

**CORE AND PERIPHERAL SETTLEMENTS IN ANCIENT CENTRAL PANAMÁ:
A RECONSTRUCTION OF POPULATION CHANGE AT SITE 054 IN THE
RÍO PARITA VALLEY**

by

MacKenzie Kirk Jessome

B.A., Saint Francis Xavier University, 2004-
B.A., Saint Francis Xavier University, 2008-

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF ARTS

in

THE FACULTY OF GRADUATE STUDIES

(Anthropology)

THE UNIVERSITY OF BRITISH COLUMBIA

(Vancouver)

April 2012

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Abstract

The suggestion that demographically nucleated cultural centers of Preconquest central Panamanian Coclé chiefdoms firmly controlled and/or influenced peripherally located occupations is empirically evaluated using newly collected, intensive survey sampling in the Río Parita valley and shovel testing of one small site in particular: Site 054. This research shows that Site 054, a relatively small-scale hamlet for its entire 1300 year-long occupation (A.D. 250 to 1522) was peripherally located relative to the major centres at the time. In spite of rapid, precocious advances in socio-political complexity at adjacent sites within the valley, Site 054 appears to have remained unaffected by trends of population nucleation associated with the emergence of complex socio-political organization. It was not until 200 years after chiefly authority had been established in the valley that Site 054 was impacted by trends of population nucleation. The findings of this research contribute to a collectively established and expanding archaeological database designed to test specific environmental and cultural factors involved in the emergence of Coclé chiefdoms in the Central Region of Panamá.

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Acknowledgements

Fieldwork since 2008 has been funded by the Canadian Social Science and Humanities Research Council (SSHRC award #752-2005-0531) under the authority and direction of Dr. Mikael Haller's *Proyecto Arqueologico Río Parita* (PARP). Funding for the writing of this Thesis has been provided by The University of British Columbia (Graduate Entrance Scholarship) as well as SSRHC's Joseph-Armand Bombardier Canada Graduate Scholarship (SSHRC award # 354-2008-0187). A special thanks to Dr. Michael Blake who greatly contributed to the thesis project, as well as my academic development in general. I am also greatly indebted to Dr. Mikael Haller for facilitating my research, as well as Dr. Brian Chisholm, Dr. Richard Cooke, Dr. Zhichun Zing, and Dr. Adam C. J. Menzies, for their advice and support during the duration of this project. I would also like to thank Peter Merchant (UBC) for reviewing drafts and providing comments. For their assistance during the data collection while conducting fieldwork in Panamá, I would like to thank the federal government of Panamá's Institute of Art and Culture (INAC), the communities of, Llano de la Cruz, Monogrillo, Chitré, and Parita, as well as graduate students Adam Berry and Javier Giraldo, of University of Pittsburgh, and Matt Monroe of Sheffield University. Last and most importantly, I would also like to send many thanks to my family Nora, Larry, Laurie, Connor, Dary, and Tova Jessome, for their continued support and inspiration.

This Master's Thesis is dedicated to my exceedingly intelligent and successful sister, Laurie Bridget Jessome, thank you for all your support over the years.

Chapter 1: Investigating Peripheral Occupation in Ancient Central Panamá

“The tradition in regional studies of utilizing the results of several scholarly disciplines to trace patterns of human occupation with a long time perspective is one from which this work has drawn heavily and to which it aspires.” –Robert McC. Adams (1965:ix)

The cultural processes that ultimately transform small-scale societies from relatively independent, egalitarian socio-political organizations to non-egalitarian, complex socio-political organizations have been vigorously debated since H. L. Morgan’s cultural “stages of progress” were refined by E. Service and M. Fried in the 1960s and 1970s (particularly Fried 1967). Archaeological literature attempting to address the development of intermediate level societies (also known as “chiefdoms”¹) in Central America (Haller 2004, 2008; Helms 1979; Menzies 2009; Linares 1977; Redmond 1994a, 1994b), Mesoamerica (Clark and Blake 1994; Drennan 1991, 1995, 1996b), and across the globe (Brumfiel and Earle 1987; Drennan 1995; Drennan and Peterson 2004; Earle 1977, 1987, 1997; Sahlins 1958, 1963; Service 1964, 1972; Wason 1994), reveal that there is still a large degree of uncertainty as to the specific (if any) cultural processes that foster socio-political complexity. This is partly due to the unfortunate reality that archaeological investigations concerning smaller, peripheral segments of society have been historically overlooked, dismissed as analytically unimportant, or missed entirely due to the ephemeral nature of their archaeological deposits (Drennan 1987; Underhill 2002).

¹ Although the word ‘chiefdom’ was most popularly deployed by Polynesian specialists Elman Service (1962; 1975) and Marshall Sahlins (1958; 1963; 1972), it was borrowed from their academic supervisor, Julian Steward (Steward and Faron 1959) while studying native political organization in Central and South America, including Panamá. Steward, in fact, borrowed the term from Kalervo Oberg (1955) to refer to moderately hierarchical social structures. Thus, the term ‘chiefdom’ used in this work refers to “a specific characterization of the societies of the Amazon and adjacent areas” (Heckenberger 2005: 349, notes) and should be considered on its own terms, not merely the ‘stage’ between lesser and greater societies.

Any program of study designed to investigate the development of “complex” chiefdoms (Wright 1984:45) must entail an examination of an entire range of site sizes, not just the largest ones (Adams 1965; Willey 1953). Decades of research, (mostly in the Near East and Mesoamerica), have illustrated that full coverage using systematic regional survey is critical to understanding the kinds of social and economic interactions that occurred between settlements. Research investigating the development of social complexity based primarily (or solely) on data from larger sites, or of just a single site, “cannot adequately inform us about the development and nature of early complex societies” (Underhill et al. 2002:745). This is because the development of socio-political complexity is not a single or simple process, as shown by considerable variation documented across the archaeological record of indigenous North, Central and South America. In order to begin to understand the transition from relatively small hamlets with independent or “egalitarian” style of socio-political organization to large and densely nucleated “complex” chieftainship, with ascribed social status, we must first examine how commoners on the periphery were related (or not) to the cultural cores; as this will provide “. . . the means to understand change in the degree and nature of socio-political integration in a given region such as growth and decline” (Underhill et al. 2002:747).

New empirical evidence of population growth and decline provided by systematically collected intensive site survey data is utilized and compared to regional archaeological survey data (Haller 2008) to test the hypothesis that peripherally located “commoner” hamlets of the Preconquest Coclé² chiefdoms were firmly controlled by the densely nucleated

²‘Coclé’ is an umbrella term used by anthropologists and historians to describe the culture reflected in the archaeological record of central Panamá.

cultural core (referred to herein as the He-4 Site³). The primary objective of this program of study is to provide a better understanding of what was occurring at peripherally located sites in central Panamá⁴ before, during, and after the rise of complex chiefly political organization.⁵ A refined, empirically based understanding of how the periphery was related (or not) to the cultural core during important population shifts in the valley allows us to ask certain research questions of the archaeological record in central Panamá, such as: (1) When did the emerging chieftainship in the Preconquest central Panamá begin to persuade and/or exert pressure on the small, previously independent, peripherally located groups to relocate into a centralized local; (2) And what implications (if any) do these findings have on theoretical models designed to understand specific factors important to the emergence of complex forms of socio-political organization?

Regional survey has proven extremely valuable to archaeological studies concerning the emergence of social complexity, including previous research conducted in the study region (Haller 2008:41; Izasa 2004). Many archaeological studies concerning the formation of complex social organization have reported a trend of demographic nucleation into a single “primate” site (or, multiple neighbouring and competing “centers”) associated with the emergence of political centers such as chiefdoms. Much less is known, however, about the role of the periphery during the emergence of complex forms of social organization. This gap in our knowledge is partially due to the fact that, traditionally, archaeological reconstructions have largely focused on analyses of broad, regional demographic trend and the heavily

³ Also known as *Finca Calderon* and/or El Hatillo site.

⁴ The region that comprises the central provinces of Panama is also commonly referred to as Central Region of Panamá (Lothrop 1950:6).

⁵ This research is affiliated with *Proyecto Arqueológico Río Parita* (PARP, hereafter), under the direction of Dr. Mikael Haller of St. Francis Xavier University in Antigonish, Nova Scotia (SSHRC award #752-2005-0531), which has been attempting to understand how the emergence of social rank was influenced by specific socioeconomic, political, ideological, and environmental factors in the Central Region of Panamá, beginning more than 2000 years ago (Haller 2004; 2008).

nucleated cultural core(s). Although my research is nested within the previous research in the central region of Panamá (based primarily on regional survey data), regional survey data alone cannot adequately address the research questions proposed above. To understand what was occurring at peripheral sites and how they were (or were not) related to broader, regional demographic trends, a finer-grained perspective is also required. It is only through a combination of intensive surface survey and systematic test excavations (in this case, shovel testing) that we can attain this detailed and fine-grained perspective in order to reconstruct relative a population density of a small, peripherally located⁶ and continuously occupied site. A reconstruction of relative population density using intensive site surface survey and testing of a continuously occupied peripheral site allows us to test hypotheses about the political extent of chiefly authority during various periods of cultural development in central Panamá.

Site 054 is habitation site, identified during Haller's (2004) regional survey (see Figures 2 and 3. The site is located approximately 12.5 km due west of He-4 Site, on what would have been the periphery of this once densely populated, heavily nucleated, socially complex village (Ladd 1964; Menzies 2009). When the intensive site survey data from Site 054 is compared to regional demographic reconstructions of the valley, we are provided information on how the periphery was related or not to the cultural core. For example, if our findings indicate that population density at Site 054 drops significantly during the emergence of chiefly political organization, then it would likely suggest that the socio-political authority of the developing chieftainship may have absorbed the population of the smaller site. On the

⁶ Site 054 was originally identified and named during systematic regional survey (Haller 2004). Site 054 and the other sites discovered in the Upper Survey Zone (USZ)(Figure 3) are smaller (in terms of extent of material remains and temporal length of occupation) and considered peripheral sites relative to the archaeological occupational deposits in the Lower Survey Zone (LSZ) (i.e. He-4, He-2) (Menzies 2009). The He-4 Site in the LSZ is considered a cultural core based on the density and nature of the archaeological deposits (i.e. presence of public architecture, craft specialization, and exotic materials such as gold, imported faunal and ceramics).

other hand, we may find that the peripheral site's population density increased or remained the same during the rise of its neighbouring centre, indicating that these sites remained relatively unaffected by trends of population nucleation associated with the rise of chiefdoms. In short, through a population reconstruction of a peripheral site we are provided a fine-grained, empirically-based perspective that enables us to determine whether emerging political elites were able to draw previously independent populations into a centralized locale.

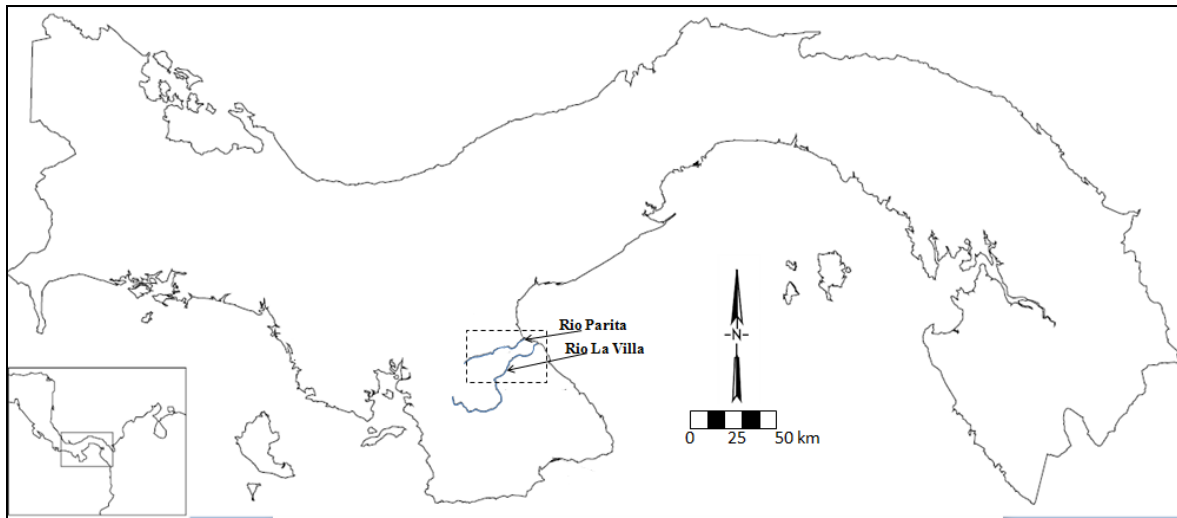


Figure 1. Map of Panamá identifying the Río Parita and Río La Villa (the study area). See Figure 3 for locations of major archaeological sites within the study area.

Chapter 2: Research Context

2.1 Physical Setting

Popular perceptions of Panamá conjure images of an immense, green rainforest canopy stretching across a mountainous volcanic landscape, saturated daily with intense rain and heat. While accurate for the western provinces of Chiriquí, Bocas del Toro, and Veraguas, the popular image does not describe the Central Region of Panamá (Lothrop 1950:6), which is a regionally unique environmental zone. In the central provinces of Herrera and Los Santos, where members of the *Proyecto Arqueológico Río Parita* (PARP) have conducted research since 2002, the nature of the landscape depends on the cycle of rainy and dry seasons (Figure 2). The region around Parita Bay is characterized by an extensive network of meandering rivers; the largest of which is the Río Parita. The nature of the vegetation is partially dependant on the local climate; during the rainy season the Río Parita changes character and magnitude. In some zones, the river can expand from its normal 10 m width to hundreds of meters (2008, personal observation).

Modern and Preconquest farmers have taken full advantage of the seasonal, predictable flooding caused by the network of rivers that traverse this relatively flat landscape (primarily the Parita and La Villa rivers) (Figure 1). The rivers also provided Preconquest communities readily available transportation routes as well as abundant subsistence resources. The Río Parita valley was home to hundreds of species of fresh water fish and shellfish,⁷ and the surrounding jungle offered a myriad of terrestrial species (Sauer 1966). Large mammals such as deer, jaguar, sloth, as well as smaller mammals such as peccary, coati, armadillo, racoon, and rodents are all common in archaeological midden

⁷ The word ‘Panamá’ means “place of many fish” and is believed to have originated from a now extinct dialect of an indigenous Panamanian language (Bright 2004:189).

deposits. A variety of reptiles including snakes, turtles, alligators, caimans, as well as many species of local and seasonal birds: (e.g., White-faced Whistling-Duck, the Tufted Jay, the Great-tailed Grackle) were also all available and exploited by Preconquest populations. Even macaws and other brightly feathered birds were hunted and traded with communities at great distances from central Panamá (Cooke et al. 2003). Archaeo-botanical studies also indicate that the communities of the Coclé culture harvested a variety of plant resources (including, but not limited to: arrowroot, bottle gourd, maize, manioc, gourd/squash, and sweet potato). Many of these plants were cultivated as early as the Late Preceramic phase (Piperno 1994; Piperno et al. 2000), while harvesting wine palm and American oil palm nuts were also important subsistence and economic activities (Cooke et al. 2003).

There is little annual variation of temperature in Panamá's central provinces, therefore local residents delineate the two major seasons in a simple but intuitive manner; one is known as "the rainy season" from May to early December, and other is "the dry season" usually beginning around late December lasting until the end of April. Transition from the dry to the rainy season is dramatic, the landscape rapidly transforms from a dry, brown, harsh environment (with excellent surface visibility), to a lush one full of flourishing vegetation, ample water, (and poor surface visibility) (Figure 2). During the past five-hundred years many of the landscapes immediately surrounding the Río Parita were dramatically altered by intensive agriculture, aquaculture (i.e., shrimp farms), and livestock activity, transforming what was once a tropical dry forest (Sauer 1944, 1966:283-5) into an environment of scattered artificial savannas and pastures with only small patches of forest.



Figure 2. Left: Site 054 during the dry season in early June 2008, Right: Site 054 during the wet season in August 2009.⁸

2.2 History of Research

Panamá offers an analytically important region to investigate the nature of peripheral sites during the emergence of chiefly political systems. Some of the primary works dedicated to defining the concept of “chiefdoms” were conducted in Panamá (i.e. Steward and Faron 1959:224-231) which have significantly influenced archaeological discussions regarding the material correlates of Preconquest chiefdoms in the Americas (i.e. Clark and Blake 1994; Creamer and Haas 1985; Drennan 1991; Earle 1987; 1997). This investigation is, however, an extremely difficult task because, although our knowledge of Preconquest central Panamanian indigenous societies is rapidly improving it is also limited, due to the “eradication, acculturation, and migration” of indigenous peoples during the Spanish conquest and colonization up to the 17th century (Haller 2008:1). There is also some disagreement concerning exactly how, where, and when socio-political complexity manifested in central Panamá; however, all specialists do agree that a small sector of society

⁸ All photographs presented in this text, unless otherwise mentioned, were taken by the author.

was able to amass economic wealth and socio-political power. The archaeological record reflects a society clearly divided by social ranks (chief, sub-chiefs, commoners, and slaves). Despite the challenges and limitations of the data, most scholars agree that socially complex societies in the Río Parita valley emerged during the Cubita Cultural Phase (250 A.D. -550 A.D.) of the Late Ceramic Period⁹ (200 B.C. -A.D. 1520) (Cooke 1984, 2003, 2004; Cooke et al 2003; Haller 2004; Haller 2008; and Haller and Menzies 2008).

The two primary sources of reliable data concerning Preconquest indigenous communities in the Central Region of Panamá, prior to recent archaeological work, are: (1) descriptions offered by ethnohistoric documents produced by the early Spanish colonists of the sixteenth and early seventeenth centuries (Adrian de Santo Tomás 1682; Castellero 1967, 1995; Espinosa 1864, 1873, 1994; Oviedo 1853, 1944, 1995; Torres de Araúz n.d.), and (2) early archaeological studies that primarily focused on high status burials of chiefs and/or elite warriors (Biese 1960, 1967; Briggs 1989, 1993; Bull 1961, 1965, 1968; Cooke and Ranere 1992a, 1992b; Díaz 1999; Fitzgerald 1996; Hearne and Sharer 1992; Holmes 1888, 1950; Ladd 1957, 1964; Lothrop 1937, 1942; Mason 1941, 1942; Verrill 1927; Willey and McGimsey 1954; Willey and Stoddard 1954). A synthesis of these sources has provided a firm understanding of elite chiefly society; however for reasons mentioned above, only sporadic references have been made concerning the peripheral communities, often referred to as “commoners.”

2.2.1 Ethnohistory. Early sixteenth-century documents identify five distinct polities (or “chiefdoms”) in the central provinces and discuss, in some detail, the composition of each. “Regional chiefs” (*caciques, principales, señores*) in central Panamá controlled

⁹ Also referred to as Village Agriculture and Social Differentiation Period (200 B.C.–A.D. 1520) (Cooke et al. 2008:101).

“territories” (*provincias*) centered along major rivers, which may have extended from the coast to the uplands (Espinosa 1994:65-67). The Spanish documents also report that each chiefly office directly controlled both a “main town” (*bohío*) where the “regional chief” (*quevi*) resided, as well as all small vassal communities within his territory which generally reached halfway between the neighbouring chiefdom, typically “separated 6 to 8 leagues [28-38 kilometers] apart” (Helms 1979:53). Small communities that paid tribute to the centralized nodes are the focal point of this investigation but were not discussed in detail by the Spanish.

Site 054 is located 27.8 kilometers from the mouth of the Río Parita and its distance from the ocean may explain why early descriptions offer little more than sporadic references to non-coastal communities; for example, Gaspar de Espinosa (1994:49) notes the occurrence of trade between “hinterland peoples” who produced maize and other agricultural goods to exchange with coastal villages for fish and crabs. Gonzalo Fernandez de Oviedo documented the types of goods and foods traded at the town of Natá.¹⁰ Oviedo (1944:VIII:23 in Linares 1977:73) stated that “salt, maize, salted fish, spun and unspun cotton, blankets, hammocks” and gold were produced for market, but he does not provide specific details concerning how hinterland communities were involved in this economy.

Ethnohistoric data from Spanish missionaries and conquistadors have proven to be a valuable resource for archaeologists studying ancient and historic Panamá cultures. The accounts are useful to illustrate the abundance, breadth, and importance of Preconquest trade networks and suggest a single chief wielded unquestionable authority and likely controlled several “micro-environments yielding products” (Linares 1977:73). Generally speaking however, the historic sources focused on describing fierce warriors and the ruling elite

¹⁰ Natá is both an archaeological site and contemporary community located in the Central Region of Panamá

classes of indigenous societies and were much less concerned with describing commoner populations. The tendency of the ethnohistoric literature to focus on elite life has helped to produce an unbalanced and largely synchronic understanding of Preconquest Panamanian Coclé culture. As the discipline of archaeology developed and archaeological projects throughout Panamá became more abundant, our perspectives have been shifted to include all of the segments of Panamanian society.

2.2.2 Archaeology. Archaeological research in the Central Region of Panamá has an interesting, if rather dubious, history. Much of the early archaeological ‘research’ in the central provinces was less concerned with scientific methods than with the collection of precious gold, ceramic, and stone artifacts as well as human skeletal remains to be put on display in the museums of Central America, Europe, and North America (Biese 1967; Bull 1965, 1967; Dade 1959, 1972; Haller 2011:212-213). Further, the cultures of Panamá were thought to be fertile ground for the study of primordial templates of social organization (Steward and Faron 1959) and became “ideal” places to trace the ebb and flow of the two great ancient culture centers; the Aztec and Maya realms of Mexico and the Inca Empire in South America. Subscribing to diffusionist theories, the consensus during this early period of archaeology in Panamá (and beyond) was that ideas, art, religion, technology, ideology, in short “culture,” diffused to, but could not have originated among, intermediate-level societies such as the Coclé.

Aside from theoretical and methodological concerns, early archaeological practice in the central provinces of Panamá suffered from other issues. The seminal excavations of mortuary features in central Panamá by Samuel Lothrop (1937, 1942, 1950) for example,

were all conducted while he covertly worked under the authority of the U.S. government's Special Intelligence Service (SIS).¹¹ Despite potentially dubious associations, Lothrop's work became the established benchmark for identifying the presence of stratified society in the archaeological record and as a result, human burial sites became a focal point of central Panamanian archaeology. Many of the mortuary complexes excavated included human sacrifices and represented hundreds, if not thousands, of hours of labour invested in the production of precious artifacts, such as gold helmets, armour, and jewelry, worked copper, effigy ceramics, and a host of specialized weapons. Gordon Willey and Mathew Stirling followed up on their colleagues' work by undertaking massive trench-style excavations in the Río Parita valley in the late 1940s and early 1950s (including the He-4 Site). This work facilitated the creation of the first chronological model based on ceramic artifact style, form, paint, and temper for the region (Ladd 1964).

As a result of these limitations, archaeological projects undertaken in central Panamá vary in quality from excellent to problematic to useless. Discussing early burial reports produced by Mitchell and Acker (1961) from the banks of the Río Parita, Briggs (1989:3) noted that, "their field techniques, strategy, and results were not compatible" and excluded them from his statistical analysis. His comment suggests that many of the early professional and amateur archaeological works were riddled with methodological problems and sometimes lacked clearly defined (or anthropologically significant) research goals and methods. None of these early works were concerned with the archaeology of small hamlet sites, such as Site 054.

¹¹ Samuel K. Lothrop had already conducted intelligence gathering for the United States under the façade of archaeological research before entering Panamá. He was selected for a mission during WWII, run by the Special Intelligence Service (SIS), an FBI-supervised foreign intelligence division operating in Central and South America. In fact Lothrop's colleague at Harvard, Gordon Willey, once recalled "it was sort of widely known on the loose grapevine that Sam was carrying on some kind of espionage work..." (Willey in Price 2003:19).

In response to a plea for archaeological research in the central provinces of Panamá to involve a systematic basin-wide survey that had the capacity to identify and sample the full range of Preconquest sites, and not just the large nucleated centers and lavish elite burial centers (Cooke 1984:301), a number of recent archaeological surveys in the central region have begun to break with the previous research models by incorporating regional survey data (Haller 2004; 2008; Izasa 2004; Menzies 2009). Within the Río Parita Valley, Haller (2004:13) designed a program of research documenting over 1,700 years (La Mula Period, 200 BC, to the El Hatillo Period, 1300-1522 AD) of social change in a 104 km² area of the Río Parita valley. Haller's program of study was based on a systematic regional survey. The intensive site survey data presented herein follows on Haller's regional survey in that I synthesize the findings from Site 054 with established regional data set. Intensive site survey combined with regional survey data allows our study to investigate how population trends at a small peripheral site may have been affected by regional phenomena. The regional survey delineated two adjacent study zones (Figure 3) (Haller 2008:23). The Lower Survey Zone (LSZ, hereafter) near the mouth of the Río Parita contains archaeological deposits firmly associated with a cultural center (Site He-4). Site 054 is located in the Upper Survey Zone (USZ), adjacent to the modern town of Llano de la Cruz, 12.5 km down river from Site He-4.

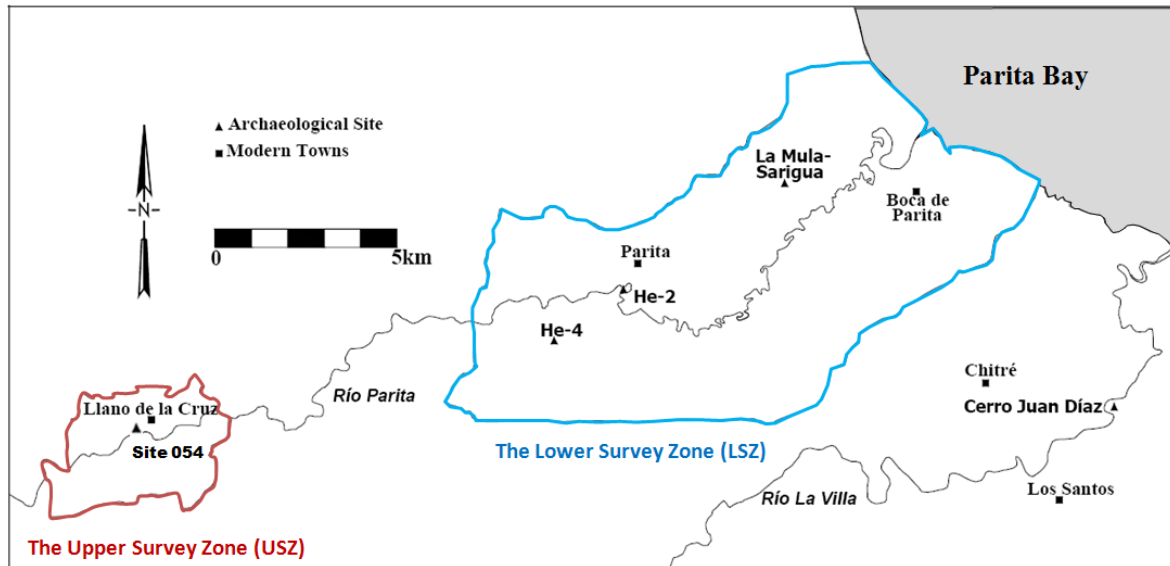


Figure 3. Map of Central Region of Panamá indicating the locations of archaeological sites and modern towns mentioned in text (including Site 054 in the USZ and He-4 in the LSZ).

Located within the USZ, Site 054 sits on a floodplain adjacent to the Río Parita, near the modern town of Llano de la Cruz (Figure 3). Centuries of continuous indigenous habitation have left only a loose concentration of artifacts, nearly invisible to the untrained eye, nestled between a slow moving and comparatively shallow section of Río Parita and a small semi-enclosed mountain range. Haller's (2004) surface collections at Site 054 represent the only archaeological work conducted prior our research team's arrival in early May 2009. Our investigations at Site 054 included mapping and systematic shovel testing. The sample of archaeological material recovered during this fieldwork is the subject of the analyses to follow.

Chapter 3: Methodology

“Archaeologists seek to unravel ...complex stor[ies] of human occupation by examining cultural deposits that accumulate sequentially over time. Determining the timeframe of the depositional sequence of cultural deposits, therefore, is intrinsic to any interpretation of past human behaviour on a landscape” (Stein and Deo 2003).

The archaeological record of central Panamanian Preconquest chiefdoms is best understood in a regional framework. Coclé chiefdoms, “must be seen as regional societies” (Haller 2008:19) as chiefs not only had political control of highly centralized locales, they also wielded control over large territories in order to ensure that resources within their region remained readily available (Espinosa 1994; Young 1971). The collection of regional survey data to reconstruct demographic change over time has played an important role in archaeological research at the regional level, (but see critics Dunnell 1990, 1992; Dunnell and Dancey 1983) and various methods have been employed to estimate population size, including counting the number of sites (Drennan 1987, 1988; Haller 2004), dwellings and identifiable surface artifacts (Bettinger 1999), estimating site size (Adams 1965; Menzies 2009), and extrapolating from ethnohistoric census data (Boyd 1996; Kolb 1985).

The data collected from intensive site survey/testing at Site 054, as part of the program of research presented herein, follows on the regional survey data collected by Haller (2004) in that shovel test data collected from Site 054 is utilized to compare with demographic trends previously documented during regional survey studies (Haller 2004, 2008). The comparison between site survey data in the USZ with documented trends of population nucleation and dispersal in the LSZ (provided by regional survey data) is made possible due to the establishment of a well-defined and long cultural-historical sequence for

Preconquest central Panamá and allow us to readily identify shifts in population size at Site 054 based on shovel test excavations at the site.

3.1 Data Collection

Site 054 was originally identified during regional survey of the entire Río Parita river valley (Haller 2004) and by using previously obtained GPS co-ordinates (M. Haller, personal communication, 2010), and aided by excellent surface visibility due to recent tilling of the fields, I was able to re-locate Site 054¹². After receiving permission from Panamá's Instituto Nacional de Arte y Cultura (INAC) to conduct excavations at Site 054, the first phase of fieldwork was carried out between May 7 and May 26, 2009. Working under the research umbrella of PARP, all fieldworkers were instructed to employ the same intensive site-survey methods developed previously by PARP, ensuring comparability of the artifacts and other collected data (Haller 2004, 2008; Menzies 2009).

¹² Accordingly, Site 054 was identified as a separate site from Site 078 located directly across the Río Parita; however, it should be noted that these two sites are related, and could be considered a single site. Over the centuries, the Río Parita has often changed its course and may have cut through the middle of a single larger site, thereby creating two sites, Site 054 and Site 078.



Figure 4. Data collection during survey at Site 054, Panamá.

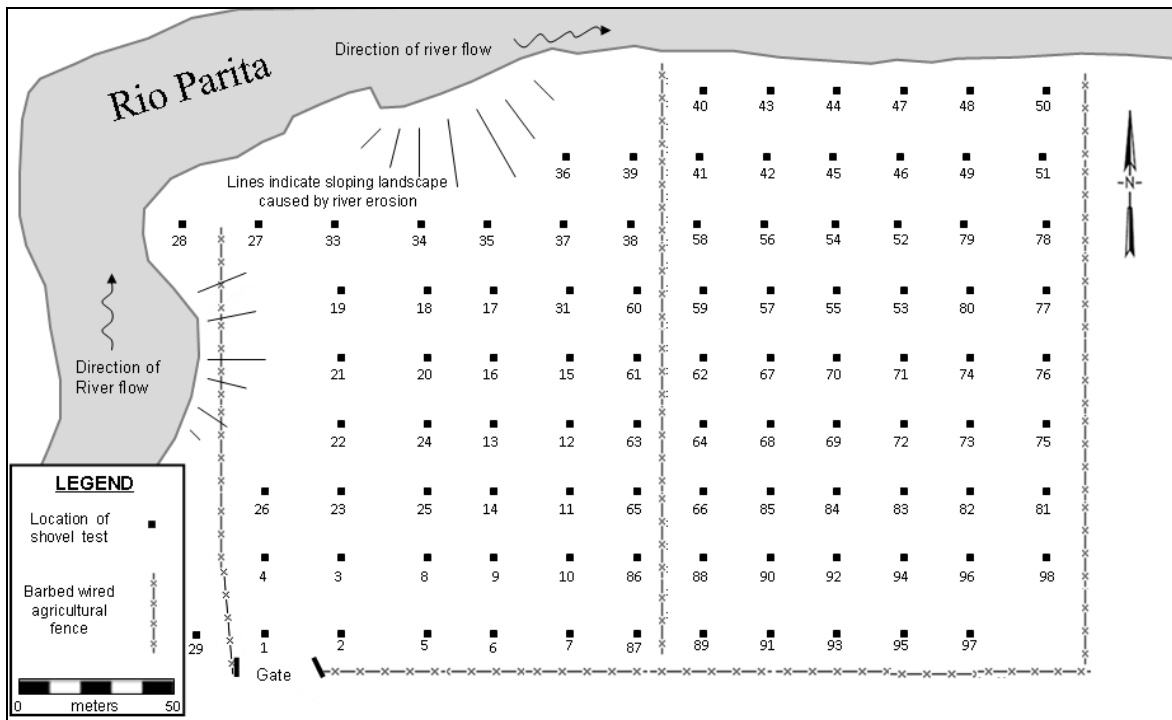


Figure 5. Map of Site 054 indicating locations of individual shovel tests.

Shovel testing was chosen as primary means of archaeological data collection. Shovel testing, as opposed to systemic surface collections, ensures that sub-surface deposits are proportionately represented in collation units and therefore all cultural periods are captured in the representative sample. Teams of two surveyors, spaced at 25 m intervals, conducted shovel testing along north-south transects, thereby creating a regular grid (Figure 5). Each shovel test [ST, hereafter] measured 0.4 m x 0.4 m in surface area and ranged in depth from 0.3 m to 1.4 m.¹³ It was often possible with 4-6 workers to complete the excavation of 6-7 shovel tests per day, depending on the weather, compactness and composition of soil, and the nature of the artifacts identified within the matrix. All STs were dug using a spade shovel, and when necessary, digging-sticks (*coa*), hand trowels and/or geologist's hand-picks were used to penetrate hard-pan soil and clay deposits. All excavated deposits were screened using 6 mm mesh screens. The maximum depth of excavation during the entire ST program was 141 cm and, in some instances, excavation was limited by the shallow depth of bedrock (typically between 30-35 cm below the surface). STs were terminated, on average, at 56 cm, and 100 percent of the units reached either sterile soil or bedrock. "Test probes" were used in 12.5 percent (1 in 8 STs) of the total collection units and differed from STs only in that they were taken to a depth of at least 1 meter in order to ensure STs were not being prematurely terminated. In total, 98 STs were placed at Site 054 over an area of approximately 5.8 ha, yielding 776 objects. No artifacts were identified below 60 cm in either an ST or test-probe.

¹³ The depth of a test unit depended on the nature of the artifacts. In cases where cultural material was encountered the depth of the ST ended only when the material remains ended—often at bedrock. STs excavation relied on the knowledge of local experts (archaeological and agricultural) as well as the publication of the Stirling and Willey's excavations at He-4 (Ladd 1964) in order to anticipate what stratigraphy could be expected at a given depth. The consensus reached was that within the flood plain, where Site 054 is located, cultural material is rarely encountered at a depth greater than 150 cm, and is usually no deeper than 50-60 cm.

3.2 Data Analysis

The second phase of research began in late July 2009 at PARP's laboratory in Monogrillo, Panamá. The ceramic artifacts from Site 054 are found in throughout the central region of Panamá (stylistically, quality, temporally, raw materials utilized, etc.) and the collections from Site 054 and He-4 differ in that the latter contains much denser and larger deposits as well as higher concentrations of painted and decorative ceramics. All specialists agree the ceramic traditions represented at Site 054 and Site He-4 are part of the same indigenous cultural tradition. All of Site 054's 776 materials were cleaned, processed, and analyzed. After the non-cultural and modern refuse was removed from the samples, 608 artifacts remained. Eight of these were identified as stone tools, or fragments thereof, 21 lithics were unmodified flakes (no evidence of retouch or use-wear).¹⁴ The remainder of the collected samples consisted of 579 pottery fragments. No flora, shellfish, or other faunal remains were recovered during any period of fieldwork, an absence that is not uncommon in the study region due to the highly acid soils in the river valley.

During June and July 2009 ceramics were analysed by the author with important assistance from specialists A. Menzies, M. Haller and R. Cooke. Analysts utilized the previously established Regional Late Ceramic Sequence (Cooke and Sánchez 2000; Ladd 1964) which relies on the examination of ceramic styles, decoration, size, colour(s), quality, temper, and vessel form (*olla*, jar, plate, pedestal plate, bowl, bottle, effigy, figurine, or zoomorphic) allowing regional specialists to determine roughly when the vessel was

¹⁴ Stone tools were measured, drawn, and analyzed according to raw material type, tool type and debitage type (Andrefsky 1998; Kooyman 2000) and all chronologically diagnostic tools, were classified according to comparisons made with previous stone tool analyses in the region (e.g. Hansell 1988: 78, Tables 2-5; Haller 2004: 140, Table 6.1; Ranere 1980). Use-wear analysis and technological measurements were conducted with the assistance of lithic specialist Adam Menzies.

produced (and potentially its function). This is because various combinations of these stylistic attributes are diagnostic of cultural phases for which we have tight chronological control and associated radiocarbon dates (e.g., Cooke et al. 2000). Furthermore, uncertainties concerning the ceramic typology for the region are relatively minor (see Cooke 1995; Cooke et al. 2000:158-159; Cooke and Sánchez 1997; 2000; Isaza 2004; Ladd 1964; Sánchez and Cooke 1997; Sheets 1992: Table 1) and the regional ceramic chronology developed for the central provinces of Panamá is among the “most refined” in all of Lower Central America (Menzies 2009:27).



Figure 6. Cubitá Ceramic plate (*vaso*) from INAC’s Museum in Panamá City, dating between A.D. 250-550. Photo of ceramic plate was taken by Mikael Haller in summer of 2004. Inset photo is of a Cubitá phase style sherd recovered at Site 054 in 2008 (PARP Artefact No. 2008:054:079).

3.3 Population Density Index (PDI)

To provide a better understanding of the role of peripherally situated sites during the emergence of chiefdoms, estimates of population growth and decline based on intensive site survey of Site 054 are compared to the regional survey data will allow us to test the hypothesis that peripherally located “commoner” hamlets of the Río Parita valley were socio-politically associated with, or controlled by, a nucleated village (the He-4 Site) during various stages of socio-political development (Haller 2008).

The systematic nature of the empirical data provides a baseline from which we can begin to understand the extent of chiefly authority before, during, and after, the development of politically ranked societies. If, for example, it is found that Site 054 underwent dramatic population decline during the Cubíta phase occupation (the cultural phase often associated with the emergence of socio-political complexity), then it would be evidence to support the notion that the developing chiefdoms at Site He-4 exerted “considerable pull” on peripherally located occupations as far away as Site 054 in the LSZ (Menzies 2009:24). Alternately, archaeological evidence for a dramatic growth at Site 054 during its Cubíta occupation would likely be indicative of relative socio-political independence (and drawing in of smaller settlements within the LSZ). In this way, a clear understanding of the patterns related to shifts in populations at both Site 054 and the Río Parita basin in general allows us to determine if and when the emerging chieftainship at the He-4 Site began to exert influence on the small, previously independent, peripherally located communities.

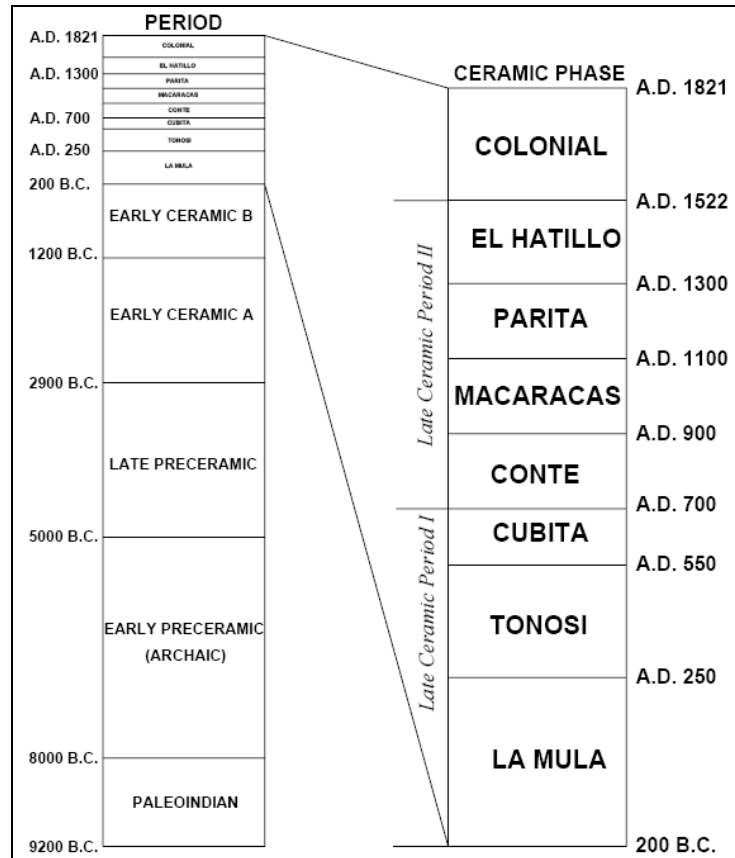


Figure 7. Ceramic Chronology in the Central Region of Panamá (based on Haller 2008).

To evaluate the hypothesis that Site 054 was demographically affected by regional socio-cultural phenomena, a quantitative index was created as a proxy for population density to compare to previously established, archaeologically-based, regional population reconstructions for the central region of Panamá. For this study, I develop the *Population Density Index* (or PDI), a modified version of an index originally developed by Drennan et al. (2003) for a settlement study of the Chifeng region of North China. Drennan et al.'s index uses variables such as site size (ha), number of collection units, and density of artifacts that

can be firmly dated to a specific ceramic phase.¹⁵ The PDI takes as its starting premise the notion that the more refuse in the archaeological record the more people likely lived at the site and is based on the on Density Area Index (DAI) developed by Drennan and colleagues (Drennan 1996a; Drennan et al. 2003). For the present study, the PDI (based on the DAI) is calculated by dividing the total number of artifacts deposited during each ceramic phase by the volume (m³) of the shovel tests (ST), divided by the number of centuries for a given phase¹⁶. The data utilized to calculate the PDI at Site 054, phase by phase, are presented in Table 1.

Table 1. Ceramic data collected from Site 054 and variables used in calculating PDI.

Variables	Tonosí (AD 250-550)	Cubité (AD 550-700)	Conte (AD 700-900)	Macaracas (AD 900-1100)	Parita - Hatillo (AD 1100-1522)
Total ceramic sherd count	11	116	4	51	4
Centuries represented	3.00	1.50	2.00	2.00	4.22
ST Vol. excavated m³	0.3040	0.3512	0.1040	0.3040	0.1552
STs included	05, 11, 65,66,72,73,76, 82	03, 05, 09, 41,54,56,57,67, 73,81,93,87	07,09,10	01,03,09,29, 39,42,60	59,71,75,78
Calculated PDI:	12.06	220.19	1.92	83.88	6.107

¹⁵ This means that only diagnostic sherds were included in this analysis since lithics and most other artifacts could not be unequivocally associated with a particular cultural phase.

¹⁶ This is because, as Drennan et al. (2003a: 155) point out, using the total number of sherds has a major disadvantage as not all ceramic phases are of equal length. Dividing the number of artifacts identified for each cultural phase by the length of the phase allows us to control for varying phase lengths.

An estimation of relative population sizes based on counts of ancient refuse has inherent limitations in central Panamá; however, the variables employed in PDI calculations presented herein have proven valuable in population reconstructions based on Density Area Indices (DAI) (see Haller 2008; Menzies 2009). Haller (2008:34) for example, has tested various methods of estimating relative population size, and found that variables such as density of chronologically diagnostic artifacts and site size provided the most accurate and reliable method for reconstructing ancient regional demographic patterns.¹⁷ The PDI does not allow an estimate of population size. Instead it permits an estimate of the relative size of the population from phase to phase. In this way, the PDI helps to identify changes in population size within a site or region relative to each other, but not in an absolute sense. The systematic nature of the methods of data collection and analysis, however, provides a robust and reliable baseline of relative population density from which hypotheses can be developed and tested.

3.4 Spatial Extent of Ceramic Artifacts

Producing estimates of house size and occupied areas during a particular ceramic phase is an extremely difficult task because many sites were continuously occupied and, with a few notable exceptions, the archaeological record of Panamá generally lacks readily identifiable domestic architecture (but see Isaza 2004 and Menzies 2009). Mapping the spatial extent of cultural materials belonging to each ceramic phase is, however, useful to archaeological reconstructions as it helps us understand the possible locations of domestic structures during

¹⁷ Other methods tested include number of sites; collections, number of sherds, sherds per century; area of collections, and a density area index (DAI) (Haller 2004, 2008).

various phases at Site 054. In the sections below, I provide phase-by-phase ceramic distribution maps (Figures 9-13) based on the counts of firmly dated ceramic sherds in each ST at Site 054. These maps are not directly related to the PDI calculations; instead they are simply visual tools to display the estimated spatial extents and the “hotspots” of ceramic concentrations during each phase of the Late Ceramic Period (Figure 7). If these ceramic concentrations were the product of household refuse discard, then they show us the likely locations of subsurface house features—the confirmation of which must await further investigation at the site.

All STs that yielded ceramics belonging to a specific cultural phase of the Late Ceramic Period were recorded and mapped. When STs located adjacent to each other tested positive for artifacts of the same phase, it was assumed the ceramic artifacts were in association with one another (as the likelihood of discovering subsurface artifacts belonging to the same ceramic phase between the positive units is very high). Accordingly, if no ceramics of a given phase were recovered in adjacent STs, a buffer was drawn around the neighbouring positive ST in order to constrain the estimated spatial distribution of ceramics for that phase. The intensity of shading presented in the spatial projections in Figures 9-13, produced using Surfer 8.0 (and specifically Surfer’s kriging algorithm), is an estimate of the ceramic concentration around each ST (the darker the shading, the greater the number of datable ceramics found in that location). The ceramic distribution maps show that most ceramics belonging to a given cultural phase clustered in distinct zones within the site and that isolated finds were relatively rare. In this way, estimated spatial distributions and relative ceramic sherd densities serve as a useful heuristic device to envision changing household locations during the sequence of Late Ceramic Period phases. Although, Figures 9-13 are not

intended to be interpreted as a comprehensive reconstruction of site size during each cultural phase, they do allow us to readily compare and contrast the extent and relative densities of sherds belonging to each phase. In this way, the maps give us a visual representation of the more abstract PDI (population density index) for the site as a whole.

Chapter 4: Results

4.1 Settlement, Stability, and Collapse

Although indigenous populations have occupied the coastal regions of the Río Parita valley since at least the Paleoindian period (9,200 B.C. to 5,000 B.C.) (Cooke 1989, 1995; Haller 2008), the results of this research suggest that occupation of Site 054, did not start until the Late Ceramic Period (Figure 7). No cultural materials collected could be firmly associated with any ceramic tradition prior to A.D. 250 or after A.D. 1522. These results accord well with Haller's (2004, 2008) findings, which also indicate that human occupation of Site 054 was initiated sometime during the Tonosí Ceramic Phase (A.D. 250 - 550) lasting until at least the El Hatillo Ceramic Phase (A.D. 1300-1522).¹⁸ The results of the PDI analysis show that Site 054 remained relatively small scale for its entire thirteen century long occupation. Population increased and declined during the course of its long occupation; however, the density and distribution of artifacts suggest Site 054 was a continually occupied small-scale site. The population of Site 054 grew during the Cubitá phase and declined during the Conte phase, as indicated by the readily identifiable “peak” [Cubitá phase] and “valley” [Conte phase] (Figure 8). The following section presents my findings at Site 054 contextualized within the broader scope of the regional survey data with particular attention paid to the 350 year period that comprises the consecutive Cubitá and Conte phases (A.D. 550-900). The subsequent section will discuss the significance of rapid population change at Site 054 and implications for our understanding of the emergence of socio-political complexity in the Central Region of Panamá.

¹⁸ During his surface collections at Site 054, Haller (2004:17) did not find any Parita Phase ceramics, however, my subsurface testing yielded a few sherds dating to this phase.

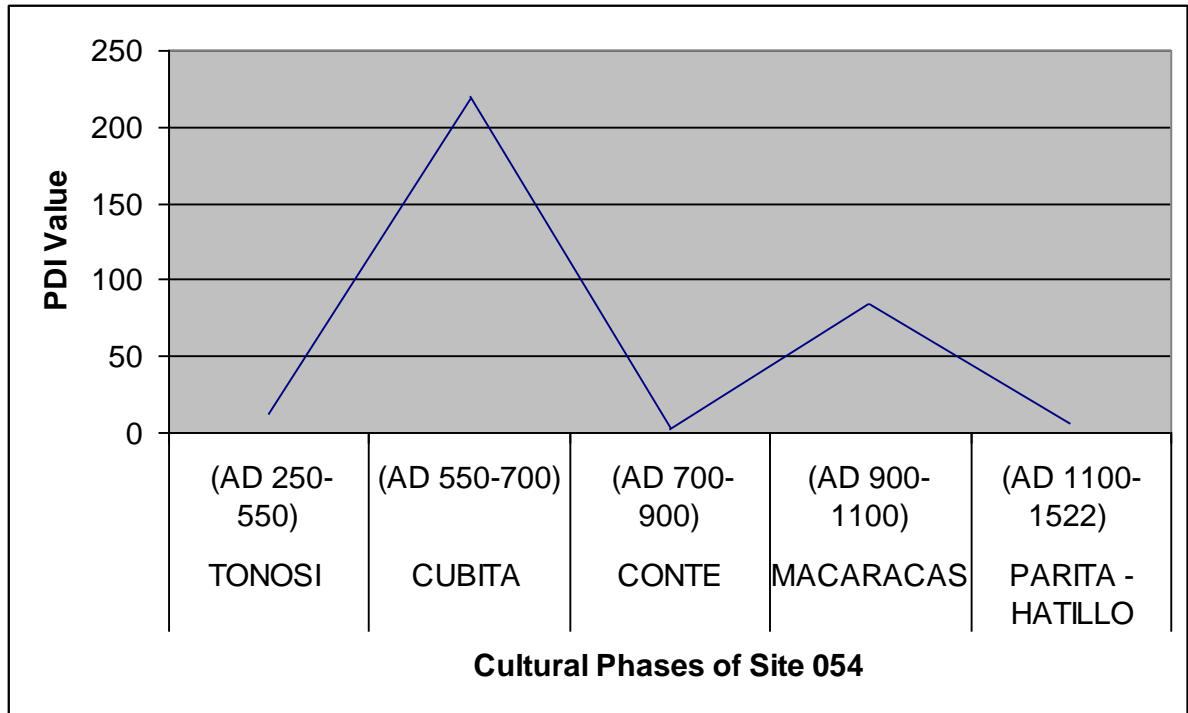


Figure 8. Phase by phase PDI estimates at Site 054.

4.1.1 Tonosí ceramic phase (A.D. 250-550). Likely as a result of the collapse of a socio-political centre near the mouth of the Río Parita (La Mula Surigua Site) and subsequent valley wide population dispersal (Hansell 1988)¹⁹, the initial occupation of Site 054 began as early as A.D. 250. The distribution of Tonosí style ceramics suggests that the occupation of Site 054 was restricted to the southern portion of the site; more than 150 m from the modern river bank (Figure 9). Of the 197 datable sherds in the sites sample, only 11 belonged unequivocally to the Tonosí phase. During this early occupation of Site 054, artifacts cluster in generally two areas of the site (Figure 9). This indicates that Site 054 was likely initially comprised of only a small group, dwelling in one or two domestic units.

¹⁹ The collapse has been theorized to be associated with the exhaustion of an exposed high quality chert outcrop adjacent to the La Mula Surigua Site (Cooke 2008, personal communication) as well as sea-level and micro-ecological changes beginning around the onset of the Tonosí phase which would have made the coastal environment around the mouth of the Parita River an unpleasant place to live (Hansell 1988:241).

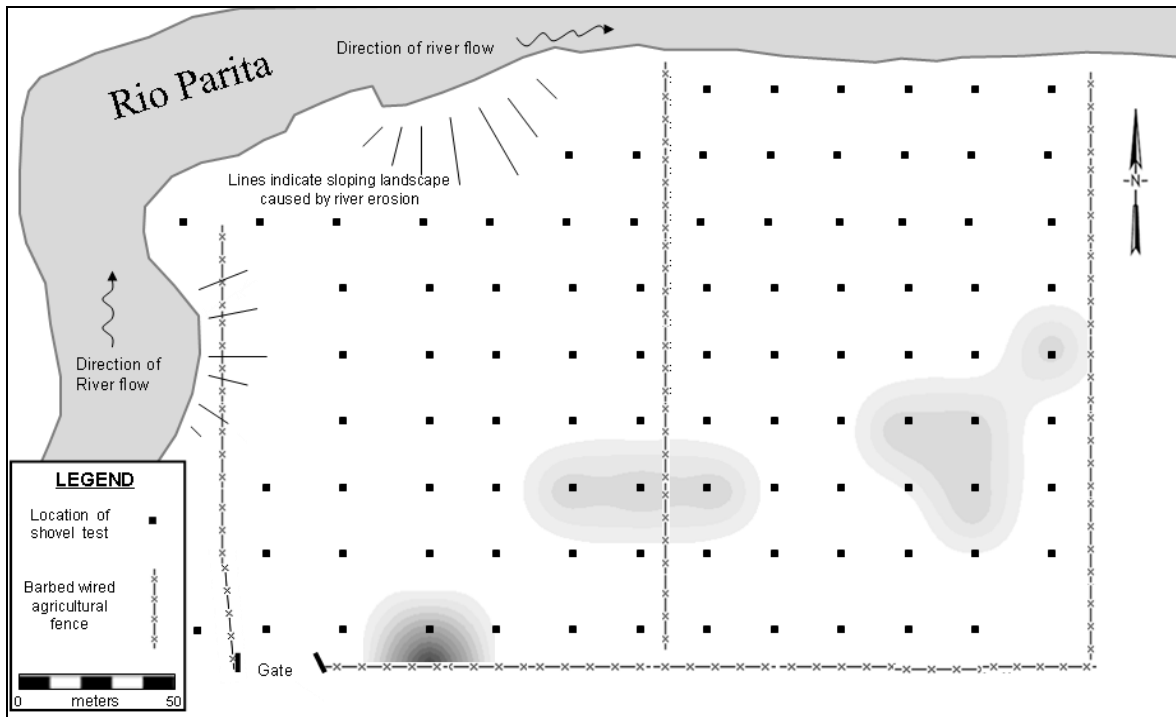


Figure 9. Spatial projection based on distribution of ceramics associated with the Tonosí ceramic phase at Site 054.

The results are not surprising since previous research has indicated the entire Río Parita valley was characterized by relatively independent hamlets with little indication of supra-hamlet organization (Haller 2008; Menzies 2009). The majority of the population occupying the valley during the Tonosí phase (including Site 054 in the USZ) was widely dispersed throughout the valley in “small farmsteads... not much bigger than a single family” (Menzies 2009:39). The limited archaeological data associated with the Tonosí phase from Site 054 suggests that it, like other sites in the valley, was a small self-sufficient community.

4.1.2 Cubitá ceramic phase (A.D. 550 -700). The Cubitá occupation at Site 054 shows a substantial increase in material culture; 116 artifacts were identified for the Cubitá occupation (comprising 20% of all sherds and 58% of all dateable sherds). The highest density of Cubitá ceramic artifacts occurred in the southeast corner of the site, above the

previous Tonosí occupation²⁰. The increase in both the distribution and concentration of these Cubitá phase artifacts suggests that Site 054 underwent considerable population expansion. Moreover, the Cubitá phase lasted a mere 150 years (the average length of the ceramic phases is 228 years), therefore the data reflect a growth in both population size and density at Site 054, now regarded as the largest and “the only second order site in the entire USZ” (Haller 2008:45).

This population expansion was a macro-regional phenomenon (Haller 2008; Isaza 2004). Both the Río Parita valley and adjacent Río La Villa valley witnessed a “demographic explosion” during the Cubitá (Haller 2008:79). Cubitá artifacts are more widely distributed, and frequently identified in ritual contexts, possibly representing greater inter-regional economic exchanges (Cooke et al. 2000). The Cubitá occupation is associated with the rise of socio-political complexity in the Río Parita valley and it has been convincingly demonstrated that settlement nucleation and population growth had “increased dramatically around A.D. 500” (Haller 2008:40), particularly at Site He-4 in the LSZ (Figure 3).

Haller’s (2008) regional survey has indicated that not only is population of the entire valley rapidly expanding during the Cubitá phase, but the emerging chiefdom centered at Site He-4 also underwent significant transformation, from a community characterized by a handful of “relatively undifferentiated villages,” to the “focus of population nucleation” in entire Río Parita valley (Menzies 2009:60). A consequence of this population growth and nucleation is that many smaller sites in the valley are either abandoned or shrink and “He-4 comes to sit at the head of a centralized regional settlement system . . . and was also *exerting*

²⁰ The southwest corner of Site 054 was occupied the longest; evidence suggests uninterrupted occupation spanning from the Tonosí phase to the Macaracas phase (AD250-AD 1100). By the Parita phase the inhabitants abandoned this region of the site (see Figures 9-13).

a considerable pull on the populations of the other settlements in the valley” (Menzies 2009:60-61, emphasis added).

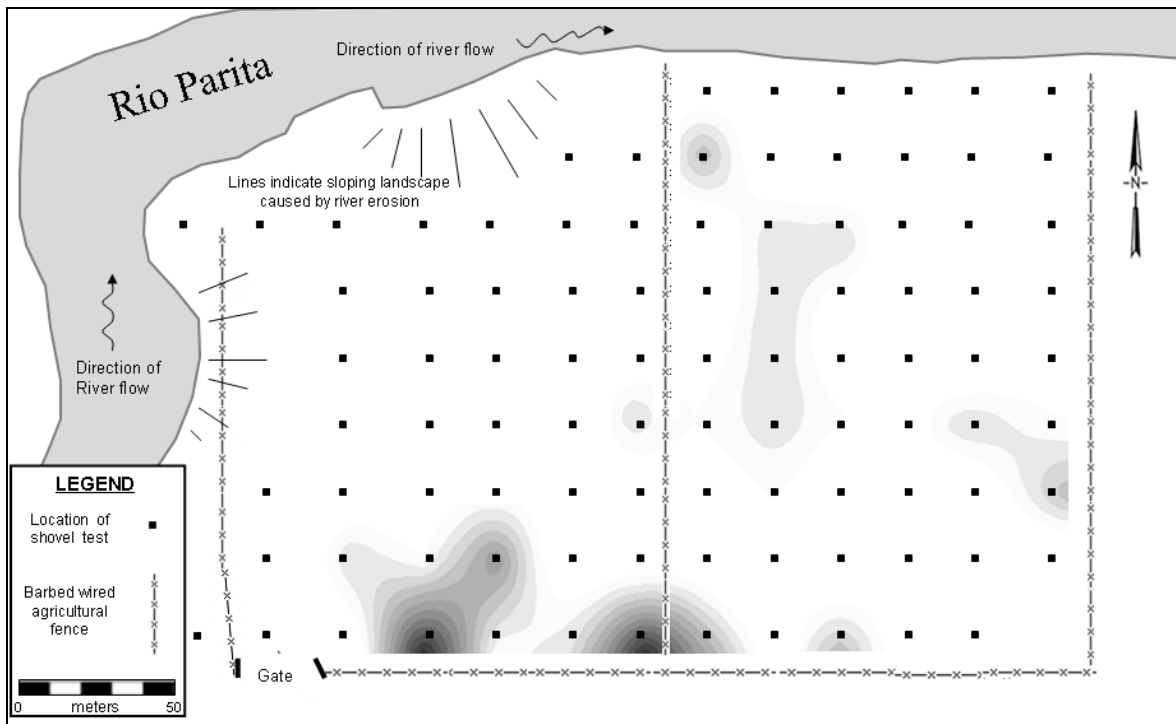


Figure 10. Spatial projection based on distribution of ceramics associated with the Cubitá ceramic phase at Site 054.

Although the majority of peripherally located, smaller sites in the Lower Survey Zone were pulled into a central primate site during the Cubitá phase (Haller 2008), the ceramic data from Site 054 suggest that the site underwent considerable population growth during the Cubitá phase and its population was not siphoned off by Site He-4.

4.1.3 Conte ceramic phase (A.D. 700-900). Conte phase ceramics at Site 054 were scarce, suggesting that the site declined in population as rapidly as it had expanded during the previous Cubitá occupation. A mere four sherds collected from Site 054 could be firmly assigned to the Conte phase. These sherds were all retrieved from three neighbouring STs

suggesting a small occupation, confined to the southeastern corner of the Site (Figure 11). Although the artifacts belonging to the Conte occupation at Site 054 were all discovered in the immediate vicinity of a cluster of Cubitá pottery fragments, the PDI as well as the localized spatial distribution of the sherds reflect a considerable decrease in population size and density from the preceding phase. The regional survey data indicates that He-4 also declined during this phase but remained at the top of the settlement hierarchy (with all competing nodes located within a 3 km radius) (Haller 2004:54); its decline, however, was certainly not as precipitous as we see at Site 054.

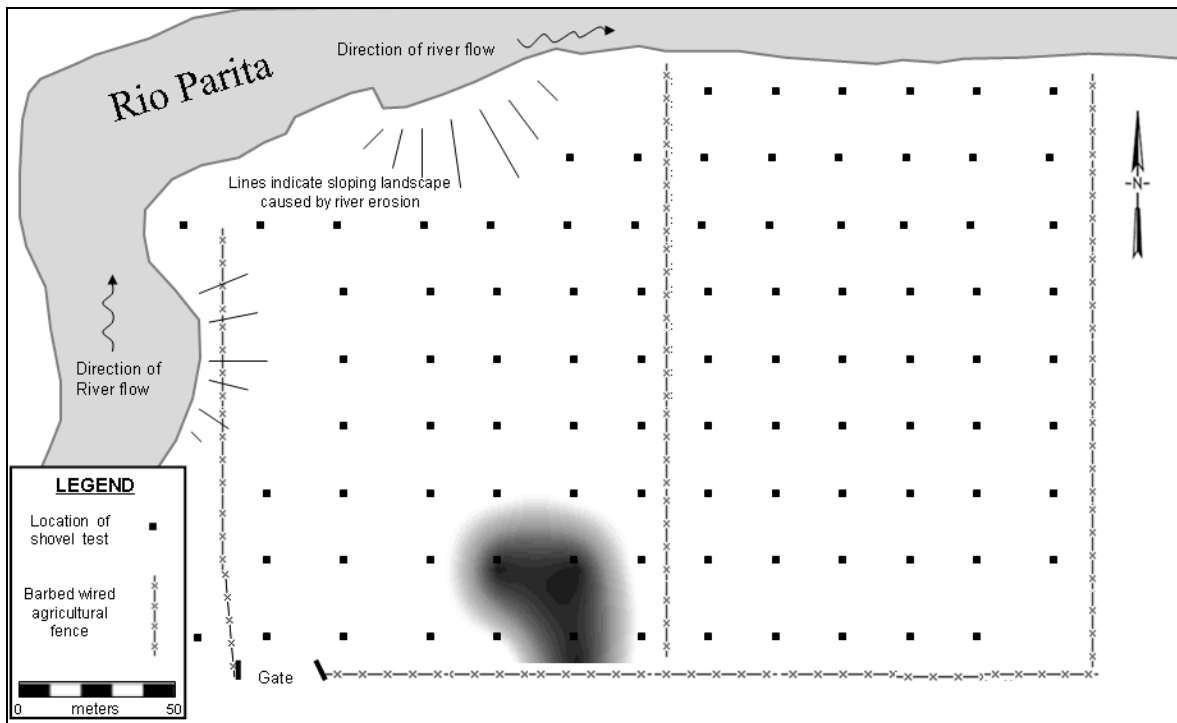


Figure 11. Spatial projection based on distribution of ceramics associated with the Conte ceramic phase at Site 054.

4.1.4 Macaracas ceramic phase (A.D. 900-1100). The Macaracas phase artifacts suggest a resurgence in population size and density. A total of 58 sherds (29.5% of all

diagnostic sherds), located in two clusters, could be firmly assigned to the Macaracas phase occupation. One cluster of sherds was located in the southeast corner and the other near the center of the site's northern zone (Figure 12). The density and distribution of artifacts again suggests a modest population increase, however, the site did not regain the size it achieved during the Cubitá phase.

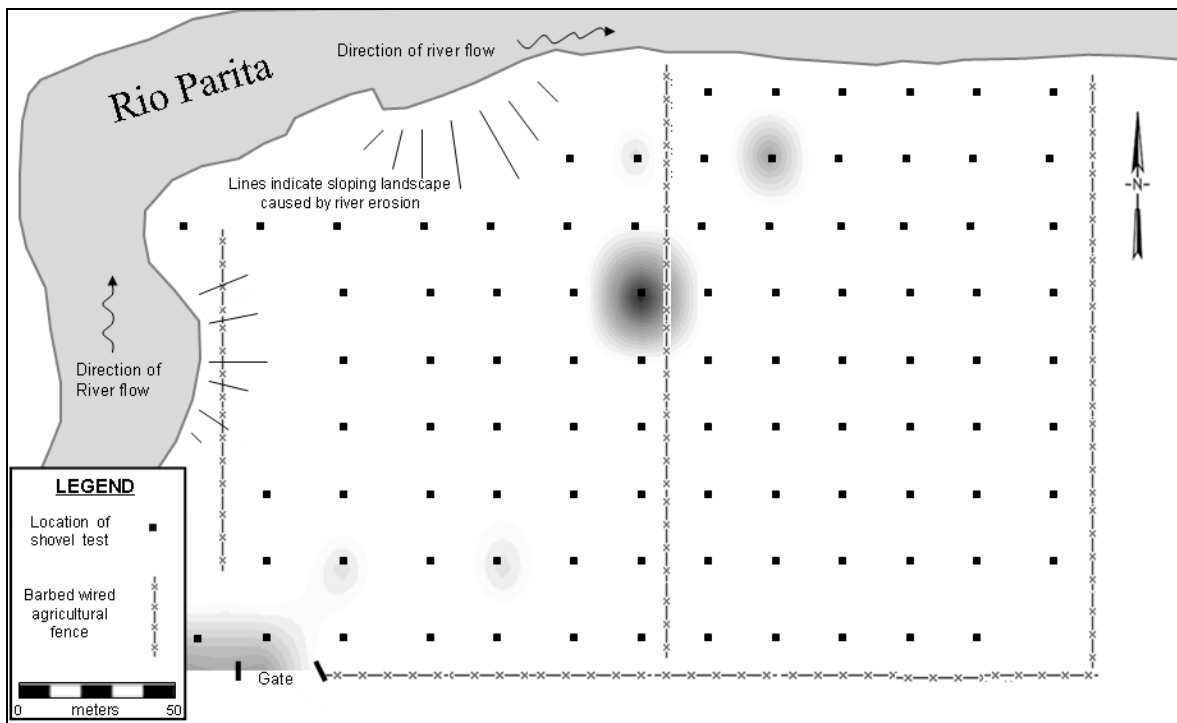


Figure 12. Spatial projection based on distribution of ceramics associated with the Macaracas ceramic phase at Site 054.

4.1.5 Parita and El Hatillo ceramic phases (A.D. 1100- 1522). The Parita phase (A.D. 1100-1300) is represented by only three sherds, while the El Hatillo occupation (A.D. 1300-1522) has only a single sherd. Due to the paucity of sherds from each of these ceramic phases, they were combined to create a single distribution map (Figure 12). The resulting map indicates that the entire combined 420 year occupation was confined to the north-

western quadrant directly overlying the previous Macaracas phase occupation (Figure 12). Of course, this pattern must be regarded as tentative considering the extremely small sample size.

A dramatically different pattern in population change has been recorded in the LSZ at Site He-4 which may be significant for explaining why this near abandonment occurred and why it persisted during the last four centuries of occupation at Site 054. The Parita phase occupation at Site He-4 was associated with the most collection units, the largest occupied

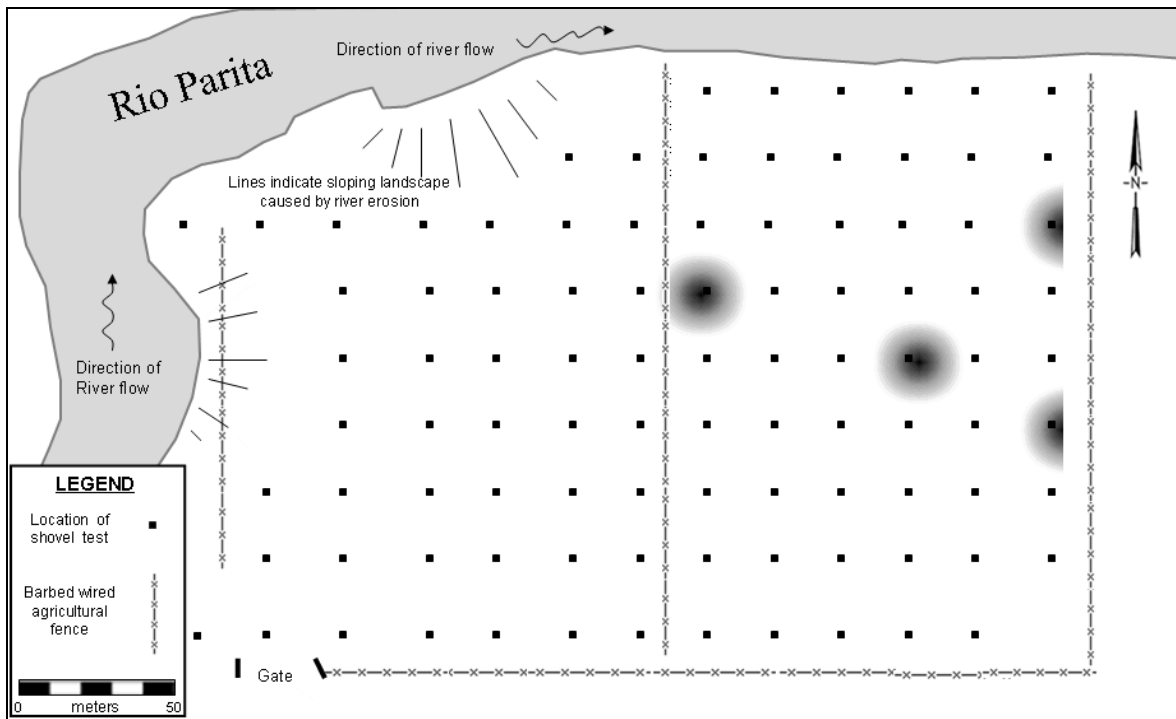


Figure 13. Spatial projection based on the distribution of ceramics associated with the Parita and El Hatillo ceramic phases at Site 054.

area, the highest number of artifacts in the zone, and “hence one of the highest levels of population that existed in Precolumbian times in the valley” (Menzies 2009:94). After loosing some population to adjacent sites in the LSZ during the Conte phase, Site He-4 had

by the Parita phase unequivocally become the most powerful and densely nucleated socio-political center in the Río Parita valley.

4.2 Summary of Results

Occupation of Site 054 began during the Tonosí phase (A.D. 250-550) when a small population of Coclé people, possibly originating from a coastal village near the mouth of the Río Parita, settled in the location. They may have come from the La Mula Surigua Site, a large village that was abandoned for unknown reasons at the end of the La Mula phase (Hansell 1988, 1989). During the Cubitá phase (A.D. 550-700) occupation at Site 054, population density and site size expanded in a relatively rapid manner.²¹ The number of sherds and their distribution was considerably more than during all later phases, but nothing approaching what we might expect at a heavily nucleated chiefly center such as Site He-4. The expansion was short-lived, a mere century and a half later, by the onset of the Conte phase (A.D. 700-900), population density and site area decreased as rapidly as it had expanded. The following Macaracas phase (A.D. 900-1100) underwent a slight resurgence in population; however, the ceramic data indicate that the site did not come close to reaching the magnitude achieved during the Cubitá phase. Following the Macaracas phase, Site 054 seems to have entered a cycle of population decline from which it would never recover. Beginning during the Parita phase (A.D. 1100-1300) material culture was restricted to the northeast corner of the site (Figure 13). These thin traces of occupation represent more than 420 years of continuous, but significantly decreased site use, until Site 054's eventual abandonment in the early sixteenth century.

²¹ Many sites established during the Tonosí phase and located in the floodplain of the Río Parita later became important village sites (importance measured in site size and duration of occupation) (Haller 2004:72, Table 4.2).

Chapter 5: Conclusions and Implications

The primary research objective of this study is to provide a better understanding of what was occurring at peripherally located sites in central Panamá before, during, and after the rise of complex chiefly political organization. In order to do so, we must examine whether population changes in small, peripherally located sites in central Panamá were associated with changes in larger regional centres. New empirical evidence of population growth and decline at Site 054, combined with regional survey data, allows us to test the hypothesis that peripheral “commoner” populations were constantly and firmly controlled by densely nucleated core sites (such as Site He-4). The results presented in this study suggest that the population of Site 054 was influenced at particular times by changes in the social and political organization of communities in the LSZ. However the political boundaries and system of regional resource and population control observed by the Spaniards during early encounters between the two cultures was not established until over a century and half after socially complex organization emerged in the region.

5.1 Examining the Periphery, Considering the Core

My first research objective was to determine when the emerging chieftainship at Site He-4 began to persuade smaller, previously independent, peripherally located groups and hamlets throughout the river valley to permanently relocate into a centralized village site. By examining population density data from Site 054 and throughout the valley we are able to understand how Site 054 was related to Site He-4. It has already been recognized that He-4 exerted considerable demographic pull during the Cubitá phase within the LSZ (Menzies 2009), however, it was not known if similar pressure was felt by populations dwelling as far

away as the USZ. The results of my research suggest that Site 054 located 12.5 km upstream in the USZ likely remained relatively independent (socially, politically, etc) from He-4 until A.D. 700. This is interesting because, contrary to the notion that populations within both the Upper and Lower Survey Zones were being drawn into He-4 Site during the emergence of increasingly powerful chiefdoms, the evidence from Site 054 suggests that at least some communities within the USZ may not initially have been drawn into Site He-4's sphere of influence.

My second research objective was to determine if these findings have any implications for theoretical models designed to understand factors that facilitate the emergence of chiefdoms in the central provinces of Panamá. To this end, the most significant finding of this research at Site 054 is that there was a relatively rapid population increase during the Cubitá phase and a large population decrease during the Conte phase. The population increase during the Cubitá phase suggests that population nucleation at Site He-4 may have occurred on a macro-regional level, but that some peripheral sites that were established early on during the Late Ceramic Period (such as Site 054) were not largely affected by this process. In other words, despite the macro-demographic restructuring of Río Parita valley around Site He-4, Site 054 in the UZS seems to have remained relatively unaffected by the broader centralizing trends during the Cubitá. The PDI analysis suggests that Site 054 expanded in population density and size considerably—resisting the gravitational pull from Site He-4 (Figure 8). The extent of socio-political authority during the rise of chiefly power at He-4 in central Panamá may not have covered as large a geographic area as was recorded centuries later by Spanish Conquistadors. In this case, socio-political authority seems to have been limited to within the confines of the LSZ and did not extend

upriver to the USZ. Yet, one hundred and fifty years later, Site 054 faced near abandonment as population density crashed, suggesting that the political pull of Site He-4 had finally reached Site 054 in the USZ. An alternate explanation to consider is that the early He-4 chiefdom may have had more effective means of interacting with neighbouring communities such as 054, without vacuuming the population in to the centre (2012, M. Blake, personal communication). The material record at Site 054 supports this hypothesis; the evidence collected suggests that Site 054's population expanded during the Cubitá phase, a phase during which most sites in the LSZ seem to become smaller or are completely abandoned. The later administration may have become more unwieldy, requiring people to actually relocate at the centre for more effective control and administration.

An additional implication of my findings is that the political boundaries and socio-political organization described by Spanish observers in the 16th century took generations to develop and may have changed several times during the region's history. Spanish documents suggest a Coclé chief's political authority extended half-way between chiefly centers, which were spaced "six to eight leagues [or 28-38 kilometers]" apart in the early 16th century (Oviedo in Helms 1979:53). This would place Site 054 on the outer boundary of the chiefdom centred at Site He-4, a distance which accords well with my findings concerning the occupation directly prior to Spanish conquest.

This research provides a more comprehensive understanding of the role of the periphery, albeit from the perspective of a single hamlet, during periods of rapid cultural growth and decline than is currently available in the literature. It is only through careful examination of the sometimes sparse archaeological evidence at peripheral sites like Site 054 that we can begin to assess the relationships among settlements within the sphere of influence

of ancient chiefdoms. In this case study I was able to estimate the relative population size of each phase of the Late Ceramic Period allowing me to pinpoint when populations were able to “resist” and when they “succumbed” to the gravitational pull of emerging chiefly centres such as Site He4. This, I hope will help us to develop more robust theoretical models in our study of the development of complex societies in the Central Region of Panamá. No longer is the mere understanding of chiefly residence and wealth accepted as sufficient to understand the development of complex chiefdoms. Instead, we must incorporate attempts to understand how the “commoners”, located on the periphery, were associated with and/or affected by cultural developments such as the emergence of complex socio-political organization.

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Appendix A

A1 Lithic data from Site 054

A total of 28 lithic artifacts were encountered during the systematic shovel testing program. Each stone artefact (including lithic waste [such as debitage, exhausted cores, or unutilized flakes] and stone tools [such as points, manos, blades, etc] was subjected to technological quantification measurements and meticulous use-wear analysis (utilizing the comparative collection at PARP labs and primarily Ranere 1980). Unfortunately, I was unable to firmly associate any of the culturally modified lithic materials collected from Site 054 to a particular ceramic phase. As a result, lithic data was excluded from the demographic analysis. Twenty-two of the 98 shovel tests excavated yielded culturally modified stones (or 22.4%), however, there does not seem to be any substantial or informative patterning to their distribution across site. Use-wear analysis provided insight into subsistence and other activities (i.e. scrappers displayed evidence of “stacking” often associated with heavy hide/leather working and/or light wood working), but in the absence of chronologically diagnostic features on tools, it is impossible to know when tool was created or utilized. No ground stone tools were identified at Site 054 during the archaeological investigations, with the exception of one expediently used hammer stone. The lack of *manos* or *metates* associated with Site 054 is likely a result of post-depositional horticultural activities. To this day local farmers deliberately move larger stones, (culturally modified or not) to the edges of cultivable fields in order to avoid hitting the metal blades of an agriculture plough, which is dragged by bulls in the tilling of fields. Typically larger and therefore more readily identifiable artifacts like *manos* and *metates* are plucked by farmers, not only because they have the potential to

damage expensive machinery, but also because they make nice collectables to decorate the farmhouse (2009, personal observation). It is important to note, however, that not all surface artifact distributions are likely to have been subjected to similar post-depositional activity as no effort is made by local *campasinos* to move ceramic sherds or small artifacts as they pose no threat to the stainless steel blades of the plough.



Figure 14. Left, utilized chert flake from Site 054; note the systematic re-touch on one side of lithic. Right, utilized granular basalt flake from Site 054.

Eighty-six percent (86%) of the lithic samples were of a high quality chert material (Figure 14), all of which have a common source of origin, a 10 ha. chert outcrop at La Mula Surigüa Site. This may be indicative of a lack of a local high quality raw lithic source in the Upper Survey Zone, forcing inhabitants of Site 054 to barter with villages closer to the mouth of the Río Parita for this ubiquitously important resource. The stone tools identified during data analysis included: 2 multidirectional cores, 1 potential projectile point (possibly a blade) (displayed in Figure 14, above), and 8 unilaterally worked scraper tools/utilized flakes. The remaining 43% of lithics collected were unmodified flakes (Table 2 below provides the detailed descriptions of use-wear, technological attributes and other data collected from the lithic sample).

Site	Lote	RawMat	Tool Type	Tool Cond	Cortex	Thermal Alt	notes:	Length	Width	Thickness	Half Thickness	Half Width	Flake Termination	Bulb	Errillure	Platform Type	Platform Width	Platform Thickness
54	2	sandstone	flake	3	3	FALSE		3	2.1	0.9	0.9	1.3	3	FALSE	FALSE	1	0.6	0.2
54	19	chert	flake	4	3	FALSE	high quality chert	2	2	0.7	0.7	2	3	TRUE	FALSE	1	1.6	0.8
54	36	chert	flake	4	3	FALSE	one edge with usewear	1.9	2.7	0.9	0.6	2.1	1	TRUE	FALSE	3	2.3	0.7
54	41	basalt	flake	2	2	FALSE	distal flake; medium quality chert, possible	1.9	2	0.4	0.3	1.6	n.a	FALSE	FALSE	n/a		
54	54	chert	flake	11	3	FALSE	green with white inclusions	3.9	3.7	2	3.1	1.5	n/a	n/a	n/a	n/a		
54	58	chert	flake	5	2	FALSE		1.8	4	1.1	0.8	3.4	1	FALSE	FALSE	1	0.9	0.2
54	59	chert	flake	4	0	TRUE	cortical primary flake; mottled with white	2	1	0.3	0.3	1	3	TRUE	FALSE	3	0.5	0.2
54	59	chert	flake	4	3	FALSE	poor quality raw material, doesn't show	1.6	2.4	0.9	0.7	2.3	1	TRUE	FALSE	3	1.6	0.4
54	87	chert	flake	4	1	FALSE		1.1	0.8	0.4	0.2	0.7	1	TRUE	FALSE	2	0.3	0.1
54	95	chert	flake	4	1	FALSE		2.2	1.8	1.1	1	1.6	1	TRUE	FALSE	1	0.7	0.4
54	96	chert	flake	4	1	FALSE	broken probably from a larger piece, lots	1.8	3.1	0.8	0.8	1.9	3	FALSE	FALSE	1	2.7	0.6
54	102	chert	flake	4	2	FALSE		3.3	2.6	0.9	0.8	0.6	1	FALSE	FALSE	2	1.8	0.6
54	46	chert	multi core	15	2	FALSE	white inclusions	2.7	1.9	1.3				TRUE	TRUE			
54	98	chert	multi-core	5	3	FALSE	deep red color	2.8	3.4	2.3	1.8	2.9		FALSE	FALSE			
54	41	chert	projectile point	2	1	FALSE	projectile point/unifacial knife; blue mottled	3.1	2.2	0.7	0.6	1.6		TRUE	TRUE	1 or 3	1.8	0.7
54	18	jasper	un id	1	3	FALSE	blocky angular shatter	2.1	1.2	1				FALSE	FALSE			
54	36	chert	un id	1	2	FALSE		2.6	1.6	1.1				FALSE	TRUE			
54	41	chert	un id	1	2	FALSE		2.5	2	0.9	0.8	1.5		FALSE	TRUE			
54	68	chert	un id	1	2	FALSE		2.4	2.1	1	1.1	1.8		FALSE	TRUE			
54	97	chert	un id	1	2	FALSE	blocky angular shatter; poor quality raw	2.6	2	0.9				FALSE	TRUE			
54	24	chert	worked scraping/ch	5	2	FALSE	loc1: microfracturing steep, dorsal and ventral	2	1.5	0.7	0.5	1.5	1	FALSE	FALSE	n/a		
54	37	jasper	worked scraping/ch	4	0	FALSE	loc1: light microflaking on scraper edge, i	2.1	2.4	1.2	1.1	1.8	n/a	TRUE	FALSE	3	0.9	1.2
54	62	chert	worked scraping/ch	5	1	FALSE		3.5	2.3	1.6	1	2.1	1	TRUE	FALSE	1	0.5	1.1
54	97	chert	utilized blade	4	1	FALSE		2.1	1.6	0.6	0.6	1.5	2	TRUE	0	2	1.3	0.9
54	31	chert	Utilized flake	4	1	FALSE	usewear loc3 - heavy stacking of hinge, s	2.4	2.1	0.6	0.4	2	3	TRUE	TRUE	1	1.4	0.4
54	37	chert	Utilized flake	2	1	POSSIBLE	possible potlid fracturing and/impurities	2.2	2.1	1	0.6	1.7	1	FALSE	FALSE	n/a		
54	76	chert	Utilized flake	4	1	FALSE	heavy usewear on one edge; possible ret	4.6	3	0.9	0.8	2.9	1	TRUE	FALSE	2	2.2	0.9
54	102	chert	Utilized flake	4	1	TRUE	high quality deep red chert, possible use	2	3.2	0.8	0.6	2.6	1	TRUE	FALSE	1	1.8	0.8

Table 2. Quantitative lithic data

A2. Additional observations

There were a couple of features, potentially archaeological, within the landscape of Site 054 which were not mentioned in the Thesis, as they provided no data to help reconstruct demographic change, but warrant mention. The first is a potentially anthropogenic mound feature associated with Site 054's Precontact occupation. The mound is located on the eastern edge of Site 054 (ST numbers 76 and 77 are the closest in proximity) (Figure 8). The subsurface tests adjacent to the mound produced both the highest density of ceramic fragments and the highest percentage of polychrome fragments during the data collection program. The slightly higher ratio of polychrome to non-painted vessels is significant because polychrome and painted ceramics, in general, are more commonly encountered in association with mortuary complex deposits. It should be noted, however, corners of fences, and indeed fence lines themselves, can sometimes produce an abnormally high number of artifacts(or 'spikes') during a systematic site survey, for reasons mentioned above (artifacts such as *manos*, and *metates* are often moved). However, the fact that we have a "spike" in shovel test placed in the immediate vicinity of the mound feature seems to be evidence to suggest the mound is a burial mound associated with Preconquest occupation.



Figure 15. Mound feature located at Site 054

The other potentially Preconquest feature was the stone wall located on a small hill just over 15 meters in height, less than 200 meters southwest of systemic survey zone of Site 054. The hill was tested due to a suspicion feature was anthropogenic; four 50 x 50 centimetre units were placed in various locations around the stone wall. All units predominately comprised of Macaracas phase ceramics and both Conte and Macaracas style sherds seemed to have been used filler in the loose mason construction (bottom left corner of Figure 15). These artifacts were left out of analysis calculating demographic information as they fell out site the bounds of the systematic methodology; however future investigations at the site should attempt to determine in the stone wall is anthropogenic, and if so, was it made by Preconquest indigenous peoples.



Figure 16. Potential stone wall feature at Site 054. Left, PARP team members eating lunch with insert of ceramic artifacts observed within the loose mason construction; Right, profile shot of stone feature facing due east.