke and Sánchez 1997, 2000, 2001). The evidence for craft production and exchange in the Río Parita Valley suggests that the inhabitants of He-4 were involved in the production and use of some items. The population explosion and the emergence of a site-size hierarchy during the Cubitá phase in the Río Parita Valley, thus, were most likely influenced by the increase in macro-regional exchange and interaction in the Central Region.

During the Macaracas phase, there is no indication from this survey, or from previous investigations in the Central Region, that a similar change in craft production occurred. Gold pendants that are stylistically labeled the “Parita Assemblage,” however, were commonly recovered from He-4 graves, including one pendant that was unfinished. With a gold ore resource nearby (45 km), it is possible that production of high-status gold artifacts occurred at He-4 and coincided with the appearance of high-status burials in the Río Parita Valley.

He-4’s central location in the valley would have provided a strategic place to take advantage of the exchange of different resources and goods from the Azuero Peninsula and, generally, the Central Region. This site’s rise to dominate the Río Parita Valley occurs alongside the increase in macro-regional interaction during the Cubitá phase. Its location would have made it a likely candidate for an exchange node for the region, where individuals or groups at He-4 would have found it easier to regulate trade and/or production and thus profit from it.

Control over Subsistence Resources

Population in the Río Parita Valley, overall, clusters in or near the first-order sites of La Mula-Sarigua and He-4. La Mula-Sarigua (during the La Mula phase) was situated near productive agricultural lands, estuaries, and coastline. On the other hand, the chiefly center of He-4 was located 14 km from the coast in some of the lowest fertility soils in the Río Parita Valley, which implies that the site was not in the best location to directly control access to subsistence resources. During the two critical phases for social change in the Río Parita Valley (Cubitá and Macaracas phases), and the later phases in general, increased regional population does not result in higher settlement density in the floodplain or near the coast, but rather further depopulation of these areas. Settlement locations appear to have been influenced more by sociopolitical than subsistence factors. Settlement patterns in relation to subsistence resource locations in the Río Parita Valley and ethnohistoric descriptions of chiefly storerooms full of maize (Anghiera 1912:307 cited by Cooke 1998a:73; Oviedo 1853:XXIX:3-5; Sauer 1966:231, 235), dried and salted fish, and deer (Espinosa 1994a:48; Linares 1977:73) support the conclusion that although direct control of subsistence production was not the base of elite power in the Río Parita Valley, the mobilization of subsistence resources most likely did play an important part.

MODELS OF CHIEFLY DEVELOPMENT IN PANAMA

The Río Parita settlement survey was designed to evaluate three current models for the development of complex societies from the Central Region of Panama. Based on ethnohistoric, ethnographic, and archaeological data, authors have incorporated the factors discussed above into distinct models. Helms' (1979, 1992, 1994) model emphasizes the role that esoteric knowledge, through the acquisition and display of long-distance prestige goods (i.e., metal objects), played in the development of social ranking. Contact-period documents suggest that the main function of warfare was to secure additional lands, slaves, and plunder that were used as military rewards in further securing allegiances. I agree with Helms (1994:56) that control over agricultural and local craft production was not an important part of chiefly authority. Consistent with this model, Natá was described as a market place (Espinosa 1994a:49), and other central places (i.e., He-4) appear best located to control trade; however, it was local, regional, or macro-regional goods, not long-distance items, that were exchanged. Although many aspects of Helms' model are difficult, if not impossible, to test with survey data, the lack of evidence for long-distance exchange from the Río Parita Valley and previous investigations does not, overall, support the Control of Esoteric Knowledge Model. Nevertheless, status rivalry and sociopolitical posturing between elites appears more likely to have contributed to the emergence and development of social ranking in the Central Region.

The Warfare Model posited for Central Panama (Redmond 1994b) and other areas of the Neotropics (Carneiro 1970, 1981, 1990, 1998; Redmond 1994a, 1994b; Steward and Faron 1959) posits that increasing population created an unstable social environment where carrying capacity was reached resulting in increased conflict over limited resources. It was through increased defensive and offensive military actions that temporary war leaders eventually acquired permanent positions of higher status. Even when the highest population and the lowest carrying capacity estimates are used for the Río Parita Valley, at no time is there anything that approaches population pressure. Therefore, the Warfare Model cannot be supported by the Río Parita survey data, at least insofar as warfare caused by population pressure is concerned. Warfare based on status rivalry, on the other hand, is well documented by ethnohistoric accounts, and may well have been involved in social change in the region.

The general idea of the Control of Local Resources Model is that external stresses (population pressure and environmental degradation) created an unstable social and economic atmosphere that led to increased local and regional exchange, which in turn resulted in sociopolitical posturing by certain individuals or corporate groups (Cooke and Ranere 1992a:287). As the volume of trade increased, local and regional exchange networks emerged focusing on specific settlement nodes, such as those described for Natá (Espinosa 1994a:49) and Veragua on the Atlantic coast (Lothrop 1950:4). Periodic ritual and

exchange ceremonies (i.e., *balsería*)—for which very large amounts of food and beverages would have been required—could have been an avenue for political advancement (Cooke and Ranere 1992a:282, 297; Cooke and Sánchez 2004:I:36-37, II:30-31; Hansell 1988:251). Both control and mobilization of subsistence resources are aspects of the Control of Local Resources Model. Although some scholars attributed to this model have advocated that the power of Central Region's elites was based in the control of prime alluvial farmland (Linares 1977:10, 31), for others it was the interplay of manipulating local and regional exchange and subsistence production (Cooke and Ranere 1992; Cooke and Sánchez 2004). Competitive generosity through the mobilization of subsistence resources, rather than restricting resource access, appears to have played an important part in legitimizing chiefly authority. The Control of Local Resources Model, with its emphasis on local production and exchange of craft goods and mobilization of subsistence resources (*balsería*), appears to be the most compatible with the findings from the Río Parita survey data. Population pressure leading to increased strain on resources and the direct control of subsistence production, however, cannot be supported.

ARCHAEOLOGY AND ETHNOHISTORY

Societies from the Central Region of Panama have long been used as models of ranked sociopolitical organization in the anthropological literature (Creamer and Haas 1985; Earle 1987, 1997; Oberg 1955; Steward and Faron 1959:224-231). Scholars' opinions have been based primarily on the descriptions from sixteenth-century Spanish documents (Espinosa 1994b:63-64; Oviedo 1853:III:118) and lavish burials of elites, who from A.D. 700 onwards were obviously able to amass much wealth and power (Briggs 1989; Cooke and Bray 1985; Cooke, et al. 2003a; Hearne and Sharer 1992; Lothrop 1937:46, 1942; Mason 1941, 1942).

In the period before the Second World War, Sitio Conte produced the first field evidence for cemeteries with strong wealth differentials (Briggs 1989; Lothrop 1937, 1942; Mason 1941, 1942). A few individuals, primarily adult males, managed to amass very large quantities of excellently crafted goods and, some were interred with what appeared to be executed retainers. Several of these high-status graves were remarkably similar in detail to the burial of Chief Parita (Espinosa 1994b:63-64), which led scholars to suggest that social ranking emerged, at least, by A.D. 700 (Briggs 1989; Cooke 1984a; Cooke, et al. 2000, 2003b; Drennan 1991; Ichon 1980; Linares 1977). Elsewhere in the Central Region, archaeological sites display little evidence for social ranking, but rather, status based on achievement or occupation. The site of Cerro Juan Díaz, for example, has been intensively investigated for ten years by a

group of archaeologists (L.A. Sánchez, A. Badilla, C. Espejel, O. Solis, B. Desjardins, D. Carvajal, K. Udagawa, and C.P. Díaz) under the general direction of Richard Cooke. These investigations produced information on ritual and mortuary practices with an impressive sample of around 400 skeletons (Díaz 1999; Cooke, et al. 2000, 2003a). None of these burials, however, possessed prestige goods in the quantities described for Sitio Conte (Lothrop 1937, 1942), and the cemetery at Cerro Juan Díaz is considered a resting place for non-elites of all ages and sexes. In the earliest funerary feature, however, which dates to the La Mula phase, the distribution of some grave goods suggests that a few individuals had special occupations (i.e., healers or shamans [2003a:117-118; Cooke 1988c:107-108]).

This is not what one would expect, based on ethnohistoric descriptions. If, at the time of contact, there were many chiefdoms with developed social hierarchies, one would expect to find a corresponding hierarchy in settlement patterns and mortuary ritual (Marcus and Flannery 1996; Steponaitis 1978, 1981). Since the site of Sitio Conte is more complex than anything else discovered archaeologically, scholars (Cooke, et al. 2000:172, 2003a:127-128, 134, 136-137; Linares 1977:76-77), have suggested the possibility that Sitio Conte represented the apex of a larger social unit, or else a necropolis, that included all of the Central Region—not just a single valley as described in the ethnohistorical documents.

Although the large site of He-4 lacks some of the features found at Sitio Conte, it appears to be another “special” site (Figures 1.1, 2.1). The core area of He-4 is around 20 ha with dense pockets of adjacent settlement and at the site’s center is a group of low burial mounds possibly arranged around a central plaza (Bull 1965; Ladd 1964). Professional and amateur archaeologists have excavated the site and recovered mortuary data that supports the existence of social ranking (Bull 1965, 1968; Dade 1972; Ladd 1964; Mitchell and Acker 1961). Philip Dade, for example, recovered 30 gold objects from a 6 m deep grave that contained 23 individuals (Biese 1967; Dade 1972). Other amateurs who investigated the site (Bull 1965, 1968; Mitchell and Acker 1961) reported similar finds of gold, fine pottery, and carved manatee-bone batons—the latter being one of the salient artifacts for identifying the highest social class at Sitio Conte (Briggs 1989:137).

In summary, this regional settlement survey was designed to investigate the emergence of chiefly societies in the Río Parita Valley and evaluate current models used for interpreting the development of social complexity in the Central Region of Panama. Surface survey recovered chronological information that confirms that indigenous occupation in the Río Parita Valley extended from the Paleoindian Period to European contact. By 200 B.C., La Mula-Sarigua becomes a large settlement located near a productive estuary and coastline and fertile farmland. No evidence of any functions, however, exists that would indicate La Mula-Sarigua was a central place, as there is no public architecture and burials display little, if any, differences in grave goods (Cooke and Ranere 1992a:281; cf. Hansell 1988:238). It is not until the Cubitá phase that social ranking possibly emerged in the Río Parita Valley. This conclusion is based on

the presence of a dramatic population surge and a three-tiered site-size hierarchy. Evidence for high-status burials, however, is not present until the Macaracas phase when a group of burial mounds at He-4 is in regular use.

The high-status graves of Sitio Conte date to A.D. 750-950 (Cooke, et al. 2000:172), whereas available information from He-4 suggests that the mounds date to A.D. 900-1500 and overlap little with the Sitio Conte burials. Cooke, et al. (2000:172, 2003a:127-128, 134, 136-137) have suggested that He-4 possibly replaced Sitio Conte as the main macro-regional necropolis in central Panama. At the same time in the Río Parita Valley, there is a significant change in the rank-size plot that suggests settlements in the valley were more integrated than before.

Based on archaeological evidence, mortuary ritual, centered at one of the necropolises, appears to have been important in integrating communities within the entire Central Region of Panama. On the other hand, the lack of high-status burials in other river valleys in Panama might suggest that the Sitio Conte and the Parita chiefdoms, at different times, held some degree of paramountcy over the Central Region as a whole. This would contradict the ethnohistoric descriptions of independent local chiefdoms found throughout Panama. Andagoya (1865:30) and Espinosa (1873:25, 32-33, 60) note, however, that Chief Parita, at the time of contact, headed a loose confederation of regional polities that could be considered a paramount chiefdom. Nevertheless, Cooke and Ranere (1992:297) claim that macro-regional polities were difficult to maintain and would not have lasted more than a generation. Archaeological and ethnohistorical information, therefore, appears to offer conflicting ideas of how indigenous societies were integrated at the macro-regional scale.

FUTURE INVESTIGATIONS

The results of the Río Parita survey have initially addressed many of the research questions proposed for the project, but there are several areas that need clarification. If we do, in fact, have something similar in the Río Parita Valley to what is described for Sitio Conte/El Caño, and quite different from other river valleys, this would have a significant impact on how chiefdoms in the Central Region of Panama are thought to have been sociopolitically organized. If elites were interred at cemeteries of other chiefdoms, without the other trappings of political control, it would be an anomaly in the chiefdom literature. In addressing this issue, intense surface collecting and excavations are need at the first-order site of He-4. If it can be shown that elites had emerged at the site before the high-status burials appear in the Macaracas phase, this would support the notion of a macro-regional necropolis at Sitio Conte for the Conte and early

Macaracas phases. Evidence could come in the form of elite dwellings, greater access to prestige goods, control of craft production, and feasting and storage of subsistence resources. Evidence such as this found at other sites would also support the macro-regional hypothesis. On the other hand, if it can be shown that the burial mounds at He-4 were used for high-status interments during the time Sitio Conte was in use, then the macro-regional necropolis would be questioned.

Although survey information exists for the Natá/El Caño/Sitio Conte region (Cooke 1972; Breece 1997; Cooke, et al. 2003b), a systematic regional survey of this territory is necessary to evaluate the macro-regional necropolis hypothesis. In examining how changes in mortuary practices were manifested in settlement patterns on the regional level. The two critical times for social change in this area would be during the Conte phase when high-status burials first appear at Sitio Conte, and the latter part of the Macaracas phase when the necropolis ceases to be used for elites (Cooke, et al. 2000:172). A better understanding of the residential occupation at Sitio Conte is also needed to demonstrate that what we are talking about are not vacant necropolises, but macro-regional cemeteries within the boundaries of existing chiefdoms. Sitio Conte did have residential occupation, but it was less intense during the times when interring high-status burials was common (Linares 1977:34, 58). Ladd (1957), from an excavated trench, recovered Parita and El Hatillo phase material, but it is not known how intense occupation was at this time at Sitio Conte. Systematic excavations at Sitio Conte would also be useful to verify that the necropolis, indeed, was not used for high-status burials after A.D. 950. This regional and mortuary information would be crucial in understanding if, and how, the Central Region was integrated through mortuary ritual, and if, and why, the macro-regional necropolis was relocated to He-4.

The results of the Río Parita survey could not support that warfare as a result of population pressure existed. Warfare based on status rivalry, as described in the ethnohistoric accounts, appears to have been endemic to the Central Region. Information from the Río Parita survey, however, did not suggest that warfare, in any form, existed. Therefore, it is not known how important status rivalry was in the emergence of chiefdoms in the Río Parita. The presence of weapons in the high-status graves at Sitio Conte (Linares 1977; Lothrop 1937), defendable settlement locations on hill tops (Ichon 1980), and ethnohistoric accounts of hostilities directed at the Spanish and between indigenous groups have been used to support the importance of warfare in the Central Region. In addition to the lack of defendable settlement locations and defensive architecture in the Río Parita Valley, other lines of evidence question the intensity of pre-Colombian conflict. The impressive sample of 400 individuals recovered from Cerro Juan Díaz showed little, if any, trauma indicative of combat. Outside of the Tonosí Valley, there has been no secure archaeological evidence for defensive structures (walls, moats, palisades). The nature of status rivalry most likely has not left a detailed archaeological record. Besides increasing the corpus of interments, archaeological evidence for status rivalry could come from trenches that extend toward

settlement boundaries where defensive structures have the greatest possible of being found. Regional settlement data covering larger areas might reveal patterns that suggest buffer zones indicative of past hostilities. Chief Parita's southern expansion resulted in the creation of a loose paramountcy. Regional settlement data for the Río La Villa and other adjacent areas could be useful in examining warfare in regard to settlement locations. In other words, is there a noticeable reconfiguration of settlements in these other valleys that might suggest their subjugation by Chief Parita. The upcoming results from the Río La Villa survey (Isaza 2004) should shed much light on the sociopolitical dynamics between this valley and the adjacent Río Parita.

Although direct control of subsistence resources does not appear to have contributed to the rise of chiefdoms, accumulating and mobilization maize, yucca, deer, fish and other foods appears to have been an important avenue for political advancement. It was not possible from the Río Parita survey data, however, to assess the role that mobilizing subsistence resources played in the emergence and development of social ranking. Faunal data from several sites suggests that feasting of white-tailed deer was common and further investigations of middens at He-4 and other sites should produce important results. Evidence for the storage of subsistence goods would come from the identification of storerooms.

APPENDIX A

Lot and Site Forms

PROYECTO ARQUEOLÓGICO RIO PARITA 2002

(Lot Form)

LOTE _____

SITIO _____

Tipo de Vegetación: Bosque Matorral Pasto Inundación

Manglar Cultivo: _____ Otro _____

Visibilidad de Superficie: Buena Media Mala

Número de Bolsas _____

Material: Tiestos Lascas Piedra pulida Concha

Otro _____

Descripción de Material (diagnóstica): _____

Modo de Recolección: General Sistemático No. _____

Otro (huaqueo, corte del río o carretera, regalo) _____

NOMBRE _____

FECHA _____

HORA _____

PROYECTO ARQUEOLÓGICO RÍO PARITA 2002

(Site Form)

SITIO _____

Lotes Asociados _____

Ubicación del Sitio _____

Rasgos: Montículos Arquitectura (piedra) Tumba

Cantera Fortificaciones Otra _____

Descripción de Rasgos _____

Perturbación _____

Descripción del Sitio _____

UTM del Sitio _____, _____

Número de Mapa _____

NOMBRE _____

FECHA _____

HORA _____

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