THE SOCIAL CONSTRUCTION OF COMMUNITY, POLITY, AND PLACE IN ANCIENT PUERTO RICO (AD 600 – AD 1200)

By

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For my Grandfather, Marion Baldwin Krauser

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LIST OF ABBREVIATIONS

ACE	Army Corps of Engineers
cal.	Calibrated
cmbs	Centimeters below surface
CPT	Central Place Theory
CRM	Cultural Resource Management
ESRI	Environmental Research Institute
GIS	Geographical Information Systems
ha	Hectares
ICP	Instituto de Cultura Puertorriqueña (Institute of Puerto Rican Culture)
km	Kilometers
m	Meters
MST	Minimum Spanning Tree
MNV	Minimum Number of Vessels
MNI	Minimum Number of Individuals
p-d	Person days
PRSHPO	Puerto Rico State Historic Preservation Office
SEARCH	Southeastern Archaeological Research
TASP	Tibes Archaeological Survey Project

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By

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This study examines the significance and process of community formation in the development of pre-contact polities in ancient Puerto Rico. Current perspectives of emerging polities in the Caribbean rely on the concept of "chiefdom" emphasizing elite aggrandizers and neo-evolutionary trajectories of social development and change. Through an examination of the relations between humans and landscapes, this research documents the (trans)formation of social communities between AD 600 and AD 1200 and the implications for the development of regional political institutions. A central theme of this research is the recursive relationship between small-scale social groups and the landscapes they occupy and how processes of community building and settlement structured social and political change.

This study focuses on south-central Puerto Rico and the region associated with the Ceremonial Center of Tibes. Tibes is one of the most elaborate ceremonial centers on the island and considered the seat of an incipient polity between AD 600 and AD 1200. This research shows that Tibes was part of a supravillage community heretofore undocumented. Corroborating this are the results of an archaeological survey

immediately surrounding the site that yielded small dispersed settlements primarily dating between AD 900 and AD 1200.

The survey results are situated within the broader socio-historical landscape of the south-central region through settlement pattern analyses. The analyses show that the rise of Tibes and its community was coeval with the proliferation of new settlements and supravillage communities throughout the region between AD 600 and AD 1200 due to population growth and dispersion. The increased complexity in regional socio-spatial networks promoted localization and fundamental changes in residential social groups evident in decreases in the size of settlements and domestic structures. Settlement composition and longevity, evident in radiocarbon dates and artifact accumulations research, suggests that land tenure and heritable property became increasingly important. This form of settlement and community organization contrasts with socio-spatial configurations and regional sociality prior to AD 600.

Settlement changes catalyzed new forms of social integration which are examined through the use and construction of plazas/ballcourts. Variability in the size, distribution, and labor required to construct these features suggests different social functions and that the power structure of local communities and incipient polities of the period was situational and regionally variable from AD 600 to 1200.

Ultimately, settlement and ritual practices of the period served to promulgate community identity, status, and corporate consolidation of natural, social, and symbolic resources. This research provides an alternative view to formulaic models of political development typically entailing the expropriation of power by elite, static hierarchical institutions, and the passivity of social groups inherent in current interpretations.

CHAPTER 1
THEMES AND AIMS OF RESEARCH

In this study I draw on a range of archaeological data from south-central Puerto Rico to document historical trajectories of development leading to the emergence of formative polities at the time of European contact—the *cacicazgos.* The aim of this research is to elucidate some of the major social and cultural transformations that occurred in the region between approximately AD 600 and AD 1200. A central theme of this research is the recursive relationship between human groups and the landscapes they occupy and how process of community building and settlement structured social and political change.

The study of ancient polities[1] has been, and continues to be, a central theme in the social sciences, particularly in political science and archaeology. Research pertaining to the formation and organization of ancient polities is attractive to modern scholars because it provides substantive material for explaining some of the enduring questions of our shared humanity including: human sociality, the origins social stratification, the rise and fall of political institutions, the emergence of the state, ethnogenesis, factionalism, and nationalism. Within contemporary archaeological research contexts of the Americas, a polity typically refers to regional political units associated with state-level societies with the spotlight on regions and cultures where these developments are most visible such as Mesoamerica and the Andes (see Yoffee 2005 for discussion). However, this term also refers to incipient political formations of regionally organized, socially stratified, non-state societies also known as “chiefdoms”.

[1] The term polity is derived from the classical Greek word *polis* which refers to ancient city-states (Oxford Dictionary 2010). For detailed discussion of traditional conceptions of the polity, a history of the Greek city state, and conceptualizations of the polity in the context of modern political science see Ferguson and Mansbach 1996.

Conventionally defined, chiefdoms imply a level of social complexity entailing the emergence of institutionalized social inequality and the formation of multi-village political units (or polities) under a centralized political authority (Johnson and Earle 2000; Redmond 1998). Because of this definition, the concept has come to represent a fundamental difference in the arrangement of human societies and a precursor to the state (Carneiro 1970, 1981; Yoffee 1993, 2005). At the inception of these early polities small-scale social groups, primarily focused on village and family life articulated into larger social and ideological collectives. According to Carneiro, its significance “lies in the fact that it represented, for the first time in human history, the transcending of village autonomy and the establishment of a supravillage polity” (1998:19).

The process of regionalization is usually concomitant with substantive transformations that entail the redefinition of the relational linkages between individuals, households, communities, and landscapes. However, the concept of the chiefdom and other typological constructs tell us little about the historical circumstances and socio-cultural processes leading to regionalization and the organization of social groups at finer social scales. Simply put, while societal typologies provide a level of utility in *describing* complex phenomena, isolating some cross-cultural commonalities among societies possessing similar demographic and/or organizational features, they have little *explanatory* power in and of themselves (Drennan 2008).

To redress this issue, it is necessary to examine how people, at finer social scales, are socially and materially constituted and articulated into larger social and political collectives. Central to this is a concern for understanding how social collectives, variously constructed and “imagined”, form a medium for political consolidation. I contend that in order to move beyond traditional archaeological approaches, focused on elite agency and evolutionary narratives, it is necessary "to see how our understanding of community and region help to construct concepts of identity and shape historical process of formulating place" (Knapp 2003:560) and, by extension, polity. In this research I question depictions of Puerto Rico's pre-contact populations as passive agents and instead highlight aspects of human sociality in the development of formative political institutions on the island and in ancient societies in general.

The *Cacicazgo*: An Enduring Design

The study of chiefdoms has been at the heart of archaeological research and interpretation of pre-contact societies in the Caribbean, and in particular Hispaniola and Puerto Rico. Upon arrival to the Greater Antilles, Spanish chroniclers documented sociopolitical networks of indigenous Taíno peoples as a series of *cacicazgos* (or chiefdoms) under the centralized leadership of *caciques* (or chiefs) (Las Casas 1951; Oviedo 1959, 1975; Pané 1999). For the past 20 years, archaeological research in the region has focused on the development of regional polities emphasizing processes leading to the centralization of authoritative power (*e.g.,* Curet 1992a, 1996; Keegan 2007; Siegel 1999, 2004, 2006). The typological concept of chiefdom is engrained in archaeological perspectives of the Caribbean where it was, in part, initially conceived (Oberg 1955; Steward and Faron 1959) and where it now represents the apex of social evolution of pre-contact societies of the region.

Studies of the *caicicazgo* in the Greater Antilles promote a history of *caciques* and their ability to centralize social and political power through the manipulation of religious ideology in community based rituals (Curet 1996; Oliver 2009, Siegel 1999). To support this perspective researchers have relied on ceremonial architecture, namely stone-lined plazas and *bateys* (ball courts), as evidence for the temporal and spatial distribution of centers of political power and ideological control (Siegel 1991, 1996; Torres 2005). Ceremonial architecture has been a key component in this respect as these features are deemed representative of the formalization of political authority based on the implied power and decision making authority necessary to appropriate the labor for their construction (Alegría 1983:118).

Indeed, few would disagree that complex regional polities characterized late pre-contact (AD 1200 – AD 1500) societies of Puerto Rico and Hispaniola. However, our understanding of their organization and the underlying social, cultural, and demographic conditions leading to their inception remain underdeveloped by a complacency induced through an enduring overreliance on the chiefdom concept.

Statement of the Problem

In a 2004 paper, Jim Petersen and colleagues noted that although "we have *some* idea about *when* and *where* social complexity developed [in the Caribbean]… most details about *how* and *why* remain unknown and disagreement pertains to this topic generally" (Petersen *et al.* 2004:18 [original emphasis]; also see Wilson 2007:111). Complicating our understanding of the *how* and *why* are several conceptual and methodological problems underpinning archaeological research and interpretation in the region.

The first problem relates to the traditional cultural-historical framework developed by Irving Rouse (1992). Recent research in Puerto Rico indicates a more complex history than previously assumed that does not neatly adhere to Rouse's original framework (Rodríguez Ramos 2010). Problematically, Rouse's framework precludes the possibility for the engagements of diverse social groups in the creation of cultural traditions and social institutions. Further, implicit in this framework is a lineal perspective of sociopolitical development whereby social groups necessarily evolve into more complicated and differentiated forms.

The second issue complicating matters is the uncritical use of ethnohistoric documents as a basis for archaeological interpretation. In many cases, researchers employ the ethnohistoric record from a few islands to infer political organization for broad regions which come to serve as “historical facts” encompassing periods of time several centuries prior to their writing (Curet 2003; Curet and Stringer 2010). This promotes regional homogeneity in the organizational form and diversity of social groups through time and space, yet continues to serve as a cornerstone for archaeological inference in Hispaniola and Puerto Rico.

Yet, perhaps the largest obstacle inhibiting an understanding of the region’s past is the overreliance on the “chiefdom” concept and its influence on archaeological interpretation in the Caribbean and Americas in general (Pauketat 2007). More often than not, the concept functions as an *explanatory destination* rather than a *point of departure* for examining variable and diverse socialities within socially and historically mitigated landscapes. Hence, ideas of the polity (or *cacicazgo*) in the Caribbean are cultivated by a perspective of linear development, social homogeneity, and uniform political structure rather than a plurality and diversity of organizations, communities, identities, and histories (Curet 2003). This perspective has come at the expense of other domains of archaeological inquiry—particularly the underlying conditions shaping regional socialities and the formation of *communities* (Pauketat 2007; Sassaman and Randall 2007; Yeager and Canuto 2000).

One of the major issues resulting from an overemphasis on the chiefdom concept is the intellectual disconnect between our understanding of the emergence of powerful leaders and the development of supravillage social groups which are treated as separate analytical domains albeit highly dependent phenomena. And while I neither deny the emergence of powerful leaders within any society, nor their tremendous impact on the lives they influence, the processes responsible for their emergence is but one small part of a larger (hi)story (Hegmon 2008:222-223) that entails a dialectical relationship between social collectives and institutions of leadership and power (Roscoe 1993; Saitta 1997).

Because of these perspectives, interpretations of the political landscape of ancient Puerto Rico is punctuated by the role of singular central places, mainly ceremonial centers or large settlements, as points from which political power is centralized and delegated down to subordinate villages (Siegel 1996a, 1999, 2004). This position essentializes people and places within space, treating them as individualized and static phenomena. To the contrary, these features are evidence for the historical engagements of people and their interactions within the larger world as parts of relational social fields, networks, arenas, institutional structures, and landscapes (Bourdieu 1977; Latour 1999).

To develop a fuller understanding of incipient political formations on Puerto Rico, it is necessary to critically examine the social and historical conditions under which small-scale social groups created and negotiated their social realities in relation to the broader social landscapes in which they lived. This approach relies on examining the materiality of landscape and the "important commonalities [that] unite certain groups of individuals to varying degrees while separating them from those in other similarly defined communities" (Lewis 1991:606). This perspective recognizes that people are simultaneously articulated *and* fragmented at different scales and in discernible ways based on *identities* of geography, kinship, cultural affiliation, political allegiances, and history.

Research Objective and Analytical Approach

In this research I propose that *that the inception of the polity in parts of Puerto Rico was a product of the promotion of communal status and identity.* At the core of this idea is a primary concern for studying human sociality and the processes/conditions that served to articulate, reinforce, and perpetuate social collectives as durable social, symbolic, and political institutions. In this research, the examination of small-scale local social groups serves as a starting point for this endeavor. By examining local social formations, within broader historical and organizational contexts of landscapes, I intend to arrive at an understanding of cultural and social phenomena less structured by typological concepts that dictate what incipient polities are and instead focus on how they were developed, organized, reproduced, and transformed.

In this work I use the concept of *community* as it forms a relational link between people, place, and time and offers a kaleidoscope through which to examine scalar properties of social collectives. At one scale, the community represents local, interdependent, residential social groups that engage in regular face-to-face interactions bound together in the use of local social and natural resources (Kolb and Snead 1997; Murdock 1949). At another scale, communities are socially and symbolically constructed, "imagined" (Isbell 2000), or "virtual" entities that are forged through historical interactions, symbolic associations, and negotiations of identity.

In order to link concepts about what communities are to the archaeological record, I focus on their 1) *composition* and 2) *organization*, evinced through the materiality of settlement, and 3) their *symbolic construction*, through the use and construction of ritual integrative facilities. To do this I rely on multiple lines of archaeological evidence, derived from a variety of sources, including: published and unpublished documents on excavated settlements, a Geographical Information Systems database of sites, new research associated with ceremonial centers, a suite of radiocarbon dates, and the results of a field survey I recently conducted in the foothills of the south-central portion of the island (Torres 2008).

Analytically, I emphasize settlement patterns to examine the composition of social groups, infer aspects related to their organization, and to show how these transformed through time at local and regional scales. In doing so, I show how communities were (re)defined between AD 600 and AD 1200 and the implications of these changes on the formation of the *cacicazgos* evident at European contact. Critical examination of plaza/*batey*s from the region, including an evaluation of their function in the material and symbolic construction of community and landscape, supplement these analyses.

In this research, I focus on the region surrounding the ceremonial center of Tibes just north of the modern city of Ponce in southern Puerto Rico (Figure 1-1). Three hydrologic basins (or watersheds), situated on the south side of the island's central mountain chain, compose the south-central region as discussed in this study. These include (from west to east) the Yauco, Portugués, and Coamo watersheds. In total, the study area encompasses approximately 1,500 km² representing 16% of the island's total landmass.

Tibes is one of the earliest and most complex ceremonial centers on the island, and the Greater Antilles in general. Based on current research, Tibes was a modest settlement established by AD 500 (Curet and Stringer 2010; González Colón 1984; Pestle 2010). Sometime between AD 700 and AD 1100, previously cleared central plaza areas were delimited through the construction of stone-lined plazas/*bateys* that eventually resulted in the twelve stone structures at the site (Curet and Stringer 2010).

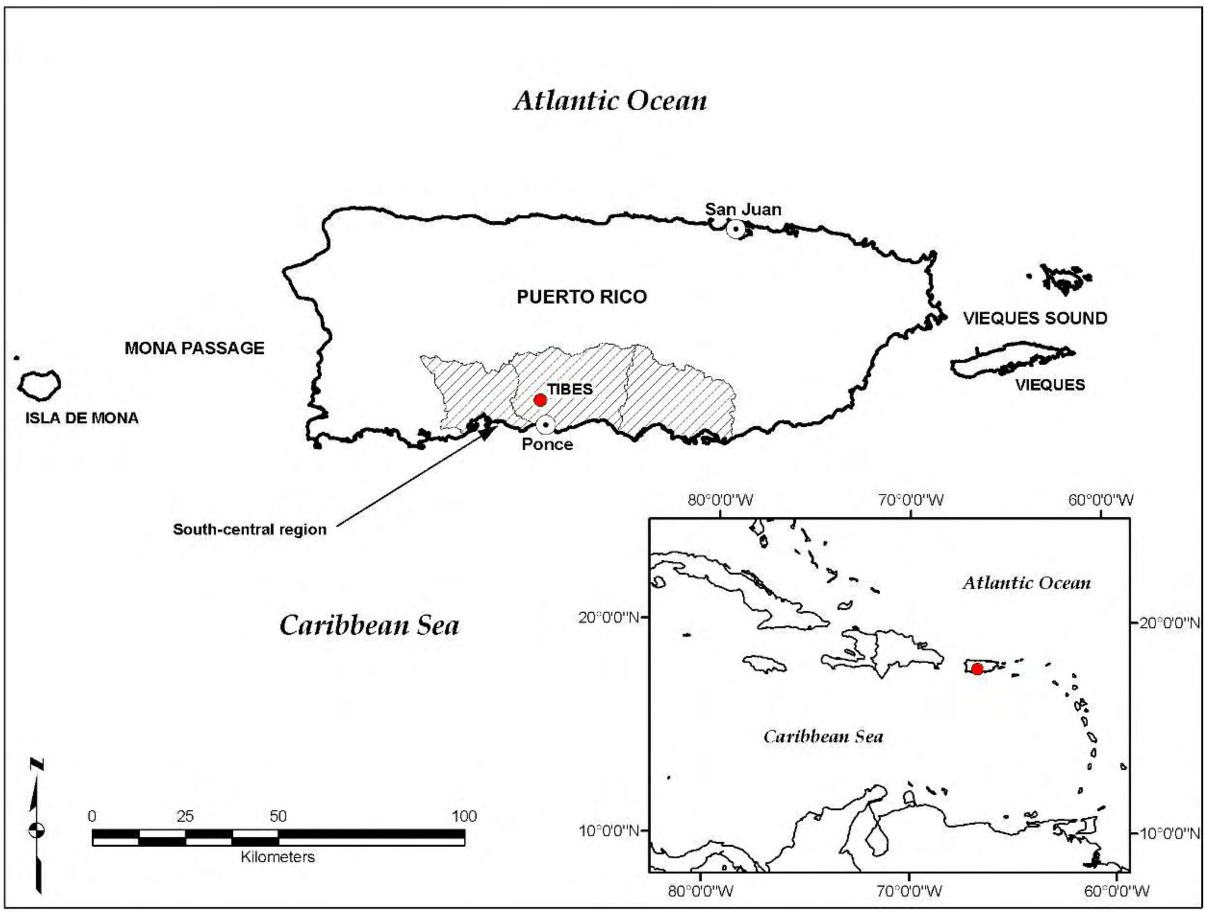

Figure 1-1. Study area, south-central Puerto Rico.

In its heyday (ca. AD 900 – AD 1200) Tibes was an important social, economic, religious, and political center at the heart of a burgeoning polity (González Colon 1984;

Curet et al. 2006; Curet and Stringer 2010; Torres 2010). Ongoing archaeological investigations at Tibes, and the surrounding region, indicate that it was an important node within a broader social network at a time of ideological and cultural transformation on the island and across the Caribbean in general (Curet 2005; Curet et al. 2004, 2006; Torres 2005, 2010). Regionalization, shifts in materiality, and the formation of higher level ritual and political institutions often emerge during times when social groups and rules are in flux because of shifting relations in local and regional populations. Therefore, by focusing on the region immediately surrounding Tibes I anticipated that archeological evidence for these changes, and some of the underlying conditions responsible for them, to be readily apparent.

This study contributes to a growing body of research that offers new insights on ancient history of the Caribbean, a region often relegated to the backburner of archaeological research of the Americas, and questions previous assumptions regarding formative political institutions in the New World based on an evolutionary narrative. This research also highlights processes of community formation and the dynamics of small-scale residential social groups in the development of incipient political systems. Fueling the timely examination of the region, and the issues presented in this work, are recent publications of the pre-contact history of Tibes (Curet and Stringer eds. 2010), the island (Rodríguez Ramos 2010), the extraordinary and controversial finds at PO-29 (Espenshade and Young 2008, 2011; Siegel et al. 2009), and the region as a focal point of indigenous political resistance since the time of European contact (Sued-Badillo 2008). Finally, this research strives to promote the preservation of the island's cultural patrimony and contribute to the ongoing narrative of Puerto Rico's history.

A Map to this Study

This work consists of ten chapters; including this introduction. In Chapter 2 I review the cultural-historical framework and archaeological contexts for the island with specific focus on the south-central region. I begin by presenting a brief review of research related to sociopolitical development and organization on the island followed by an overview of the cultural-historical framework developed by Irving Rouse (1992). The heart of this chapter consists of an in-depth discussion of current archaeological evidence from the island to provide a nuanced historical context for the research presented here. The final portion of this chapter summarizes previous research from the south-central region and evaluates available radiocarbon dates from the area to contextualize the present study in its immediate archaeological and geographical settings.

Chapter 3 introduces some of the key theoretical concepts discussed in this work. In the first part of this chapter, I briefly discuss anthropological approaches to formative political institutions. I then examine the concept of community by emphasizing aspects structuring the organization of small-scale residential social groups. Here, I focus on the role of kinship, households, and ritual as important dimensions that structure communities. I conclude this chapter with a brief discussion of landscape and how it links people and places in the structuration of society.

Chapter 4 supplies background and methodological considerations for this research. I first outline the analytical strategies and methodologies guiding this research. As a large portion of this work employs settlement pattern data, I then give a review of settlement research in archaeology and the Caribbean. In this chapter, I also discuss some of the factors influencing the spatiality of social groups and patterns of distance that structure settlement and social interaction. This discussion contributes to the interpretation of patterns observed in the archaeological data as presented in Chapters 7, 8, and 9.

Chapter 5 presents the methods and detailed results of the Tibes Archaeological Survey Project (TASP), an archaeological survey I conducted in the region immediately surrounding the ceremonial center of Tibes (Torres 2008). This section gives descriptions of the sites identified during the survey and characterizes settlement variability in the Tibes locality. The results of this survey form a foundation for further analysis and a point of departure for comparative examination of community organization throughout the broader study region.

In Chapter 6 I provide the analyses and interpretations of the artifacts and sample of faunal remains recovered during the survey. These materials situate social groups within the local landscape associated with Tibes and provide clues to the functional and temporal context of the newly identified archaeological sites. I revisit the pottery data from this chapter in Chapter 8 to evaluate the composition and temporal duration of residential settlements in relation to other similarly constituted settlements in the south-central region between AD 600 and AD 1200.

Chapter 7 presents the settlement pattern analyses for the south-central region. Through detailed examination of regional settlement landscapes, I characterize the variability in regional settlement through time, elucidate the distribution and organization of regional populations, and discuss the implications on the (trans) formation of communities. In doing so, I reveal a major reconfiguration in the regional social landscape between AD 600 and AD 1200 that entailed a fundamental restructuring of local and regional social relations during that period.

In Chapter 8, I return to the local landscape associated with Tibes to discuss community organization by examining the composition of residential settlements. In this chapter I focus on co-resident social groups and households to elucidate community members in their most elemental settings. Here, I compare data from two residential settlements recorded during the field survey (PO-42 and PO-43) to other similar coeval settlements in the south-central region between AD 600 and AD 1200. Through this, I demonstrate how the changing structure of residential settlement contributed to the creation of local identities and new forms of community that contrast with previous social formations.

In Chapter 9, I conclude the analytical portion of this work through a review and evaluation of plazas/*bateys* from the region. This chapter explores the use of these spaces and their role in the social and material construction of people and "places" that came to define social, symbolic, and political communities in the post AD-600 landscape of Puerto Rico. This discussion relies on spatial distributions, size, and labor estimates of a sample of these features to address assumptions of political development, consolidation, and regional hierarchies. This chapter also examines the role of these features in the articulation of social communities the implications for the organization of local and regional social groups.

To conclude this study, the final chapter (Chapter 10) offers a synthesis and discussion of this research which demonstrates that the social construction of the community, variously structured and imagined between AD 600 and AD 1200, served as a basis for local and regional social order and a foundation for incipient political institutions in the region. Ultimately, this work provides an alternative view to the formulaic models of political development on the island entailing the expropriation of power by the elite, static hierarchies, and the passivity of non-elite inherent in current interpretations. Here the *cacicazgos* of ancient Puerto Rico were living communities of people, intimately tied to one another through social relations, history, and *places* on the landscape. I conclude this chapter with suggestions for future research for the region, the island, and for studies of ancient polities and communities in general.

CHAPTER 2
HISTORICAL OVERVIEW AND ARCHAEOLOGICAL CONTEXTS OF SOCIOPOLITICAL CHANGE IN PRE-CONTACT PUERTO RICO

In this chapter I present the cultural-historical framework and archaeological contexts for this study. Writing this chapter was a challenge because the traditional cultural-historical framework developed by Irving Rouse (1992) is rapidly changing. Stimulating these changes is a wealth of new data generated from cultural resource management (CRM) and academic research projects on the island since the 1980s. This research demonstrates that there is more variability in the spatial and temporal arrangement of peoples on the island, bringing into question traditional notions of social and cultural development.

I begin this chapter by summarizing recent research regarding the development and organization of the *cacicazgo* in Puerto Rico. Following this is a review of Rouse's time-space systematics that defines basic terms and concepts and identifies some of the problems associated with their use. Next, I provide culture-historical contexts for the island with particular attention to the social and cultural milieu between AD 600 and AD 1200. This was a period of marked social and cultural transformations and represents the temporal focus of this work. I conclude this chapter with a brief review of archaeological research from the south-central region. Here I summarize the major archaeological finds and evaluate a suite of radiocarbon assays which serve as points of reference and units of comparison later in this study.

The Study of Sociopolitical Organization in Pre-contact Puerto Rico

As briefly introduced in Chapter 1, our current perception of sociopolitical organization in ancient Puerto Rico derives from ethnohistoric documents depicting a series of complex, territorial polities (*cacicazgos*) on the islands of Hispaniola and

Puerto Rico upon European contact. Described by Spanish chroniclers, *cacicazgos* are large territories, comprising many smaller villages (*yucayake*), under the leadership of a paramount *cacique*[1] (chief or lord) that controls the social, economic and ritual aspects of society. Ethnohistoric descriptions of the *cacicazgos* of Hispaniola and Puerto Rico primarily come from the writings of Columbus (1969), Pané (1999), Oviedo y Valdéz (1959, 1975), Martyr de'Anghiera (1964) and Bartolomé de Las Casas (1951). The most detailed descriptions of indigenous sociopolitical organization are from Hispaniola and many scholars often utilize these accounts as direct analogs for describing Late Ceramic Age (AD 1200-AD 1500) society and culture in Puerto Rico. Scholars also rely on the writings of Fernández de Oviédo y Valdez whose *Historía general y natural de las Indias* (1959; 1975) gives a detailed second hand account of major events that transpired at the time of Spanish settlement and conquest of the island.

Early research of the *cacicazgos* on Puerto Rico and Hispaniola focused on the identification of political territories and the location of chiefly settlements described in the Spanish chronicles[2] (*e.g.,* Fewkes 1907; Loven 2010 [1935]; Rouse 1952; Vescielus 1980). It was not until the late 20th century that scholars began to study process of development and the organizational dynamics of these polities. With the "New" North American and Marxist oriented Latin American "Social" archaeologies of the 1970s and 1980s, researchers employed adaptationist perspectives that focused on subsistence economy to explain social, cultural, and political change[3] (Binford 1968; Vargas Arenas

[1] The word *cacique* was interpreted by the Spanish to mean king or governor but in the native language the word was perhaps *ka-siqua* meaning with house or head of houses (Arrom in Pané 1999:8).

[2] See Carbone 1980, Curet 2003, and Curet and Stringer 2010 for discussion.

[3] See Curet 1992a 82-97 for discussion.

1985; Veloz Maggiolo 1984). However, while population/resource imbalances undoubtedly affected the formation of regional polities on the island, these factors do not appear to be the primary causes for their development (Curet 1992a; Torres and Curet 2008).

Through the 1980s and 1990s, archaeologists became interested in processes of political consolidation and the evolution of social complexity in mid-range societies. During this time, researchers working in the Caribbean (and other regions) stressed neo-evolutionary schemas of societal development from tribes to chiefdoms and between simple and complex forms of the latter (Table 2-1; Moscoso 1981; Siegel 1996a).[4]

Table 2-1. Idealized representation of sociopolitical evolution for Puerto Rico.[5].

Period	Social Org.	Community Org.	Ideological Org.	Mortuary Patterns	Cultural Complex
PIV AD 1200-AD 1500	Simple-Complex Chiefdoms	Polity Based Village Hierarchy	Ancestor worship with ideology of domination	Clan based; Socially partitioned by grave goods	Esperanza, Capa, Boca Chica
PIII AD 600-AD 1200	Complex Tribe-Simple Chiefdom	Small village-Large village-*batey*	Ancestor Worship; Incipient ascripitive social inequality	Community based ballcourts	Monserrate, Santa Elena
PII 500 BC-AD 600	Tribe-Complex Tribe	Village Oriented, Central Plaza Ringed by communal houses	Ancestor Worship; Egalitarian Ethic	Community based central plaza area	Hacienda Grande, Cuevas

[4] Siegel (2010) has recently shifted his definition of evolution to imply social and cultural change in the broader sense of the word.

[5] Adapted from Seigel, P.E. (1996) Ideology and Culture Change in Prehistoric Puerto Rico: A View from the Community. *Journal of Field Archaeology* 23(3):313-333.

By the late 1990s, concepts associated with political-economy, emphasizing economic *and* ideological processes, served as the central platform for framing research questions and interpreting archaeological data. In this research, the evolution of the *cacicazgos* was reliant upon the ability of powerful self-aggrandizers to successfully command labor and production through control and manipulation of social, religious, and symbolic capital (Curet 1992a; 1996; Moscoso 1981; Oliver 1992a, 1998; Siegel 1991, 1996a, 1999). For Siegel (2004, 2006, 2010) this process stimulated regional antagonism and conflict among social groups which he conceives as the primary impetus for the regional consolidation of local social collectives.

Current wisdom suggests that the centralization of political power on Puerto Rico was a result of elite-based strategies associated with the corporate mode of political economy.[6] Here motivated self aggrandizers consolidated political power through hosting perfromative rituals demonstrating access to apical ancestors and control over associated ideological symbols and objects (Curet 1996; Oliver 2009; Siegel 1996a, 1999). Supporting this hypothesis is the proliferation of ceremonial objects, shifts in settlement patterns, and the emergence of communal based integrative ritual facilities (plazas/*batey*s) throughout the island after AD 600.

[6] Blanton and colleagues (1996) initially conceived of corporate and network political economic strategies as occurring in a variety of social formations; not constrained to a particular societal type or scale of development. The corporate-network model was meant to "elucidate the types and sources" of sociopolitical power within all societies (Blanton *et al.,* 1996:3). In the network mode, access to power is through the acquisition of wealth based on a prestige good economy in which elites control access to preciosities and/or critical natural resources in exclusionary exchange networks. In contrast, the corporate mode posits that the centralization of power is through control over communal ritual activities and staple finance (Blanton *et al.,* 1996: 7). Broadly conceived, the model represents a continuum with both modes present to varying degrees at any particular point in time.

Additional evidence supporting the centralization of political power through corporate strategies, are archaeological correlates indicating the reduction in size of domestic structures (and by extension--households [Curet 1992b]) and exclusionary mortuary practices that point to a decreased emphasis on kinship and the crystallization of institutions of status and rank (Curet and Oliver 1998). Research from Puerto Rico and southeastern Hispaniola indicates that symbolically charged objects, such as three pointed *cemi*s, stone collars, and ritually charged spaces are the material referents for the personification of elite power and authority (Alegría 1995; Curet 1996; Oliver 2009; Siegel 1999; Walker 1993). These changes are also thought to represent shifts in the domestic economy (Moscoso 1981). Both interpretations are complementary and emphasize the narrowing of social and political power to particular individuals.

Fundamental to current interpretations are stone-lined plazas and *bateys* (ballcourts). These features are considered the primary evidence for the temporal and spatial distribution of centers of political power, communal ceremonies, and corvée labor projects controlled by chiefly individuals (Alegría 1983; Ortiz Aguilú 2009; Siegel 1991, 1999). However, noted variability in the distribution, size, spatial arrangement, construction techniques, and petroglyphs on the stones composing these features suggests that sociopolitical organization and its ideological basis was regionally variable among the peoples of the Greater Antilles (Curet 2003; Keegan 2007:57; Oliver 2007, 2009). The structural variability of these features and their underlying implications on the organization of local and regional social groups of the island have yet to be fully explored and documented.

Traditionally, the political landscape of Puerto Rico is seen as a tiered hierarchy based on the total area of plazas/*bateys* at a given site. Regional analysis supporting this interpretation rests on a limited number of sites with emphasis on those utilized immediately prior to European contact (Siegel 1991, 1999). This axiom promotes the role of singular central places from which ideological, administrative, and ultimately political power is centralized and delegated down to subordinate residential settlements. A troubling consequence of this schema is the homogenization of organizational variability of regional social groups during and prior to the late pre-contact era. Moreover, this perspective obfuscates a relational perspective of interacting social groups at finer social scale of analysis. This perspective is unwittingly perpetuated throughout the archeological literature of the region.

Current scholarly discourse regarding political development and organization in the region advocates a shift from one-dimensional portrayals of the past to approaches that examine various social and cultural processes at finer social and temporal scales of analysis (*e.g.,* Curet and Stringer 2010; Keegan 2007; Oliver 2009; Rodríguez Ramos 2010). However, this approach has been hampered by the fact that "Very little effort has gone toward the collection of more refined data at the smaller level of community or household in order to develop more detailed and realistic models" (Curet and Stringer 2010:3). I contend that this endeavor is also restrained by the lack of attention paid to the dialectic between communal bodies and institutions of power in the structuration of society (Giddens 1984; Roscoe 1993). This study is a response to these issues. Here the focus on communities, and the historical circumstances influencing the formation of local social groups, reveals some of the conditions for how people coalesced in particular places at particular times, articulated into broader social and political communities, and how such interactions may have changed over time.

Rousean Time-Space Systematics

Irving Rouse devised the cultural-historical framework for Puerto Rico and the Caribbean during the Classificatory-Historical period of North American archaeology.[7] Rouse's framework set the agenda for archaeological research in the region for more than five decades and contemporary scholars are indebted to his many contributions (as noted in Petersen *et al.,* 2004). Rouse's framework has been revised several times since the late 1930s (*e.g.,* Cruxent and Rouse 1958; Rouse 1939, 1948a, 1948b, 1951, 1952, 1964, 1986, 1992, Rouse and Cruxent 1963) and is in revision again, particularly for Puerto Rico (*e.g.,* Rodríguez-Ramos 2010; Rodríguez-Ramos *et al.,* 2010).

Rouse's framework is based on a tiered system of cultural classification consisting of (in ascending order) *style* (or complex), *subseries,* and *series*. His motivation for developing this system was principally for tracking "peoples and cultures" through time and space (Rouse 1986; Siegel 1996b). He created the framework through defining styles of pottery (and other archaeological materials), and grouping these into larger classificatory units based on similarities in attributes or *modes* observed through comparative analysis. The categories were constructed to be as "culturally homogenous as possible" (Rouse 1986:7).

Rouse classified pottery styles on the concept of *modes* that represent sets of commonly occurring attributes in artifacts. Modes, and the stylistic qualities of other aspects of material culture, were considered to reflect the cultural *norms* of the people

[7] See Wiley and Sabloff 1974 for historical overview.

who made them (Cruxent and Rouse 1958:2; Rouse 1952:326-327; Rouse 1972; Siegel 1996b). Hence, similar modal forms and decorative techniques conform to the "peoples and cultures" that produced them (Curet 2005:9-26, Keegan 2007:52-58; Petersen *et al.,* 2004). For Puerto Rico, Rouse never formally published all of the ceramic modes and recent critiques note inconsistencies in the stylistic attributes for classifying pottery as well as the interpretive implications associated with his framework (Gutiérrez and Rodríguez 2009).

At the foundation of Rouse's cultural-historical schema is the unit of *style* or *complex*. In his book, *The Taínos*, Rouse defines ceramic styles in two ways: 1) the "Sum total of a people's wares and modes--a site-unit" and 2) the "cluster of a people's ceramic traits that has spread to neighboring peoples or has survived among subsequent peoples—a trait-unit" (Rouse 1992:175). However, Rouse typically used the first definition and reserved the term *complex*, rather than *style*, for material culture associated with Lithic and Archaic cultures (Cruxent and Rouse 1958:3; Rouse 1992).

Rouse noted that pottery assemblages from different geographical areas and times shared many similarities but were not identical. Hence, he proposed that some ceramic styles, and by extension cultures and peoples, were related based on these shared modes. Spatially and temporally related styles sharing common modes were considered descendant from a common ancestor (Siegel 1996b). Thus, Rouse developed the term *series* which he defined as "a set of related styles sharing many, but not all, of their diagnostic modes forming a continuous series, extending through time or space or both" (Rouse 1992:182-184).[8]

Until the mid-1980s, pottery styles in Puerto Rico (Santa Elena, Early (Pure) Ostiones, Late (Modified) Ostiones, Capá, Esperanza, and Boca Chica) were classified into three separate series: Ostionoid, Elenoid, and Chicoid (Rouse 1982, 1986:143). This categorization had the unintended consequence of obfuscating variability in the material culture and the historical relationships among the three series.

In 1980 Gary Vescielus created an intermediate taxonomical level between the style and series termed *subseries* which Rouse later adopted (Vescielus 1980; Rouse 1992:33).[9] Rouse defines the subseries as "a division of a series consisting of styles and cultures that share a common ancestor" (1992:187). For Rouse, pottery styles that diverged or evolved from a common ancestral style could be grouped together as a subseries. The processes that distinguish one subseries from one another were explained either through decreased interaction between daughter styles or the adoption of foreign elements and/or innovations that were shared by daughter styles of one of the subseries but not the others (as summarized in Weaver *et. al* 1992).

Style, subseries, and series terms are all frequently used to denote cultural manifestations as well as the temporal range in which a particular style, subseries or series is thought to have spanned. In each case, these terms apply to different conceptual contexts that are often neither consistently maintained nor explicitly defined

[8] Series were named from the first style in which the series was identified, or from the earliest instance or most typical style for the series. To distinguish them from styles, series names are followed by the suffix–oid (*e.g.,* Saladero yields Salad-oid).

[9] Subseries are named after the style most typical of the subseries proceeded by the suffix–an to distinguish it from both style and series.

in archaeological studies of the Caribbean. Nonetheless, most Caribbean researchers continue to use these terms for delineating cultures, space, and time.

Rouse identified one Archaic complex and nine ceramic styles for Puerto Rico (Figure 2-1) which he categorized into four distinct cultural periods (PI, PII, PIII and PIV) each with an early and late (a, b) component (Rouse 1992:52 and 107). These periods are traditionally used to define the Archaic age (PI) (c.a. 1000 BC– 300 BC) and the ceramic sequences associated with the Saladoid (PII) series (300 BC –AD 600), the Elenan and Ostionan Ostionoid (PIII) subseries (AD 600 – 1200) and, the Chican Ostionoid (PIV) subseries (AD1200 – 1500).

<table>
<tr><th rowspan="2">DATE (APPROXIMATE)</th><th rowspan="2">PERIOD</th><th rowspan="2">SERIES</th><th colspan="2">SUBSERIES</th><th colspan="2">COMPLEX/STYLE</th></tr>
<tr><th>WEST</th><th>EAST</th><th>WEST</th><th>EAST</th></tr>
<tr><td>AD1200 -1500</td><td>IVa</td><td rowspan="3">Ostionoid</td><td colspan="2">Chican</td><td>Capá/Boca Chica</td><td>Esperanza</td></tr>
<tr><td>AD 900 - 1200</td><td>IIIb</td><td rowspan="2">Ostionan</td><td rowspan="2">Elenan</td><td>Late
Modified Ostiones</td><td>Santa Elena</td></tr>
<tr><td>AD 600 – 900</td><td>IIIa</td><td>Early
Pure Ostiones</td><td>Monserrate</td></tr>
<tr><td>AD 400 – 600</td><td>IIb</td><td rowspan="2">Late
Saladoid

Huecoid

Saladoid</td><td colspan="2" rowspan="2">Cedrosan (for
Saladoid only)</td><td colspan="2">Cuevas</td></tr>
<tr><td>300 BC - AD 400

200 BC - AD 600

500 BC - AD 400</td><td>IIa</td><td colspan="2">|
|
| La Hueca
Hacienda Grande</td></tr>
<tr><td>4000 BC – AD 100</td><td>Ib</td><td>Ortoroid</td><td colspan="2"></td><td colspan="2">Coroso</td></tr>
</table>

Figure 2-1. Socio-temporal framework for Puerto Rico.[10]

Recently, Rodríguez Ramos (2010) showed that cultural development is neither unilineal nor sequential as predicated by Rouse's socio-temporal boxes. Using a suite of recalibrated radiocarbon dates from the island, he demonstrated that the temporal

[10] Adapted from Rouse, I. (1992) *The Tainos*, pp. 52-53, 107. Yale University Press, New Haven

distribution of pottery shows instances where more than one culture overlapped in time and space (Figure 2-2) suggesting a more dynamic and plural landscape than previously conceived.[11] As a result, Rodríguez Ramos promotes a reticulate model of cultural development rather than one characterized by clear phylogenic relationships.

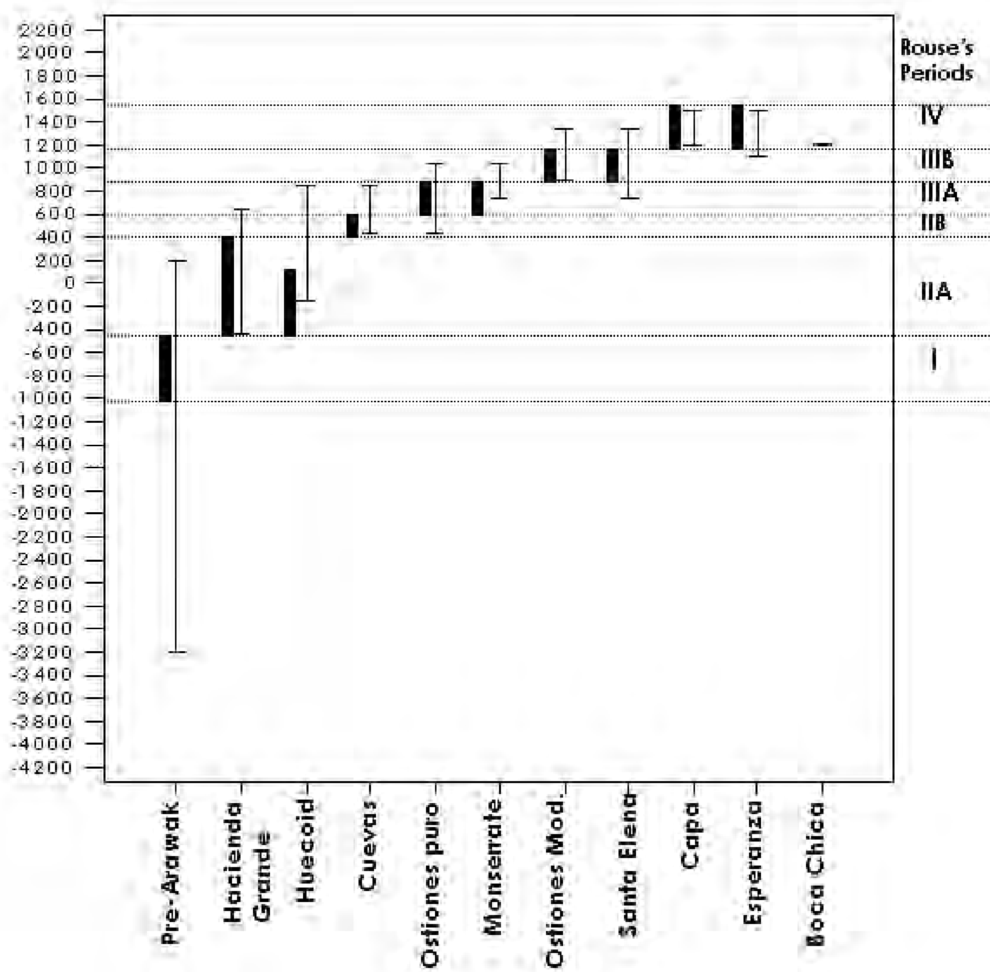

Figure 2-2. Temporal distribution of pottery styles for the island of Puerto Rico. High-Low logs are based median 2σ ranges of radiocarbon dates. The black boxes denote ranges based on Rouse (1992). (Figure based on Rodríguez Ramos 2010).

[11] Connected to this critique, I would also add that Rouse's framework (as used, interpreted, and perpetuated by others) has heavily influenced conceptualizations of the development of social complexity whereby earlier cultures were less evolved or developed than those of later time periods.

Compared to Rouse's framework, the observed variability between the temporal distribution of radiocarbon dates and associated pottery styles reveals several discrepancies. For instance, earlier cultural manifestations represented by Hacienda Grande and La Hueca styles persist much longer and overlap with purportedly earlier Archaic complexes as well as later pottery of the Ostionoid series. Further, Cuevas pottery is documented in the same context with Ostiones, Monserrate, and Santa Elena styles at some sites, while at others only one style is present. Similarly, Modified Ostiones and the Santa Elena styles overlap with the dates of purportedly earlier Pure Ostiones and Monserrate styles. The variability points to a landscape characterized by diverse social groups which Oliver observes, "is not always the result of mechanical admixtures or post-depositional factors… but rather is a reflection that plurality predominates" (Oliver 2009:39).

Despite problems with the current cultural chronology, it is important to note that *there are* patterns in the temporal and spatial distribution of material culture on the island that promote the diachronic examination of local and regional social groups. I contend that the variability in cultural expressions is contingent upon particular local contexts that are not necessarily temporally synchronized for the island as a whole. In this sense, the varying temporal distributions of material culture reflect historical trajectories of social groups occupying smaller regions (*i.e.*, micro-regions), or *locales* (*sensu* Giddens 1984), and emergent interaction spheres that may lose interpretive precision over larger geographical scales (Thomas and Ehrich 1969). Hence, one of the primary goals of current research should be the development of regional and micro-regional histories (Keegan 2001). This scale of analysis lends itself to understanding social and cultural transformations, like the emergence of ancient social and political communities that, while linked at larger inclusive social and spatial scales, become more apparent at smaller ones (Curet 2003). It is at these smaller scales where social agents make decisions and where shifts in social practices leading to social and cultural change originate.

Pre-Contact Culture-History of Puerto Rico

Rouse's four socio-temporal periods (I, II, III, and IV) form the basis for the following cultural-historical overview of the island. While the details and timing of specific social and cultural manifestations is still a matter of contention, I utilize Rouse's periods as a rough guide for distinguishing major cultural trends evident in the archaeological record. Of particular importance is recognition that the distinct socio-temporal boundaries determined by Rouse's pottery styles are dynamic overlapping periods of interaction and transformation rather than strict delimiters of them. Hence, the use of Rouse's periods should not limit our ability to envision the existence of socially and culturally diverse communities with unique identities and histories.

Period I: Pre-Arawak/"Archaic" Occupation (ca. 4000 BC – AD 100)

The earliest evidence for human occupation on the island of Puerto Rico is defined by Rouse's Archaic period (Ortoiroid Series) Coroso complex (Rouse 1992). Artifact assemblages lacking pottery but containing abundant stone (particularly groundstone) and shell tools (Alegría 1965; Rouse 1992) traditionally define this complex. Archaic habitation sites are generally considered small, ephemeral occupations located near coastal or estuarine environments (Alegría *et al.,* 1955; Ayes Suárez 1989; Rodríguez López 1999, 2004; Rouse and Alegría 1990). While Rouse conceived that the Archaic peoples were culturally homogenous, recent research suggests that the island may have been a point of convergence of multiple social groups from Central and South America (Rodríguez Ramos 2010; Veloz Maggiolo 1993).

Archaic social organization is based on evolutionary models of complexity associated with hunter-gatherer societies where social groups are comprised of small mobile bands lacking pottery and cultigens (Alegría *et al.,* 1955:113; Rouse 1992:58). Because of this, Archaic groups on Puerto Rico were thought to have little if any impact on the development of subsequent cultural groups and their sociopolitical formations (Curet 2005; Rouse 1992; also see Rodríguez Ramos 2010; Rodríguez Ramos *et al.,* 2010).

The earliest evidence of the settlement of Puerto Rico comes from the sites of Angostura, which produced a radiocarbon date of 4900 cal. BC (Ayes Suárez 1993) and Maruca, located on the south-central coast, dating to 2700 cal. BC (Rodríguez López 1999, 2004). These dates are also supported by evidence for early anthropogenic landscape modifications through intentional burning and clearing of forested areas (Burney *et al.,* 1994; Siegel *et al.,* 2005).

Evidence from Cueva María de la Cruz (Rouse and Alegría 1990), Paso del Indio (Clark *et al.,* 2003; Walker 2005), and Yanuel 9 (Tronolone *et al.,* 1984) show that Archaic populations existed at least through AD 100 and interacted with Saladoid populations (Rodríguez Ramos 2010:150-155). Hence, instead of the Saladoid colonizers rapidly replacing the previous inhabitants, they lived side by side for as long as 600 years.

Archaic settlement patterns are not well documented, especially in the interior river valleys. Data for existing sites primarily comes from coastal locations. Angostura is a large site exceeding 5 ha on the northern coast of the island and other large Archaic period sites are registered for the south-central region at Cayo Cofresí (Veloz *et al.,* 1975) and Maruca (Rodríguez Lopez 1999). The presence of postmolds indicating semi-permanent structures at Paso del Indio (Walker 2005) and Maruca (Rodríguez López 1999) suggest some degree of sedentism. Burial clusters registered at Maruca suggest long-term use and brings into question the degree of mobility (and ultimately "simplicity") normally associated with these groups (Rodríguez Ramos 2010).

Paleobotanical research from several Archaic contexts provides evidence that Archaic groups cultivated a wide variety of plants (deFrance and Newsom 2005; Newsom 1993; 2008; Newsom and Pearsall 2003; Newsom and Wing 2004; Pagán Jiménez *et al.,* 2005). The results from these studies indicate the presence of maize (*Zea Mays*), manioc (*Manihot esculenta)*, yam (*Dioscorrea spp.*), and sweet potato (*Ipomoea batatas)* centuries prior to the arrival of later Saladoid and Huecan groups—the purported purveyors of horticulture and plant domestication to the island.

In addition, pottery has been recovered from Archaic contexts at over a dozen sites on Puerto Rico. Current research shows that many of the design motifs from this early pottery are replicated in later Ostionoid pottery assemblages, suggesting that the development of the Ostionoid-period culture groups was in part a product of interactions between Saladoid/Huecoid colonists and Archaic groups (Chanlatte Baik 1990; Rodríguez Ramos 2010). In a recent paper, Rodríguez Ramos and colleagues suggest that Ostiones pottery emerged directly from Archaic pottery traditions in Hispaniola (Rodríguez Ramos *et al.,* 2008).

Based on this combined evidence, Rodríguez Ramos (2010) refers to these groups as pre-Arawak rather than "Archaic", eschewing notions of temporal and cultural circumscription, subsistence orientation, and lack of ceramic technology. The early emplacement of pre-Arawakan people and their long-term occupation on the island indicates a social landscape well established upon the arrival of Saladoid and Huecoid colonists (Chanlatte Baik 1995; Keegan 2006; Siegel 1989; Rodríguez Ramos 2010). Hence while their use of plants, pottery, and stone tools likely varied from later colonizers, they were neither easily displaced nor eradicated from the cultural landscape. The full implications of the interactions between pre-Arawakan and later cultures are still in development. However, the view that they were unsophisticated passive agents is no longer tenable with current evidence indicating prolonged interaction and mixing of pre-Arawak and later colonizing populations.

Period II: Saladoid/Huecoid Series (ca. 500 BC-AD 600)

Around 500 BC ceramic-bearing horticulturalists migrated to the island. These groups are defined by Rouse as the Arawak-speaking Cedrosan Saladoid and (linguistically undetermined) Huecan pottery making groups. Traditional conceptualizations of Saladoid migration into Puerto Rico point to northeastern Venezuela and the Orinoco River basin as points of origin (Rouse 1992). Their arrival to Puerto Rico and surrounding islands has been (and continues to be) a subject of scholarly interest tied to studies of migration from, and population movements within, the South American continent (Heckenberger 2002, 2005; Keegan 2004, 2009a).

Rouse conceived migrations to Puerto Rico as a stepping-stone model in which populations from South America moved into the region by successively following the intervisable island chain northward (Rouse 1992). Contradicting Rouse's migration model is evidence for the earliest documented Saladoid sites in the northern Lesser Antilles and in Puerto Rico indicating a direct migration from the South American mainland (Callaghan 2003; Haviser 1997:61; Keegan 2004, 2009a; Torres and Rodríguez Ramos 2008). For instance, one of the earliest known Saladoid sites in the Antilles is Tecla, located in southern Puerto Rico, dating to approximately 500 cal. BC (Narganes Storde 1999). In contrast, there is little evidence for Saladoid settlements in Trinidad or the Windward islands until around AD 200 (Haviser 1997; Keegan 2004).[12] Later settlement of the Windward Islands appears to reflect population expansion north from South America *and* movement south from Puerto Rico and the Leeward Islands. Both Siegel (2010) and Keegan (2009a) suggest that the process of migration was characterized by a series of "pulses" with scouting groups sent forth to found settlements with continued interactions and subsequent arrivals once they were established.

In addition to evidence for colonists from South America, unpainted pottery called La Hueca suggests migrations from the Isthmo-Columbian region (Rodríguez Ramos 2010). This style of pottery was first recognized at La Hueca-Sorcé by Chanlatte Baik (1990) and later at Punta Candelero by Miguel Rodríguez Lopez (1991). Rouse (1992) envisioned La Hueca as diverging from a common Saladoid ancestry and made it a sub-series of the Saladoid series. Initially supporting this idea were pottery studies that did not see significant variation in vessel attributes between Hacienda Grande and Huecan assemblages (Carini 1991; Roe 1989). Hence, earlier perspectives viewed Huecan and Saladoid pottery makers as two culturally similar but competing ethnic

[12] In a recent publication Siegel notes potential Saladoid settlement of Barbados by BC 400 and Trinidad by BC 300 – BC 400 (Siegel 2010:4).

groups (Roe 1989). Rouse originally thought La Hueca material represented an offshoot of the Hacienda Grande style and not a separate cultural series (1982:48-49).

Rouse's initial sub-classification of Huecan materials within the Saladoid series caused substantial debate. Chanlatte (1990), not seeing the connection between La Hueca and Hacienda Grande, placed this new complex at the level of series calling it Huecoid or Agro-I, and re-named the Saladoid series to Agro-II. Artifact assemblages recovered from the sites of La Hueca-Sorcé and Punta Candelero site in eastern Puerto Rico (Rodríguez López 1991), Hope Estate and other sites in St. Martin (Haviser 1991; Hofman and Hoogland 1999), and Morel I in Guadeloupe (Hofman *et al.,* 2001) further support the idea of a distinct cultural group different from the previously defined Saladoid series (Oliver 1999).

Saladoid and Huecoid Material Culture

Hacienda Grande pottery on Puerto Rico marks the earliest material manifestation of the Saladoid series (ca. 500 BC – AD 600). The distribution of Hacienda Grande sites is generally confined to the eastern third of Puerto Rico, with further migration west presumably halted by extant "Archaic" populations occupying western Puerto Rico and Hispaniola (Veloz Maggiolo 1972, 1991, 1993).

The high-quality Hacienda Grande pottery is thin, well fired, and of fine paste with few aplastic inclusions. Diagnostic for the style are painted design elements consisting of bichromatic painting (particularly white-on-red) using curvilinear and anthropomorphic motifs (Rouse and Alegría 1990). Fragments of ceramic griddles (or *burens*) also are common in early Saladoid sites. The presence of these griddles generally indicates reliance on cultivated plants, and in particular, manioc. However, recent research demonstrates that other foods such as maize and meats were also being prepared and cooked on them as well (Pagán Jiménez 2008a and 2008b; Rodríguez Suárez and Pagán Jiménez 2008; VanderVeen 2009).

Hacienda Grande pottery makers also used stone, shell, coral, and bone to produce a variety of tools and items of personal decoration. Of particular note are finely worked ground stone beads, amulets, and pendants. Common amongst the amulets and pendants are intricately carved and polished shell and semi-precious exotic stone artifacts representing a simple frog motif. These amulets have a widespread distribution from Puerto Rico through much of the Lesser Antilles and northern South America (Cody 1993). Other items created from bone and shells consist of needles, spoons, gouges, celts, hoes, and simple three-pointers or *cemis* (*e.g.,* Rodríguez López 1983).

Similarities in the widespread distribution of motifs (in pottery and other items), is suggested to have been a veneer, “a collection of superficial resemblances that served to unite small widely dispersed groups” (Keegan 2004, 2009a). This veneer would have provided a common ideological arena for the interaction of widely dispersed groups; serving as a socially integrative mechanism to mitigate risks associated with the colonization of a new social landscape.

In contrast, La Hueca (ca. 200 BC – AD 800) pottery has modeled-incised decoration. The geographic distribution of this style is primarily limited to the eastern edge of Puerto Rico and the northern Lesser Antilles. In addition to pottery, unique to the Huecoid assemblages are condor like pendants with both animal and human figures clasped in their claws (Chanlatte Baik 1981, 1983; 1993; Chanlatte Baik and Narganes Storde 1980, 1990: Rodríguez López 1991). Other differences between Huecoid and Hacienda Grande assemblages are noted in lithic reduction sequences (Rodríguez

Ramos 2001, 2010). The differences in material culture between Huecoid and Saladoid assemblages do not mean that there were not shared commonalities between them. In fact, Oliver notes the ceremonial use of *cohoba* and associated paraphernalia as points of similarity (Oliver 2009:33). In light of recent archaeological discussions it is now generally accepted that Saladoid and Huecoid are two distinct cultural groups that migrated to the region at approximately the same time--either together or separately (Curet *et al.,* 2004; Keegan 2004; 2009a).

Cuevas (Period IIb – Period III ca. AD 400 – AD 1000?)

Cuevas pottery conventionally represents the latter half of Rouse's Period II (*i.e.,* Period IIb). Cuevas pottery is a continuation of Saladoid traditions and its early manifestations (*i.e.,* prior to AD 600) reflect the changing social and cultural landscape on Puerto Rico. Sites with Cuevas pottery are widely distributed; spanning from the eastern Dominican Republic (Veloz Maggiolo 1991, 1993) to the Virgin Islands (Hayward and Cinquino 2002; Righter 2002). Cuevas-related settlements are well documented across Puerto Rico (see SEARCH 2008:19-21 for a discussion) and include Tibes, Las Flores, Cañas, PO-38, and Collores in the south-central region; AR-39 in the Arecibo river valley in the northwest; and Punta Candelero and the Kings Helmet site, on the southeast coast near Yabucoa.

Rainey first documented Cuevas pottery at the site of Cañas[13] which contributed to defining decorative motifs and vessel forms for the style (Rainey 1940:35-62). Contrasting to Hacienda Grande and La Hueca pottery, Cuevas shows a decline in design elements, manufacture, and overall aesthetics (Curet 1997). Rouse initially

[13] Located within the south-central study region approximately 5 km southeast of Tibes.

dated Cuevas pottery to AD 400–600. However, work conducted by Siegel (1991) at Maisbel, Oliver at Lower Camp (1992b), and a reevaluation of radiocarbon dates by Rodríguez Ramos (Rodríguez Ramos *et al.,* 2010) suggest that Cuevas pottery continues several hundred years past AD 600, particularly on the eastern side of the island, where it persists to about AD 1000 (also see SEARCH 2011a, 2011b).

Current research indicates that while the Cuevas pottery began late in Period II, there was not a unilinear progression (as predicted in Rouse's framework) from Cuevas to later pottery styles (*e.g.,* Monserrate to Santa Elena). Instead, the broad occurrence of the Cuevas style suggests that there is a tradition of finely made, red-painted pottery that carried on into Period III. Hence, it is likely that Cuevas pottery developed from the red-painted tradition of the Saladoid style, but continued to make up a small component of the ceramic repertoire in later Ostionan and Elenan Ostionoid assemblages (SEARCH 2011b).

Period II Settlement Patterns and Sociopolitical Organization

Saladoid settlements are typically located a short distance from the coast, occupying areas adjacent to freshwater streams or rivers representing an opportunistic and flexible subsistence adaptation (Boomert 2001; Curet 2005; Siegel 1989, 1993; Torres 2005). However, settlement locations during this time may have served other purposes related to sociopolitical organization; such as maintaining regional contact with other widely dispersed groups, through both land and water travel (Keegan 2004, 2010; Siegel 1991, 1993).

Despite their general coastal orientation, Hacienda Grande pottery is documented in the lowest levels at several inland sites that are spatially transitional between the coastal plains and foothills physiographic zones. Examples of settlements on the south-central coast are Tecla (Chanlatte Baik 1976), Cañas (Rouse 1952), Tibes (Curet and Stringer eds. 2010; González Colon 1984), Hernández Colon (Maíz López 2002), and Collores (Rodríguez López 1983).

Saladoid villages tend to be oriented in a circular or horseshoe pattern with domestic structures surrounding large open plaza areas relatively devoid of cultural material (Siegel and Bernstien 1991).[14] The spatial organization of villages is posited to stem from traditional cosmological conceptualizations that Arawak-speaking groups brought with them from South America (Heckenberger 2002, 2005; Siegel 1995). In Puerto Rico, early Saladoid settlements are relatively large averaging up to approximately 8 ha (Siegel 1996). Current evidence indicates these settlements were permanent and functionally undifferentiated, consisting of one or more multi-family domestic structures (Boomert 2001; Curet 1992; Siegel 1989). In this context, the *maloca* style domestic structure is believed the type used for Saladoid sites in Puerto Rico and may have continued to be used in some post-Saladoid sites in the Lesser Antilles (Siegel 1992).

The central clearings, or plazas, in villages, appear to have been utilized communally for both religious ceremonies and daily activities (Curet and Oliver 1998:22; Oliver 1992:7; Siegel 1996:319, 1999:216). At some Saladoid settlements, this central space also functions as a burial ground (Curet and Oliver 1998; Keegan 2010; Rodríguez López 1991; Siegel 1999). This central space is thought to represent the *axis-mundi* through which spiritual connections with deceased ancestors were formed

[14] Recent research has noted potentially more variability in the spatial organization of Saladoid villages than previously observed during this time (see Keegan 2009) and there has been some debate on this issue (see Siegel 2010)

during religious ceremonies (Siegel 1996, 1999:216; 2010; Oliver 1992). Saladoid social groups did not physically segregate this space through the construction of stone alignments.

By the end of the 4th century AD, the onset of Cuevas pottery coincided with an increased diversity in settlement locations--including areas further inland and parts of eastern Hispaniola (Curet 2005; Lundberg 1985; Rodríguez López 1983; Torres 2001, 2005). Late Cuevas-related settlements (after AD 600) show more diversity in sizes, probably a reflection of coastal vs. inland settlement locations and the topographic variability of habitable landforms in each of these settings. For example, research of late Cuevas-related sites in the municipality of Ceiba (CE-34 [SEARCH 2011]), Yabucoa (Kings Helmet [García Goyco 2008]) and Arecibo (AR-38 and AR-39 [SEARCH 2008]) all indicate the prevalence of relatively small settlements comprised of nuclear family domestic dwellings. Diversity in settlement size is thought to reflect new social developments and the fissioning of larger “highly welded” Saladoid settlements.

Traditional conceptualizations of early Cuevas and Saladoid sites indicate a decentralized regional system lacking formal settlement hierarchies (Lundberg 1985; Oliver 1992a:8; Siegel 1996, 1999; Torres 2005). Implicit in this interpretation are usufruct land rights and relatively equal access to social and environmental resources across the landscape. Because of these observations, most researchers believe that Saladoid society was “egalitarian” or tribal in nature (Boomert 2001; Curet 1996; Curet and Oliver 1998; Hardy 2008; Hofman and Hoogland 2004; Moscoso 1986:307; Siegel 2010:4)--often equated with “Tribes of the Tropical Forest” defined by Steward (1948). However, the extent to which hierarchical sociopolitical relationships had developed during this time is currently a point of debate with some suggesting incipient chiefdoms developing through elite-based strategies associated with the network mode of political economy in the Northern Lesser Antilles (Crock 2000; Hardy 2008). Other researchers indicate that highly developed social hierarchies were brought to the islands by Saladoid colonizers (Heckenberger 2001; 2005).

By the end of the 6th century AD the Saladoid “veneer” or networked “lifeline” (Keegan 2010) began to dissolve on the island of Puerto Rico with the development of new regionally specific artifact assemblages. “Indeed, [early] Cuevas related middens are comparatively poor in prestige items and other personal adornos and religious paraphernalia” (Garrow *et al.,* 1995:26; also noted in Curet 1996).

Period III: Early Ostionoid Series (ca. AD 600 – 1200)

By AD 600, new social and cultural configurations developed on Puerto Rico and adjacent islands. These changes are recognizable in the emergence of new pottery styles, shifts in settlement patterns, domestic architecture, and the development of ritual integrative facilities in the form of stone-lined plazas/*bateys*. The proliferation of new settlements intensified on the coastal plains, and new settlements formed in the interior valleys of the foothills and in the mountainous uplands (Curet 2005; Oliver 2009; Rodríguez López 1991; Torres 2001, 2005). These changes accompanied the development of regionally distinct identities, increased sociopolitical organization, and economic diversity. As noted by Rodríguez López, “It was during Period IIIa that human settlement of all ecological zones of the island occurs. It was possibly the moment of greatest population on the island especially in the east” (Rodríguez Lopez 1992:13).

During this time several regionally specific pottery styles are evident on the island. These styles are traditionally associated with Ostionan and Elenan Ostionoid subseries of Rouse's framework (Rouse 1992) consisting of Pure and Modified Ostiones styles in the western portion of the island and Monserrate and Santa Elena (Period IIIb) styles in the east (Figure 2-3) (Rouse 1986).

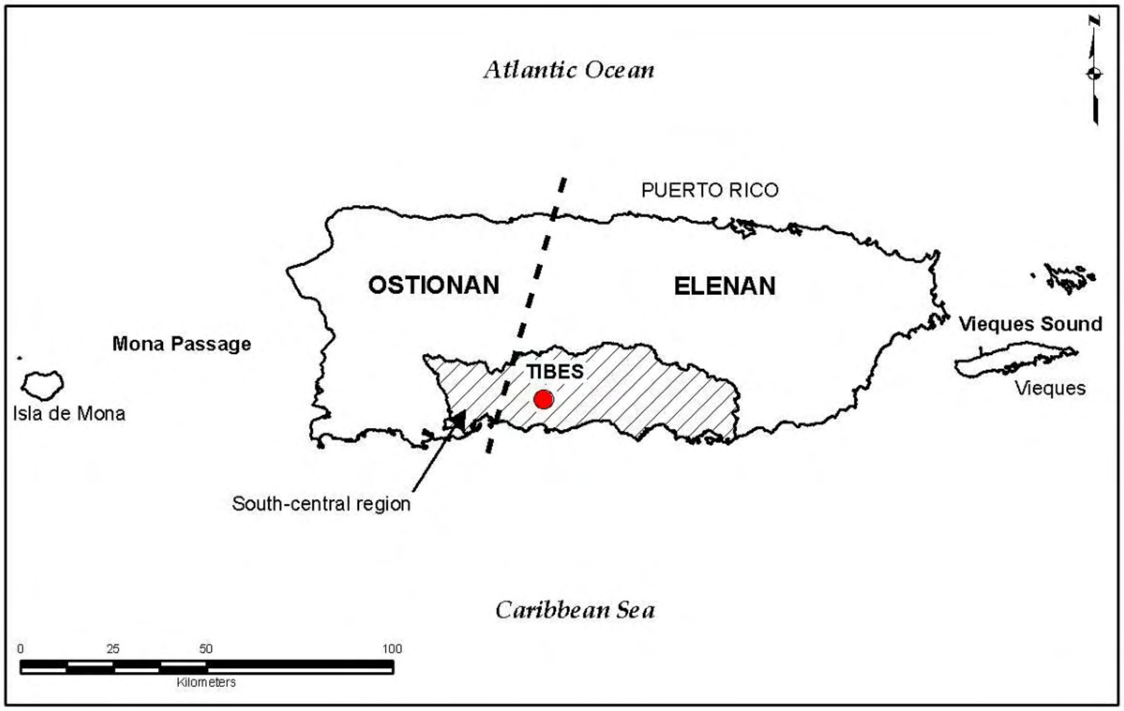

Figure 2-3. Documented distributions of pottery styles Puerto Rico during Period III (*ca.* AD 600 – AD 1200).

The spatial distribution of Ostionan and Elenan pottery styles, particularly after AD 600, are not isolated and are found in varying proportions at sites between the eastern and western portions of the island with distributional frequencies contingent on distance from either end (Goodwin and Walker 1975; Hayward and Cinquino 2001:200; Robinson 1985; Rodríguez López 1992; Rouse 1986). Sites with mixed assemblages are common where social groups producing Ostionan and Elenan ceramic pottery spatially converge on the island, as noted for the region surrounding Tibes (*e.g.,* Thomas and Swanson 1987; Robinson 1985; Weaver *et al.,* 1992; Torres 2009).[15] I discuss this dimension of regional interaction and its impact on community formation in the south-central region between AD 600 and AD 1200 later in this dissertation.

The Ostionan and Elenan Ostionoid Subseries

In contrast to the ceramic styles of the previous period, Elenan and Ostionan ceramics represent a general decrease in aesthetic quality from Hacienda Grande and Cuevas pottery styles (Curet 1996:118-119). Morphologically, Ostionan and Elenan Ostionoid pottery tends to be thicker and coarser, and there is a notable reduction of stylistic painting from the previous period. According to Rouse, both Ostiones and Monserrate pottery developed from the Cuevas style (Rouse 1992); however, these two pottery styles are different in terms of both their geographic origin and morphological characteristics. The following discussion briefly highlights archaeological contexts associated with Elenan and Ostionan Ostionoid styles. A detailed discussion of the pottery (as well as Cuevas and later Chican Ostionoid styles) is in Chapter 6 of this work.

Early evidence for Ostionan style pottery comes from sites in the Dominican Republic dating to approximately AD 300 (Ulloa Hung 2005) suggesting that early Ostionoid culture developed in Hispaniola and spread east to Puerto Rico (Keegan 2006; Rodríguez Ramos *et al.,* 2008). Early Ostionan pottery, also known as Pure Ostiones, was defined by Irving Rouse from the type site in Cabo Rojo on the west side of Puerto Rico (1940:15-25). Several other sites were also used in determining the

[15] As noted by Rouse, more variation in ceramic sub-series appears to exist within the island than between each end and its adjacent island neighbor (Rouse 1951, 1986). According to Rouse, “When I began to trace the distribution of the styles, I was surprised to find their main boundaries cut across the islands instead of passing between them” (Rouse 1982:48).

chronological placement and stylistic classification of the Ostiones style including Boquerón, Las Cucharas, Llanos Tuna, Buenos Aires, Cañas, Carmen, and Diego Hernández (Rouse 1952:544).

At the Cañas site, Cuevas and plain, red-painted Pure Ostiones pottery overlapped stratigraphically, which contributed to Rouse's conclusions that Ostiones developed from Cuevas (Rouse 1952:344). Indeed, Cuevas and Pure Ostiones pottery share many similarities and are found mixed in single contexts in western Puerto Rico (see SEARCH 2008). The modeled and incised design elements occurring in "Modified" Ostiones (ca. after AD 600) are considered a result of the influence of people living in Hispaniola whose pottery contained similar decorative techniques (Rouse 1992:110). Generally, the cultural material recovered on the western half of Puerto Rico is more reminiscent of forms from Hispaniola.

The earliest documented Ostiones pottery from the south-central region (and the island in general) comes from the site of PO-23 in the Cerrillos River Valley dating to the beginning of the 5th century AD (Krause 1989). Another site, Las Flores, is also located in the south-central region, and contains deposits associated with Cuevas and early Ostiones pottery; it also yielded one of the earliest dates (*ca.* AD 600) on the island attributable to a stone-lined *batey* (Wilson 1991:145-146).

Contrasting with early Ostiones pottery, Monserrate-style pottery was identified at the type site located near Luquillo Beach in northeast Puerto Rico (Roe *et al.,* 1985). This style was not recognized in Rouse's earlier work and was combined with the later Santa Elena or earlier Cuevas styles. The terminal date associated with Monserrate pottery is AD 900; however, work conducted at HU-6 and HU-7 in southeast Puerto

Rico by New South Associates (2002) demonstrates a transitional Monserrate/Santa Elena style at approximately AD 1000. Several sites in the south-central region exhibit evidence of Monserrate pottery and are, without exception, associated with sites possessing late Cuevas pottery including Tibes, PO-29, and Collores.

Santa Elena pottery is named for the type site of Santa Elena (TB-7), located in the contemporary municipality of Toa Baja (Rouse 1952). Santa Elena pottery is documented at many sites with earlier Saladoid components in eastern Puerto Rico demonstrating the longevity and continuity of many settlements throughout the island. This pattern is also evident in the south-central region at the sites of Tibes, Collores, Caracoles, El Bronce, and Las Flores where early Saladoid pottery has been documented.

Period III Settlement Patterns and Sociopolitical Organization

Elenan and Ostionan Ostionoid settlement patterns possess considerable variation, with a diversity of site types and sizes including large villages, small villages, hamlets, farmsteads, and specialized activity areas (SEARCH 2008; Siegel 2007; Torres 2001, 2005, 2008, 2010). At the level of the residential settlement, there is a purported decrease in the size of domestic structures through Period III, which has been used to denote an increased emphasis on the nuclear-family household (Curet 1992b:170). Research by Moscoso (1981, 1986) suggests that this was a time of socio-economic transition from communal based production to a tribute-based system indicative of an emergent chiefdom. However, as will be discussed later in this work, shifts in domestic architecture were influenced by other social, cultural, and environmental factors.

Domestic structures generally continue to be arranged around central open plaza areas; however, significant changes occurred in spatial arrangements at the village level during this time. In addition to a decline in house size, human burials beneath house floors, or in house contexts (*i.e.,* associated middens), became common (Curet and Oliver 1998).

The most significant change in settlement organization is the emergence of integrative ritual facilities in the form of stone-lined plazas/*batey* structures (Alegría 1983:59-118). Siegel (1992, 1996, 1999) posits that the development of these features resulted from an evolution of ritual behaviors associated with ancestor veneration. In this context, ritual was a platform from which the ruling class emerged. At the regional level, the number and elaborateness of monumental architectural features are interpreted as centers of political power (Siegel 1996, 1999; Vescelius 1977) and reflect an increase in territoriality (Torres 2005). This too will be further discussed in the proceeding chapters.

Current wisdom suggests that between the AD 1000 and 1200 regional territorial units began to emerge coinciding with a narrowing of social power to a small number of individuals (Curet 1996; Oliver 2009; Siegel 1991, 1992, 1996, 1999, 2004). Concomitant with these developments, especially by ca. AD 1200, is the proliferation of ceremonial objects in the form of cemis, stone collars and *duhos* that point to an increase in symbolic and iconographic elaboration associated with perfromative ritual practices and elite power (Curet 1996; Oliver 2009). These developments are traditionally conceived as the genesis of centralized authority, social stratification, and the emergence of the chiefdoms evident at the time of European contact (Oliver 2009;

Siegel 1996, 1999, 2004). However, as cogently expressed by Curet, "Although it is widely accepted that cultural diversity became more pronounced during Periods III and IV, little discussion has focused on variability in social and political organization" (Curet 2003:18).

Period IV: The Late Ceramic Age (ca. AD 1200 – AD 1500)

The final period of indigenous habitation on the island is characterized by the "Taíno" who extended throughout the Greater and Northern Lesser Antilles (Rouse 1992). It is during this time that sociopolitical territories are thought to have become formalized and powerful chiefs on Puerto Rico and adjacent islands ruled (Siegel 1992; 1999; 2004; Wilson 1992). Traditional perspectives suggest that the Taíno were in a "formative stage" of sociopolitical complexity and in the process of developing into more "complex" regional polities which was truncated by Spanish conquest (Carbone 1980).

Despite similarities in symbolic and material manifestations among peoples from Hispaniola and Puerto Rico, considerable social and cultural variability existed, bringing into question the use of the term and concept "Taíno" to represent a singular cultural entity (Curet 2008; Rodríguez Ramos 2008). In their comprehensive reconstruction of the languages of the Caribbean islands, Granberry and Vescelius (2004) highlight this cultural complexity by presenting evidence for a variety of native languages spoken in the region at the time of European contact.

Chican Ostionoid Subseries

By AD 1200 new pottery styles emerged on the island defined by the Chican subseries of the Ostionoid series. Three pottery styles are documented on the island for this period: Capá, Esperanza, and Boca Chica. Current evidence indicates that the Chican Ostionoid subseries was influenced by the Atajadizo style (previously Punta style) from the eastern Dominican Republic (Veloz Maggiolo *et al.,* 1976) which spread eastward across the Mona Passage and through the Vieques Sound. As in the preceding period, Chican Ostionoid assemblages are regionally variable based on an east/west trend in distribution.

Capá style pottery was identified during the analysis of pottery recovered from Mason's excavations at the Ceremonial Center of Caguana, and collections made by Rouse from the sites of Las Cucharas, Minillas, Palma, and Machuca (Rouse 1952). The Capá style is considered more common in western Puerto Rico and in the mountainous interior of the island. In the eastern portion of the island, the Esperanza style is predominant. Esperanza style pottery was first identified by Rouse at the type-site of Esperanza on the island of Vieques (1952:352-354). Esperanza pottery generally resembles Santa Elena pottery in surface and paste characteristics.

Boca Chica, less common in Puerto Rico and the most elaborate of the Chican styles, also developed from the Atajadizo style and is commonly associated with the eastern half of the Dominican Republic. Boca Chica pottery is considered an intrusive style in Puerto Rico. This pottery style is characterized by complicated vessel forms and the most elaborately decorated pottery in the region during this time.

Boca Chica pottery has been identified at several sites in the south-central region and mountainous interior including Cayito, Villón, El Bronce (Robinson *et al.,* 1985) and at the site of PO-29, located approximately 4km north of Tibes (Espenshade *et al.*, 2008). Further, recent excavations by Rodríguez Melendez (2007) as part of her dissertation research identified Boca Chica pottery at the site of Sonadora in Utuado demonstrating that while not pervasive, Boca Chica pottery was widespread during the Late Ceramic Age.

The presence of Boca Chica pottery is interesting because it demonstrates continued connections between Puerto Rico and the eastern portion of Hispaniola. Evidence for Boca Chica pottery from the south-central region is becoming increasingly common demonstrating the flow of objects, information, and likely people from the Eastern Dominican Republic during this time (Rodríguez López 2007).

Period IV Settlement Patterns and Sociopolitical Organization

By AD 1200, indigenous peoples were settled throughout the entire island of Puerto Rico (*e.g.,* mountain valleys, river valleys, coastal plains). Residential settlements varied with respect to size and associated domestic and ritual features, ranging from sites with evidence of one or two domestic structures to larger villages with multiple ball courts and plazas (Siegel 1999; Oliver 1992b, 2005). Smaller residential settlements tend to be in the foothills and island interior, with larger settlements located on the coastal plains. Small domestic structures suggest that household organization focused on nuclear-family households, and variation in domestic architecture may be indicative of class differentiation or social status (Curet 1992b).

In the south-central region, previous research suggests demographic shifts in which populations may have moved from coastal and foothill physiographic regions to those of the islands mountainous interior (Curet 2005; Lundberg 1985; Torres 2001, 2005). The reasons for these shifts and the subsequent social formations resulting from them remain some of the most interesting and unresolved issues for the region (Torres 2009, 2010).

Work conducted by Jose Oliver and Juan Rivera Fontán provided important data for understanding social and political organization during the Chican Ostionoid in the central mountainous portions of the island (Oliver 2007; Oliver *et al.,* 1999). They identified numerous small residential sites both with and without plazas/*bateys* as well as several sites possessing these features but lacking clear evidence of domestic occupation. The small residential sites they call "farmsteads" because "one could hardly envision more than one or two households for such sites" (Oliver 2007). These sites often possess a single plaza or *batey* with slabs displaying petroglyphs and associated midden deposits that fall down slope into the valley below (*e.g.,* UA 27 [Oliver 2007; River Fontán 2003]). Other similarly interpreted sites possess a single midden but lack definitive evidence of stone-lined enclosures. Interestingly, nowhere in these mountainous regions is there "any evidence of village or even hamlet-sized settlements…." (Oliver 2007).

Ceremonial architecture during this period is purportedly at its highest frequency and Oliver suggests that most *batey* sites were occupied (Oliver 2007). Oviedo y Valdez notes that most Taíno villages possess a plaza or *batey* in which certain rituals (*areyetos*) were carried out and in which the ballgame was played (1959:296-300). The ceremonial sites of Caguana and Viví represent relatively large complex manifestations of plaza/*batey* sites that emphasize group oriented ritual activity in the constitution of social and political life (Oliver 1998; Oliver and Rivera Fontán 2004; Rodríguez Melendez 2007). This will be further discussed in Chapter 9.

Non-residential *batey* sites are also identified, such as UA-53 (Oliver *et al.,* 1999). The stones delimitating the plaza/*bateys* at these sites lack petroglyphs although they sometimes have one or two terminal monuments carved with petroglyphs. Excavations show they are limited in artifacts and ecofacts suggesting a lack of activities associated with long term domestic occupation. These sites are typically situated on narrow ridges intervisable with nearby farmsteads (Oliver 2007). Based in rank/size of ceremonial features, Sigel suggested (1990, 1999) that there was regionally organized hierarchical system of sociopolitical organization in place throughout the island during this time.

On the island of Hispaniola, serious consideration has been given to the regional organization of sociopolitical power and it appears the island was divided into at least five major *cacicazgos* (potentially subdivided into smaller territories) at the time of European contact (Wilson 1992:108-109). In contrast Puerto Rico is noted as being composed of approximately 18 political territories at the time of the Spanish arrival (Coll y Toste 1907; Rouse 1952; Oliver 1999). Glenis Tavares María (1996) suggests that the island of Hispaniola, like Puerto Rico, was likely divided into smaller sociopolitical divisions and in a variety of ways that escaped the European chroniclers.

Supporting the presence of hierarchical social divisions in Taíno society, archaeologists (with the use of ethnohistoric data) posit that there were status divisions between the elite *nitainos* and the *naborias*, or commoners (Moscoso 1981: 216-220; Keegan 1997:116). Ethnohistoric evidence also suggests that variation in domestic architecture is indicative of class differentiation or social status (Curet 1992b:161-162; Fewkes 1907:41-47; Garrow 1995:37; see Samson 2010 for discussion). According to a summary by Coll y Toste “The leader’s house is called a *caney* and has a rectangular shape with a small porch, in front of the *batey* or small plaza; the other Indians houses (*bohio*) were circular" (1979:90 [authors translation]).[16]

As for Puerto Rico, the sociopolitical landscape during this time appears to be divided into smaller, competing polities with most of the *cacicazgos* mentioned in the chronicles located either in river or intermontane valleys (Curet *et al.* 2004; Oliver 2009). Supporting this idea is a historic document which describes Puerto Rico as being composed of small cacicazgos, each one governing a river valley (Ponce de León y Troche and Santa Clara, 1914 [1582]).

At the time of European contact, no major chiefdoms or political territories are noted by Spanish explorers for Ponce. However, Sued Badillo contends that the site PO-10 (Caracoles), in Ponce, was the main village associated with the cacique Aguebana II who helped lead the indigenous rebellion against the Spanish in 1511 (Sued Badillo 2008). And although the *cacicazgo* is well founded ethnohistorically, their formation and organization is still poorly understood in the centuries prior to Spanish conquest. Expanding our knowledge of small-scale social formations and local organizational dynamics can facilitate an understanding of the *cacicazgos* and the underlying conditions of social change leading to their development.

Archaeology of the South-Central Region

South-central Puerto Rico has a rich archaeological history. Field investigations in the region over the past century have supplied a corpus of data making it one of the most intensively studied areas on the island (see Rodríguez López 1983 Appendices I-

[16] Curet notes that this observation may have been a product of European influences on indigenous groups and the adaptation by the later of European architectural style (Curet 1992). However, several researchers indicate the likely possibility for variability in domestic architecture based on status (Curet 1992; Kaplan 2009).

A through I-D for detailed listing; Pantel 2006). While not exhaustive, the following review provides an overview of archaeological work conducted in the region. To help orient the reader, Figure 2-4 shows the location of the sites presented in the following discussion.

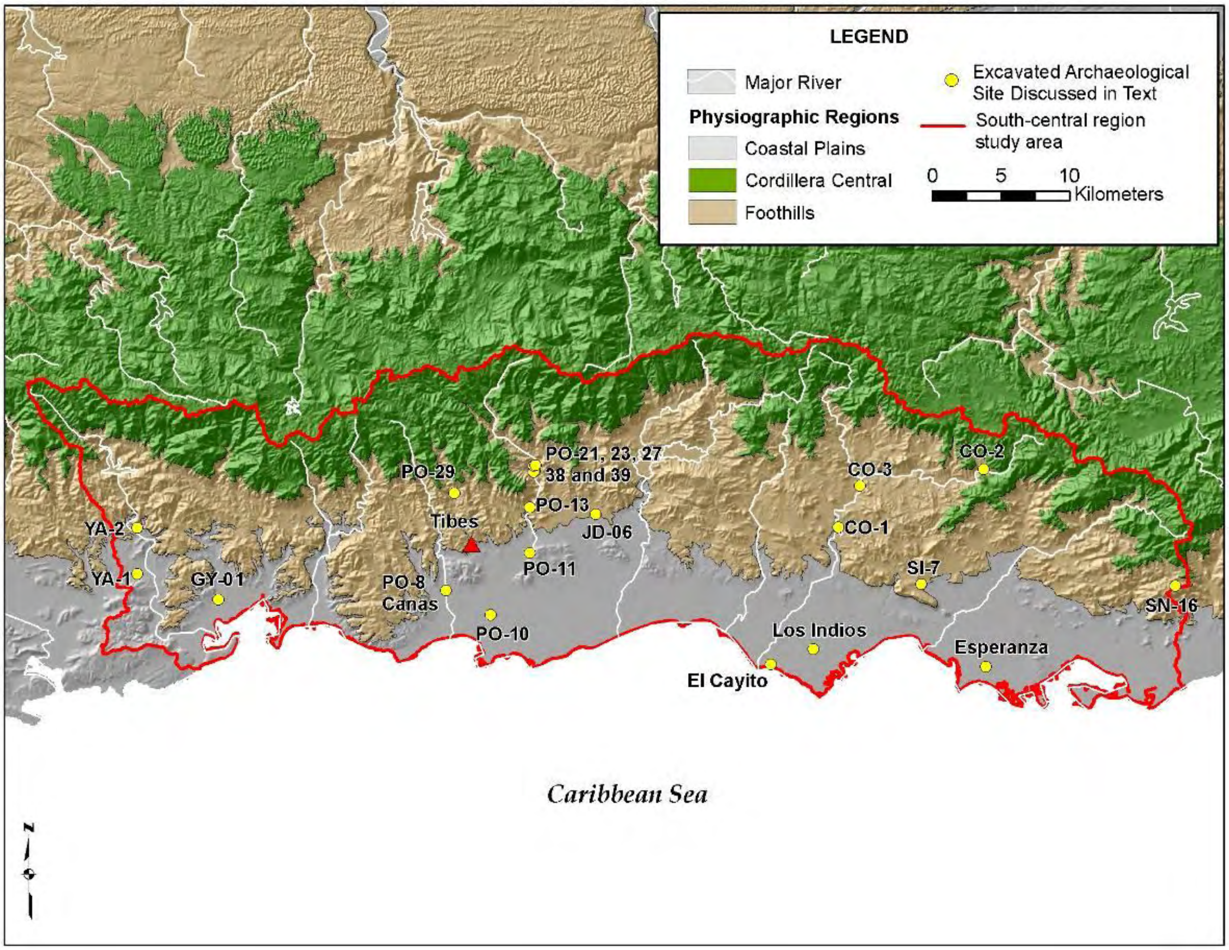

Figure 2-4. Well documented residential settlements from the south-central region discussed in the text.

The archaeology of the south-central region is intimately tied to the historical development of archaeology in Puerto Rico.[17] The earliest archaeological research on the island dates to the late 19th century to the work of Alphonse Pinart and Augustin Stahl (Pinart 1893; Stahl 1889) who visited several sites in the 1880s. In the 1890s Cayetano Coll y Toste visited several sites on the north coast and documented in his 1907 publication on the prehistory of the island (Coll y Toste 1979[1907]). Investigations during this time were motivated by general interests in antiquarianism, the history of initial European colonization of the island, and a search for national identity by some independentist scholars.

The first anthropological investigations in Puerto Rico were conducted by Jesse Walter Fewkes through Bureau of American Ethnology (BAE) and prompted by the acquisition of Puerto Rico by the United States during the Spanish American War in 1898. Fewkes' study incorporated historical sources and archaeological remains to develop a study of the island's prehistory. Fewkes' 1907 publication *The Aborigines of Porto Rico and Neighboring Islands* was a significant contribution to Puerto Rican archaeology and continues to serve as a key reference for modern researchers.

Fewkes' research stimulated additional investigations in Puerto Rico during the early portion of the 20th century. Sponsored by the New York Academy of Sciences, the Scientific Survey of Porto Rico provided opportunities for several scholars from the United States to conduct archaeological investigations on the island. R.T. Aitken (1917-1918), H.K. Haberlin (1917) and J. Alden Mason (1917, 1941) all conducted research

[17] For detailed history of the history of archaeological research in Puerto Rico the reader is referred to Carbone (1980) and Curet (1992a). Also see Pagán Jimenez and Rodríguez Ramos (2008) for post-Colonial critique of this history.

under the guidance of Dr. Franz Boas of Columbia University, who in 1914 was placed in charge of the anthropological portion of the study (Carbone 1980). J. Alden Mason's work is perhaps most notable because he conducted the first archaeological investigations at the Ceremonial Center of Caguana in the contemporary municipality of Utuado (Mason 1917, 1941).

On the south-central coast, the first documented archaeological survey was conducted by Padre Nazario (1893:137-139, 159-162) with the first known excavation in 1875 by Dr. Souquet at the site of Cayito (Rainey 1940; Rouse 1952:515). Survey work was later conducted by Fewkes (1907:86-87), Britton (1930:167), Mason (1941: 269-270), R.S. Prescott, and Spinden (as noted in Rouse 1952). Hebert J. Spinden excavated several sites in the south-central region prior to the onset of World War I including the site of Carmen in the Coamo River Valley (located approximately 30 km east of Tibes). Samuel K. Lothrop also conducted research on the southern coast in 1915 and 1916 excavating at two large sites, Esperanza and La Florida (Los Indios) in the municipality of Salinas, however; the details of these investigations were never published.

Archaeological research on the island prior to the 1930s was largely focused on the reconstruction of the "immediate ethnographic past" (Carbone 1980: A-3) and verifying historic accounts. Minimal attempts to establish regional chronology were made and early efforts were hindered by the limited number of excavated sites and published documents. Froehlich Rainey, with the support of the Yale Peabody Museum, The American Museum of Natural History in New York, and the University of

Puerto Rico, conducted archaeological investigations in 1934 and 1935 to expand the inventory of archaeological sites on the island.

Discussions with Dr. J.L. Montalvo Guenard, regarding the presence of white-on-red pottery, motivated Rainey to commence excavations at the site of Cañas. Based on excavations at Cañas, Rainey developed a chronological sequence defined by an earlier Crab culture followed by a Shell culture (1940) based on differences in pottery stratigraphically associated with lenses of crab and shell. Rainey also excavated the site of Collores in Ponce, which was later visited by Rouse (1952) and then by Miguel Rodríguez López as part of his Masters research during the 1980s (Rodríguez López 1983).

In addition to the North Americans, several Puerto Rican researchers were engaged in archaeological investigations during the early 20th century. Most notably is the work of Dr. J.L. Montalvo Guenard (1933) and Dr. Aldofo de Hostos (1919, 1938, 1941). J.L. Montalvo Guenard was a local antiquarian from Ponce who visited many sites in the region and helped Rainey and Rouse in their early investigations. Hostos, who would later become the official historian for the island from 1936 to 1950, excavated a *batey* site just northeast of the town of Juana Diaz called Minas. However, no other information is available regarding the site and its precise location is unclear (Rouse 1952:516).

In 1936 Irving Rouse, under the guidance of Rainey, engaged in a series of excavations in throughout the island. The details of his findings are documented in his 1952 work which set the stage for archaeological research in the region for the next 50 years. Within the area defined by the present study, Rouse excavated the sites of Arba, Buenos Aires, Cañas, Collores, Diego Hernández, Esperanza, Carmen, Villón, Buenos Aires, and Cayito.

With the development of Federal regulations for the preservation of cultural resources in the 1970s and 1980s the south-central region (and island in general) saw an increase in archaeological field research. Several regional avocational organizations were independently developed during this time including the *Sociedad Guaynía de Arqueología e Historia de Ponce* and the *Sociedad Arqueología del Sur-Oeste de Puerto Rico* to conduct survey and site evaluations (Carbone 1980). The *Sociedad Guaynía del Sur-Oeste de Puerto Rico* excavated at Tibes in the mid-1970s after the site was discovered in the aftermath of Hurricane Eloísa (Alvarado Zayas and Curet 2010: 19-37).

Army Corps of Engineers and the Cerrillos/Bucana River Projects

In the 1970s the U.S. Army Corps of Engineers (ACE) began archaeological compliance work, as part of several interrelated water control management projects, in the Cerrillos/Bucana and Portugués Rivers. Investigations revealed almost a dozen new archaeological sites and several of them were subject to intensive excavation. Of particular importance to the research presented here are associated survey investigations conducted by Pantel (1978), Solís Magaña (1985, 1987) and Oakley (1990) as well as excavations at El Bronce (Robinson *et al.,* 1985), PO-21 (Espenshade 1987), PO-23 and PO-27 (Krause 1989), PO-38 (Weaver *et al.,* 1992), PO-39 (Garrow *et al.,*1995), and more recently PO-29 (Espenshade 2009a, 2009b, 2011). These sites, and others in the immediate vicinity of Tibes, are summarized below to provide an archaeological context for the area.

Robinson excavated El Bronce (PO-11) in the early 1980s as part of the ACE Bucana River drainage channelization project. The site measured about 1.7 ha and had a single ballcourt or *batey* dating to the 8th century AD (Robinson *et al.,* 1985). The *batey* was approximately 20 x 20 m and many of the stones lining it were elaborated with petroglyphs (Robinson 1985:A1-A12). Documented post molds indicated several structures; at least two were designated as nuclear domestic dwellings (Curet 1992b; Kaplan 2009). Middens at the site contained substantial quantities of pottery, lithics, shell, and bone suggesting permanent residential settlement. The middens yielded a combination of Elenan, Ostionan, and Chican Ostionoid pottery styles mixed in single contexts leading Robinson to suggest that a single occupation witnessed the use of all three styles simultaneously (Robinson 1985:F24). Radiocarbon determinations from the site place primary occupation between approximately cal. 2 σ AD 700 and AD 1400.

Just northeast from El Bronce, Garrow & Associates excavated several sites in the Cerrillos River Valley in the 1980s (Espenshade 1987). These first of these, PO-21, is relatively small measuring approximately .5 ha. Pottery recovered from midden contexts at the site yielded Early Ostionan Ostionoid pottery (Espenshade 2000). A pit/post mold feature produced a radiocarbon date of cal. 2 σ AD 465-870 (Beta-18191) which coincides with the temporal range generally associated with Pure Ostiones pottery (Espenshade 2000). Although no conclusive evidence was found, local area residents reported two rows of parallel stones at the site before historic leveling activities. Espenshade (1987, 2000) interpreted the site as a small hamlet consisting of three to six nuclear dwellings.

A few hundred meters north of PO-21 are PO-23 and PO-27. Oakley-Solís Magaña (OSM) Associates excavated the pre-contact component at these sites from 1986 to 1988. Both are relatively small (approximately .5 and 2 ha respectively) consisting of domestic refuse with a probable house structure at PO-23 and the ruins of a plaza/*batey* (30 x 24 m) at PO-27. Pre-contact ceramics from PO-23 indicate an early Ostionan Ostionoid component (Pure Ostiones style). Two radiocarbon dates were recovered from PO-23: cal. 2 σ AD 258 – AD 597 (Beta 23282) and AD 445 – AD 890 (Beta 23283) (Krause 1989). The former date is the earliest registered date for Ostiones pottery from the south-central region and one of the earliest for the style from the island (Rodríguez Ramos *et al.,* 2010).

Calibrated radiometric age determinations from PO-27 (cal. 2 σ AD 990 - AD 1210 [Beta-41467], AD 1020-AD 1210 [Beta-41478], AD 1290 – AD 1440 [Beta-41477]) in conjunction with the Ostionan and Chican pottery place it late in Rouse's Period III and early in Period IV (Krause 1989). Despite Krause's reluctance to provide formal interpretation regarding these two sites, both appear to be small settlements based on the abundance and diversity of recovered artifacts, the presence of several post-molds, as well as hearth features.

Garrow & Associates also excavated PO-38 as part of the ACE Cerrillos River project. Initial excavations at the site yielded a Cuevas and late Ostionan/Elenan component with radiocarbon date ranging between cal. 2 σ AD 420 - 770 AD (Beta-45290) and AD 1040 –AD 1290 (Beta-33259) (Garrow *et al.*1989). Phase II investigations revealed that the primary occupation was associated with the Ostionoid component and appears to be contemporaneous with PO-21 (Weaver *et al.,* 1992).

Stone alignments are present at the site, but their dimensions and function are not discernible from documented sources (Weaver *et al.,* 1992). Archaeologists interpreted the site as a small settlement based on presence of at least one house structure.

PO-39, also excavated for the Cerrillos River project, is thought to have functioned as a local ceremonial center during the Elenan/Ostionan occupation of the area (Garrow *et al.,* 1995). The site possesses a minor Chican Ostionoid component evinced by Capá and Esperanza style pottery. The site consists of three loci that represent discrete functional activity areas. Locus 1 contained a *batey* (10 x 20 m) delineated by upright stones. Locus 2 contained deeply buried midden deposits and appears to have been used for food processing and cooking. Locus 3 contained a complete 10 m diameter circular stone structure that appears to have been a small ceremonial area or possibly shaman's house (Garrow *et al.,* 1995; Garrow 2006). All three loci appear to be contemporaneous based on six radiocarbon dates (cal. 2 σ range AD 760-AD 1260) and the respective artifact collections.

Garrow interpreted PO-39 as an uninhabited ceremonial site likely used periodically by local residents. According to Garrow, ""the site was not residential; instead, it appears to have functioned as a minor ceremonial center periodically used by the residents of the upper Cerrillos River Valley" (Garrow *et al.,* 1995:iii). Espenshade notes that "the only potential weakness with the non-residential argument is whether the deposits of Locus 2 (the buried midden) could really have accumulated from feasting alone" (2009:23). The proximity of PO-39 to Tibes raises several questions regarding community and political organization in the region. Based on current interpretations PO-39 indicates that there may have been different levels of ceremonial activity that did not require higher level integrative facilities like Tibes (Garrow 2006; Espenshade 2009:23). This point is addressed in Chapter 9 of this work.

Portugués River

Following early archaeological investigations at Tibes (González Colon 1984), several pre-contact sites were documented in the late 1970s and early 1980s during archaeological survey of the drainage for the ACE Portugués River dam project (Oakley 1990; Solís Magaña 1985; Espenshade 2007, 2009; 2011). These sites are generally small limited activity areas and will be discussed in further detail in Chapter 5. However, one exception to these was the site of PO-29 which will be discussed shortly.

Tibes (PO-1) is a relatively large site (approximately 5 ha) situated on an open alluvial terrace of the Portugués River. Based on radiocarbon dating conducted by Pestle (Pestle 2010) Tibes was established as a residential settlement by ca. AD 500 (cal. 2 σ median AD 497 [AA83953]). Sometime after AD 900 the previously cleared plazas were delimited through the construction of several stone-lined plazas/*bateys*. Based on the latest radiocarbon date (cal. 2 σ 1220-1300 [Beta 198876]) and relative absence of Chican Ostionoid pottery, Tibes appears to have fallen into disuse shortly after AD 1200, although it appears that small groups of people may have visited the site sporadically after this time (Curet 2010).

The site consists of several middens, and twelve stone structures ten of which are currently visible at the site today. Early research by González Colón (1984) indicated that all structures belong to Period IIIb (ca. AD 900 – AD 1200). In addition, early excavations revealed two clusters of burials with one located under the central, quadrangular plaza and the other, 50 m southeast under *batey* 3 (González Colón 1984). Both clusters appear to belong to the Saladoid series and are older than the overlying stone structures. Additional burials, belonging to the Elenan Ostionoid subseries, were identified dispersed across the site, in what appear to be domestic contexts (refuse middens and/or possible house floors), typical for Ostionoid mortuary patterns in Puerto Rico (Curet and Oliver 1998).

PO-29 (Rodríguez Soler/La Jácana) is located, approximately 4 km north of Tibes on the last available large river terrace before the drainage becomes deeply incised and constricted. The site measures approximately 2.5 ha stretching along the terrace. PO-29 is a complex multi-component, habitation site that includes a plaza/*batey*, a midden mound, several areas of domestic occupation, and numerous burials. Hundreds of post molds and other features were documented at the site. In his recent Master's thesis, Jeremiah Kaplan identified at least 16 nuclear domestic structures (Kaplan 2009). Excavations of a large (40 x 50 m) *batey* yielded evidence of multiple, highly elaborate petroglyphs (Loubser 2009; Espenshade 2009, 2011).

At writing of this dissertation, the final report has not been publically available and therefore the final interpretations are in progress (Espenshade and Young 2011). Presently, current research suggests that the site consists of three pre-contact components based on pottery and radiocarbon dates recovered from excavations. The first component dates from approximately AD 400 – 600 (Beta – 272032) and includes a late Cuevas and early Monserrate component (Espenshade and Young 2011). The houses and the *batey* are from a later component and cover much of this deposit.

The second component dates ranging from approximately AD 680 – AD 820 based on seven radiocarbon determinations (Beta-272023, 272025-272030). Espenshade suggests limited evidence for occupation from AD 800 and AD 1300 based on the absence of expected Santa Elena and Modified Ostiones pottery styles (Espenshade and Young 2011). Pottery from the dated deposits includes Monserrate styles, with Pure Ostiones influences. Dense domestic middens, several houses, many burials, a midden mound, possible *conucos* and an earlier *batey* (a smaller version with simple petroglyphs) characterize this component (Espenshade and Young 2011).

The site appears to have been reoccupied sometime shortly after AD 1300. This third component is evinced by Capá, Boca Chica, and Esperanza style pottery corroborated by five calibrated radiocarbon dates ranging between cal. 2 σ AD 1260 – AD 1520 (Beta-247736, 247737, 272024, 272031, 272033). The 40 x 50 m *batey* and the expansion and use of the midden mound date to this component. During this period relatively little midden accumulation occurred, and Espenshade suggests that it was not a residential site during this time (Espenshade and Young 2011).

Camp Santiago

Archaeological investigations at the Camp Santiago National Guard Training Center, in the eastern portion of the study region, were initiated in the mid-1980s by Miguel Rodríguez (Rodríguez López 1985). Initial survey consisted of a ten-percent stratified sample of the 12,000 acre facility that resulted in the identification of 22 new archaeological sites. In 2001, archaeological studies resumed at Camp Santiago because of a cooperative agreement between the Caribbean National Forest and the Puerto Rico Army National Guard. Under the direction of U.S. Forest Service, archaeological investigations were conducted during 2000-2003 which added additional sites to the base inventory. Archaeological surveys and site assessments continue to be conducted as regular part of Federal preservation rules and legislation. Detailed information regarding many sites on Camp Santiago is unavailable beyond Rodríguez

López's 1985 study due to base security. However, two sites have been well documented and are of note.

The first, Ochos Concheros (F-4-01), consists of a series of shell middens or *concheros* occupying a hill top, south-facing ridge slope, and a ridge "toe" (Robinson 2004:5). The site, initially documented in 1985 by Rodríguez López (1985:90, 93), is in the southwestern portion of Camp Santiago between two seasonal tributaries. Caribbean National Forest archaeologists revisited the site in 2001 and identified eight shell middens.

Wake Forest University archaeological field school excavated the site in 2003. The Wake Forest field investigations were unable to relocate the previously described eight shell middens but did identify four large and five small midden concentrations (Robinson 2004a:14). The scatter of shell, likely from a domestic occupation, was found along the edge of the hill top.

Pottery recovered from the site consists of plain and red painted wares that are consistent with Cuevas and Santa Elena pottery styles (Robinson 2004a:13). Based on this description, and critical examination of the report (Robinson 2004a: Figures 42-47), the site also appears to contain a minor Chican component; however, the predominance of Santa Elena pottery at the site indicates primary occupation during Period IIIb (Rodríguez López 1985: 88; Rouse 1992:107, 124). Robinson interpreted the site as a small hamlet (Robinson 2004:13).

The second site, SN-28 (G-15-01), is on a terrace on the north side of the Salinas River floodplain in the eastern portion of Camp Santiago (Robinson 2004b:2).

Rodríguez López also documented this site in 1985 and identified a *batey* surrounded by numerous *concheros* (Rodríguez López 1985:90 and 93).

Excavations conducted by Wake Forest University (2004b) confirmed a series of domestic middens surrounding a small plaza/*batey* (19.5 m east-west by 17 m north-south). Like Ochos Concheros, the pottery assemblage was documented as "mostly plain and painted wares that are consistent with pottery of the Middle to Late Elenoid series" (Robinson 2004b:16). Examination of the pottery documented in the report (Robinson 2004b: Figures 32- 38) indicate Ostiones and possible Monserrate styles suggesting that the site was occupied sometime between approximately AD 600 and 1200. Like Ochos Concheros, G-15-01 represents a small habitation site; albeit slightly larger than others documented at Camp Santiago (Robinson 2004:17). However, unlike Ochos Concheros the *batey* feature at G-15-01 likely played a role in hosting ceremonial activities that may have included proximally related settlements (Robinson 2004:17)

Other Research and Field Investigations of the South-Central Region

Several other sites from the south-central region offer additional reference for the observations and interpretations presented later in this work. These sites are discussed below and presented alphabetically based on the PRSHPO site number.

José Ortíz Aguilú excavated CO-1 (Las Flores) in the 1970s where he recorded several middens surrounding a *batey*. The site measures approximately 3 ha with the *batey* accounting for approximately 1000 m^2. Analysis of excavated objects suggests long-term domestic occupation associated with Saladoid and Ostionoid pottery. Diagnostic material consists of Cuevas, Ostionan, and Elenan pottery (Eicholz 1976). Unfortunately, the excavation results have never formally been published and are based on few conference proceedings (Ortíz Aguílu 1975, 2006). The importance of Las Flores lies in the fact that it yielded one of the earliest dates for a plaza/*batey feature* in the region (ca. 7th century AD [Wilson 1991:195-196]).

CO-2 (Villón/Cuyón) was a residential settlement situated in the foothills of the Río Cuyón valley approximately 36 km east of Tibes. The site occupied a hilltop at the intersection of the Cuyón River and a small tributary stream. Villón measured approximately 280 m northwest to southeast by approximately 100 m east to west at its widest point.[18]

Surrounding the site were several middens in an elliptical shape that followed the natural contour of the hill top. Villón is notable for its multiple stone enclosures which appear to be primarily associated with a late Ostionoid (possible late Period IIIb and Period IV) component (Alegría 1983; Rouse 1952:502-507). Rouse observed that the proportions of the Ostiones pottery were higher in the lower levels of the site with Santa Elena pottery predominating in the upper levels. Rouse also noted a small quantity of Boca Chica pottery at the site (Rouse 1952). Like many other sites documented in the south-central region (*e.g.,* El Bronce [Robinson *et al.,* 1985], PO-31 [Thomas and Swanson 1987]) the mixture of pottery emphasizes social diversity in the region and the fluidity of regional boundaries and interaction.

In 2007, the author visited this site and noted shell and pottery scattered about the surface. However, the *batey* and associated midden features were could not be relocated. Housing construction and residential development likely destroyed these features.

[18] Based on the map in Rouse 1952:505 Figure10.

Rouse documented CO-3 (Buenos Aires) as a large village site on the southern edge of the modern town of Coamo (Rouse 1952). The site measures approximately 2 ha consisting of a continuous midden deposit approximately 75 cm in depth. Rouse recovered a variety of stone and shell tools from the site (Rouse 1952:519). The presence of a small amount of Cuevas pottery with a later primary Ostiones and Santa Elena component at the site lead Rouse to interpret occupation during Period III (1952:519).

Tecla (GA-1), in Guayanilla, is one of the earliest documented Saladoid settlements in the Greater Antilles with a radiocarbon date of ca. cal. 2σ 500 BC. Luis Chanlatte Baik excavated the site in the early 1970s (Chanlatte Baik 1976) recording a series of stratified midden deposits in a sugarcane field covering approximately 20 ha. The middens extend to a depth of 80 cm with Ostionoid pottery present in the upper 30 cm associated with the shell middens (Chalatte Baik 1976). Chanlatte was able to identify a long term occupation sequence at the site ranging from approximately 500 BC to AD 800. The early cultural component at the site contains Hacienda Grande pottery with later components consisting of Cuevas and Ostionan Ostionoid pottery (Narganes Storde 1991, 1999).

Collores (JD-6) sits on the banks of the Río Guayo east of Tibes in the modern municipality of Juana Diaz. The site is approximately 2 ha consisting of two large midden mounds. This was Rainey's first excavation in Puerto Rico; however; Rouse published the results (1952:532). Rouse visited this site in the 1940s and used material recovered from Rainey's excavations to help define the Ostiones style. Rouse's investigations demonstrated that the upper levels of the site predominately contained

Ostiones pottery mixed with a lesser quantity of Santa Elena pottery (Rouse 1940, 1952b).

Miguel Rodríguez López excavated the site in the 1980s as part of his Master's thesis (Rodríguez López 1983). Rodríguez López identified Saladoid and Ostionoid occupations at the site showing that occupation began toward the end of the Hacienda Grande pottery style (ca. AD 400) continuing through Cuevas and Monserrate (with three dates ranging from cal. 2σ AD 745-885 [I-6894-6896). The site included material associated with Pure and Modified Ostiones assemblages evinced by bat head lugs and loop handles (albeit in small proportions).

Hernández Colón (PO-13) is approximately 13 km north of the southern coastline at the base of the Cerrillos River Valley. The site was recently investigated by Edgar Maíz López as part of his Masters' research (2002). Maíz López interpreted the site as a residential settlement measuring about 1.5 ha occupied from approximately AD 300 to AD 650 (Maíz López 2002; 2004). Pottery from the site consists of Hacienda Grande, Cuevas, and early Ostiones styles (Maíz López 2004). Fine screening of midden deposits recovered substantial quantities of faunal material indicative of long term residential habitation.

PO-10 (Caracoles) is large settlement located approximately 5 km south of Tibes. Miguel Rodríguez López (1985b) conducted initial archaeological testing and Juan González Colón (1985) conducted a subsequent Phase III mitigation at the site. PO-10 consists of a series of mounded middens covering approximately 5 ha. The site is interpreted as a town or local population center of one of the great Taíno caciques, Aguebuena II (Sued Badillo 2008).

Pottery recovered from the site consists of Monserrate and Santa Elena styles as well as Pure and Modified Ostiones styles. Later components include substantial quantities of Boca Chica, Esperanza, and Capa style pottery (Rodríguez López personal communication 2010; 1985b). Other items of note are fragments of shell and clay amulets and many small cemis (Rodríguez López personal communication 2010). Several postmolds, that appear to be associated with nuclear dwellings, were documented in a semicircular fashion away from the trash middens (González Colon 1985). Several *batey* stones were also identified; however, these appear to have been displaced from historic sugar cane cultivation and looters. Despite the identification of a stone-line segment, not enough of the *batey* remained to determine its dimensions.

Pantel recently excavated SI-04 (Los Indios) as part of the mitigation for a utility corridor right-of-way a along the southern coast (Pantel 2003, 2006; Rodríguez López 2007). The site yielded a potential plaza feature, several related post molds, and human internments. The plaza area (20 x 39 m) and a potential road leading to it were exhibited by anthropogenic soils (Rodríguez López 2007:202). No stone alignments were identified and it is assumed these were removed by agricultural activities in the area.

Two clusters of burials also were identified. Excavations at the site yielded a wide array of stone tools, pottery, and an abundance of terrestrial vertebrate fauna and marine shell. Pottery recovered from the site consists mainly of Santa Elena and Boca Chica styles indicating Period IIIb and Period IV occupation.

Cayito (SI-7) is on the coast adjacent to mouth of the Coamo River. Cayito was investigated by a number of researchers but Rouse was the first to conduct controlled excavations in the 1930s (Rouse 1952:502-532). Rouse documented the site as encompassing 2.4 ha and interpreted it as a residential settlement. The site consisted of several dense midden deposits containing pottery, bone, and human burials. Rouse recovered Boca Chica pottery from the site indicating primary occupation after AD 1200. A single radiocarbon determination from the site corroborates this interpretation with a median date of cal. 2σ AD1295 (Rouse and Alegría 1979).

Esperanza (SN2) is a "large shell heap with several smaller middens along its southern and western edges" (Rouse 1952:541). Rouse, citing Lothrop, describes a series of depressions in the shell deposits suggesting that they represented ballcourts surrounded by houses. The site contains Ostiones, Santa Elena, and Esperanza style pottery--although Cuevas, Boca Chica and Capá style pottery are also represented. In addition to the pottery a wide array of other material including stone axes, grinders, elbow stones and stone collars. According to Rouse the site appears to be occupied sometime around AD 600 – AD 1500 (Rouse 1952: 542).

Rouse documented YA-2 (Diego Hernández) on top of a "low, flat hilltop measuring approximately 1 ha in area (Rouse 1952:537). The center of the site contained a limited amount of artifacts leading Rouse to conclude that it was a plaza/*batey* area; however, no evidence for a stone-lined *batey* was documented. Early Ostionan pottery was recovered from the site as well as a substantial quantity of serpentine and jade pendants (Rouse 1952).

The site of La Florida (YA-1) lies in the Río Yauco valley. The site appears to represent a long-term habitation site that was occupied uninterrupted from approximately AD 500 to approximately AD 1200 with the final extent of occupation measuring approximately 1.5 ha. Pottery recovered from the site consists primarily of Cuevas and Ostiones style pottery (both Pure and Modified) (Maíz López 2008).

Chronology and Radiocarbon Dates of the South-Central Region

As previously mentioned, Rodríguez Ramos (2010) has demonstrated significant variation in the temporal distribution of pottery styles. The results of these efforts indicate that pottery styles often begin earlier and extend longer than proposed by Rouse--with the significant overlap in many cases. This variation represents the pluralistic and socially diverse landscape and the non-linearity of socio-cultural development of the island. Yet, while the disparity between material culture and time as presented by Rouse is evident in Rodríguez Ramos' work, styles do tend to occur more frequently within particular period of time and in particular locales. Hence, it is useful to critically examine this variation within smaller regions to refine temporal expressions of material culture and social diversity (Keegan 2001).

To provide a chronological framework for the south-central region, and facilitate the temporal placement of settlements later in this work, I examined all of the currently available radiocarbon dates from excavated archaeological sites from the south-central region and their association with particular pottery styles. One-hundred and nine radiocarbon determinations are available from 19 sites and form the basis for examining the chronology of the south-central region presented here (Appendix A). The pottery components associated with this sample were compared to observations made by Rodríguez Ramos as well as Rouse's original framework (Figure 2-5).

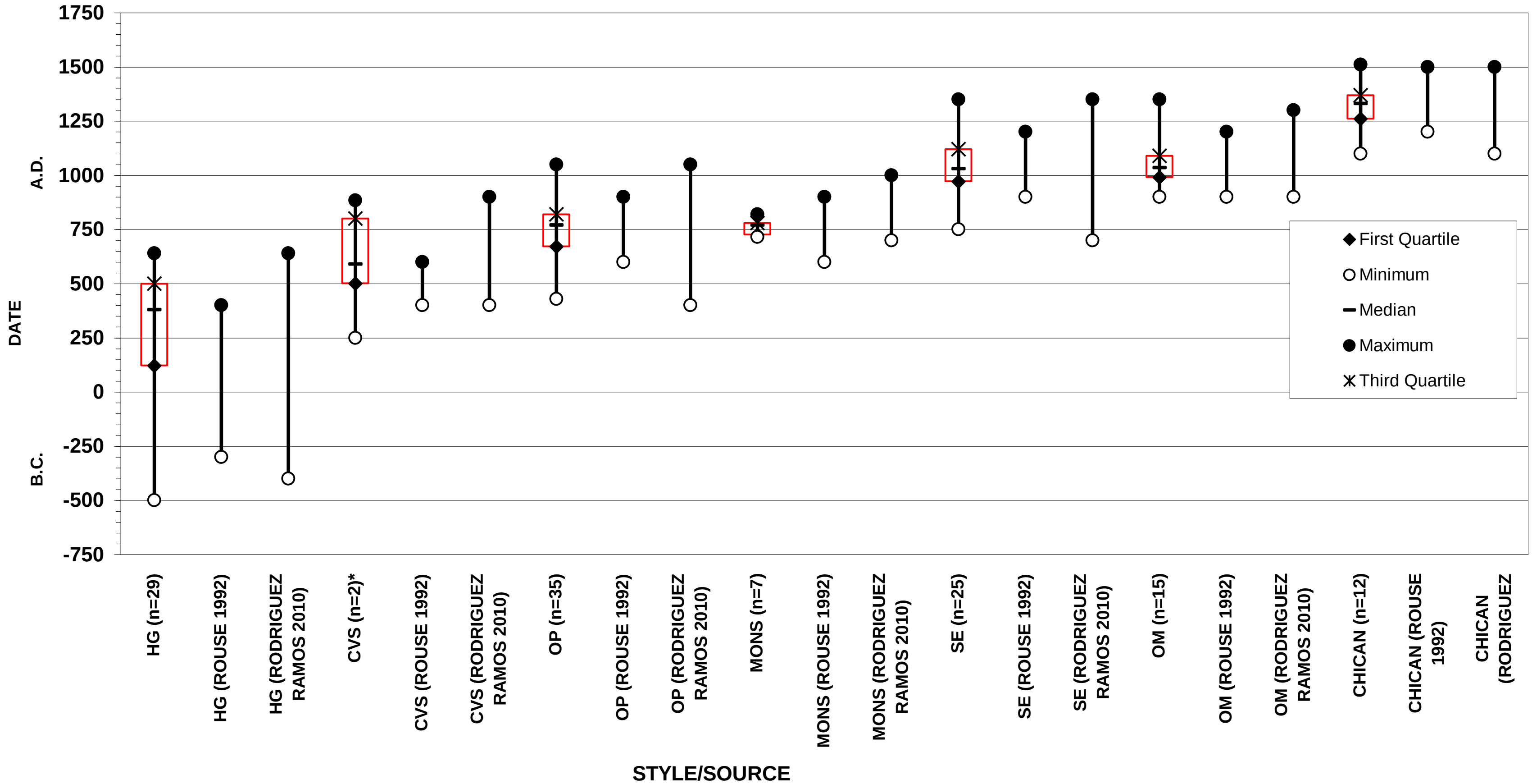

Figure 2-5. Box-plot of radiocarbon median dates (cal 2 σ) for pottery styles of the south-central region compared to Rouse (1992:52) and Rodríguez Ramos (2010). (HG=Hacienda Grande, CVS=Cuevas, MONS=Monserrate, OP=Ostiones Pure, SE=Santa Elena, OM=Ostiones Modified, Chican=Chican Ostionoid).

The dates were calibrated using the reported conventional radiocarbon BP ages and standard error ranges with Calib6.0 software (Reimer *et al.,* 2009; Stuiver and Reimer 1993). The calibrated 2σ median dates were then used to create a box-plot for visual comparison. A cautionary note: many of the dates possess limited information on the type of artifacts and specific stratagraphic contexts from which the material was dated. Further, the definition of pottery styles has changed through time and the identification of particular styles can sometimes be confused or misidentified. Finally as there are several styles with few samples of particular styles (*e.g.,* Cuevas and Monserrate) available determinations cannot be interpreted as expressing the full range for which a particular style was made and used in the region. However, this exercise is useful for the development of *more regionally specific chronologies* to address the "nagging lack of specificity, and increasing evidence for significant variability and diversity among the pre-contact groups that inhabited the island" (SEARCH 2008:33). This exercise is also useful for refining the temporal placement of settlements in the region lacking radiocarbon dates but possessing pottery.

The box plot displays the minimum and maximum ranges of dates from the south-central region for each style as well as the first and third quartiles. Through this it is possible to visualize the potential temporal range of particular styles in the region and their placement in Rouse's and Rodríguez Ramos's sequences. In general, Rodríguez Ramos shows that Hacienda Grande and Cuevas styles persisted longer and overlapped with pottery of the early Ostionoid Series; with Hacienda Grande extending to AD 650 and both La Hueca and Cuevas extending to AD 800. Further, Monserrate begins later (AD 700) and extends to AD 1000, while the date span of Santa Elena-style pottery nearly doubles (AD 700–1300). Modified Ostiones also extends to AD 1300. The Chican Ostionoid dates are the only ones that generally conform well to Rouse's temporal division for the period (AD 1200–1500), with Esperanza beginning slightly earlier than the other styles.

Examination of the data from the south-central region of pottery for the Hacienda Grande style (n=29) runs from approximately 500 B.C. to AD 650 with 50% of the dates ranging between AD 100 and AD 500. However, the current sample of dates is predominately from the site of Tecla (Chanlatte Baik 1976). One additional radiocarbon date associated with Hacienda Grande pottery (cal. 2σ mean AD 640) is from the site of Hernández Colon located approximately 5 km east of Tibes (Maíz López 2002).

Unfortunately contexts with Cuevas style pottery, while well documented in the region (Cañas, Tibes) are not well dated from the south-central region with only five dates from three sites (Tibes, PO-29, and PO-38) documented. While capturing the potential early development of this style in the south-central region (AD 250 at PO-38), the latest mean date extends to AD 880 (Tibes) which is in line with dates documented for eastern Puerto Rico.

Similarly Monserrate style is characterized by a limited number of dates (n=7) with all radiocarbon determinations coming from the site of PO-29. The style has a temporal range from about AD 520 to AD 820 with 50% of the dates ranging between AD 725 and AD 780. This range coincides with Siegel's findings in Humacao (Siegel 1992), recent research at the site of CE-34 in eastern Puerto Rico (Torres and SEARCH 2010) as well as Rodríguez Ramos' and Rouse's data.

The sample of radiocarbon determinations for Pure Ostiones style pottery (n=35) extends from AD 430 to AD 1150. Fifty-percent of these samples range between approximately AD 680 and AD 900 which is comparable to Rouse's range for the style. A single radiocarbon determination from the site of PO-23 yielded a date range of AD 258 – AD 597 (Beta 23282) which is one of the earliest dates for this style from the island. The latest date for the temporal extent of the style, in the region comes from the site of Hernández Colon dating to the middle of the 11th century (Maíz López 2002).

Santa Elena style (n=25) ranges from AD 820 to AD 1350 with 50% of the dates occurring between AD 970 and AD 1150. Modified Ostiones also ranges from AD 500 to AD 1350 again with 50% of the dates spanning AD 990 to AD 1110.

Due to the limited number of dated Chican Ostionoid samples, pottery characterized by Capá, Boca Chica, and Esperanza styles were compressed into a single Chican Ostionoid category generally define the range of Late Ceramic Age pottery. Based on the box plots, these dates range between AD 1100 and 1510 with 50% of the dates between AD 1150 and AD 1360—generally conforming to the traditional material temporal framework developed by Rouse.

In sum, the preponderance of the dates within the first and third quartile ranges from the south-central region generally fall within Rouse's projected temporal ranges. However, looking at the full range of the median dates there is substantial variation.

Summary and Conclusions

Our conceptualizations of time, space, and the nature of the post-Saladoid sociopolitical landscape is changing dramatically. Researchers currently stress a dire need to refine regional chronology and the dynamic interplay between social groups both within the island and its broader spatial and social contexts. Current perspectives are emerging that address some of these issues and paint a very different picture of the social landscape than previously conceived in traditional socio-cultural and temporal models.

Rouse's time-space framework was developed by classifying pottery decorations and other forms of material culture according to general similarities and differences. However, these categories were developed from a normative perspective that "emphasized similarities and differences at higher levels of analysis (*i.e.,* cultures and peoples) that may be inappropriate for the study of social processes that are mostly related to lower levels such as immediate regions, communities, households, or individuals" (Curet and Stringer 2010:7). While Rouse's model is currently under revision, and chronology in disarray, archaeological research focused on specific regions offers an important opportunity to identify variability in material culture and examine sociopolitical processes at more localized scales.

The preceding overview demonstrates that in addition to a socially diverse landscape, multiple social, cultural, and historical processes were at work which ultimately led to the development of regional sociopolitical units evident at the time of European contact. The available archaeological data hints at these processes in which the formation of the polity was not only a result of social process related to reproduction and maintenance of basic social groups, but also entailed the *redefinition* of social groups with diverse histories, worldviews, and identities. For the remainder of this work, I will attempt to identify some of these processes and discuss their implications on the development of social and political communities for the south-central region.

CHAPTER 3
CONCEPTUALIZING SOCIAL AND POLITICAL COMMUNITIES

In this chapter I present concepts underlying the study of incipient polities and social communities in archaeological research. In the first section of this chapter I present some of the themes implicit in archaeological approaches to the development of emergent polities with particular emphasis on “chiefdoms”. I then give an overview of community as theorized and employed in anthropology and archaeology. Here I concentrate on recent archaeological approaches to communities that demonstrate its utility unit of analysis for examining co-residential social groups, the scalar properties of human sociality, and the social construction of “imagined” social collectives (Hegmon 2002, 2008, Isbell2000; O’Gorman 2010; Pauketat 2007, 2008; Varien and Potter 2008; Knapp 2003). In this context I focus my attention on the composition of small-scale social groups and factors that enable and constrain social action. This also includes a discussion of social landscapes and the role of spatiality in the structuration of society.

Incipient Polities in Context

Approaches for explaining the emergence and organization of incipient polities are largely predicated on factors which emphasize social dominance in the interactions between emerging elite and community members. In this context, processes of social integration and political centralization generally focus on a small segment of society and their ability to efficiently organize and manipulate economy and ideology at the expense of the collective (Blanton *et al.* 1996; Brumfiel and Fox 1994; Earle 1997; also see Crumley 1995; Dobres and Robb 2000 and Pauketat 2008 for discussion and counterpoint). The impetus for sociopolitical development is often portrayed as the result of singular causal factors with the result being a description of the process by which social groups passively become members of a hierarchical collectivity (Dillehay 2004). The evolutionary framework and the underlying assumptions associated with these views have come to represent archaeological dogma over the last 40 years (Crumley 1987; Pauketat 2007; Yoffee 2005).

Guided by neo-evolutionary perspectives developed during the middle of the 20th century, archaeologists traditionally viewed societal development as a series of progressive stages. Popularized by Elman Service (1968) these stages: bands, tribes, and chiefdoms (with the archaic state added later) represented societal organization as a series of types whose inherent level of complexity was tied to subsistence production strategies, regional organization, and degree (or scale) of social hierarchy. The process by which societies evolved, or became more "complex", was considered an "upward spiral of intensification primarily contingent on the systemic relationships between population and technology" (Johnson and Earle 2000:29). Social development from this perspective transitions from simple to more complex forms of organization that entails increases in scale and differentiation of internal structures (Earle 1989; Drennan and Uribe 1987).

In terms of development, several causal factors have been put forth for the emergence of the chiefdom including circumscription involving, population resource imbalances (*e.g.* Johnson and Earle 2000), or warfare (*e.g.* Carneiro 1998). Another (and widely accepted) perspective related to the development of chiefdoms is based on the emergence of political economies of staple finance, in which surplus production finances the institutions of chieftaincy (D'Altroy and Earle 1985; Earle 1997). Within the context of an emergent chiefly political economy, local leaders attempt to expand the institutions of leadership and sociopolitical power through access to agricultural surplus. This is generally operationalized through promoting the intensification of agricultural technologies and/or by attracting followers as a labor base for agricultural production (Earle 1997; McIntosh 1999). Both strategies inherently promote conflict in which power is contested among local chiefs in the pursuit to control the regional political economy. Hierarchical relationships are thought to develop from temporary resolution of this conflict.

In this case, local leaders consolidate an area by increasing their access to labor and agricultural surplus through the incorporation of local villages. Consolidation assumes different forms depending upon the degree of mobility and access to resources by other villages. In conditions where mobility and access to resources is constrained consolidation strategies can take the form of coercion. Here, the chief's ability to incorporate new lands and the associated labor force may be accomplished through defeating rivals at war (Carneiro 1998; Earle 1997; Johnson and Earle 2000). In settings where mobility and access to resources is relatively unrestricted regional consolidation strategies may take the form of a persuasive process through which local chiefs attract followers from rivals—usually through the manipulation of ideological sources of power (DeMarris *et al.* 1996; Earle 1990; 1997).

Critically, this perspective is teleological in its approach to history and, by virtue of evolution as a fundamental aspect of human societies, spatial variation and human agency are ignored (Smith 2003:33; Spencer 1993). Underemphasized are the engagements of socially diverse groups and how they resisted, or made *choices*, towards developing communal efforts to integrate or consolidate on their own terms within the limits placed upon them by history and tradition (Saitta 1997). *Such choices promote the status, power, prestige and social memories of communities, houses* (*sensu* Lévi-Strauss 1982), *lineages or clans rather than that of specific individuals per se* (Emerson 1997). From this view people may arrange themselves along various dimensions of vertical (hierarchical) and horizontal (heterarchical) complexity that represent differing forms of organization as well as structure their political allegiances based on circumstances benefitting the group (Crumley 1985; Dietler and Hayden 2001; Dillehay 2004; Ehrenreich *et al.,* 1995; Hayden 1995; McIntosh 1999; Mehrer 2000; Renfrew 1986).[1]

An over-emphasis of the elite in current models of political development has caused an interpretive disconnect between our understanding of the emergence of powerful leaders and the development of supravillage social groups which have been treated as divergent, mutually exclusive processes. As a result, the analytical focus of some researchers tends to overlook many of the underlying social, demographic, and historical conditions which contribute to sociopolitical organization and change as well as set the stage for the emergence of powerful individuals within society. For instance, in the study of political landscapes the focus tends to promote the role of singular central places, typically ceremonial centers or large settlements, as the focal point from which ideological and political power is centralized and delegated down to subordinate peoples and places (de Montmillon 1989; Steponaitis 1981; also see Smith 2003 for detailed discussion and counterpoint). This position essentializes people and places

[1] As noted by Yoffee, in incipient political institutions "…power was not simply imposed from the top downward. Social actors, who could be members of more than one group (including king-groups and occupational groups)….could thus exploit the ambiguities of multiple group membership, evaluate their options, including their social identities, and, as circumstances changed, could transfer their allegiance to new leaders" (Yoffee 2005:34).

within space, treating them as individualized phenomenon, rather than socially constructed networks, and forces a set of preconceived hierarchical relationships (that may or may not be real) onto the social and political landscape.

Missing in this narrative are workings of smaller social groupings that constitute these formations and are constituted by a multiplicity of interrelated dimensions of social life. Hence, central to understanding the genesis of the polity or "political community" are the organizing principles by which social groups structure internal order and construct their communal identities (*e.g.,* Maxham 2000). I believe the processes of socialization, imbedded in routine social practices, was critical in enabling social groups to engage in self-directed modes of political production (Saitta 1997). Through the lived histories of place, cooperative labor projects, and communal ritual performances, small-scale social groups "negotiated relationships through which more inclusive social entities were formed" (*e.g.,* Wilson 2005:4).

Ultimately, the strength in archaeological research for the interpretation of incipient political formations is the diachronic perspective that archaeology can bring to bear regarding the human communities that constitute them (Trigger 1978:155). A community-based perspective offers a means to critically examine the morphological constructs of social groups at varying spatial and temporal scales to identify their social and material composition as well as some of the historical conditions that served to structure them (Pauketat 2000a, 2000b; Schachner 2008). Therefore, instead of attempting to answer the question "how complex is it?" we can begin to address "how is it complex?" (Nelson 1995:599) and more importantly, "how did it get that way"? (Cobb 2003).

The Concept of Community

The concept of community provides a productive realm of inquiry that offers a lens through which to examine the histories of place through locally based social aggregates and their articulation to more inclusive social and political bodies. In his book *Peasants*, Eric Wolf notes that small-scale agricultural communities form an integral part of larger, complex societies (Wolf 1956). In his study of peasant group relations in Mexico, Wolf cogently notes:

> Communities which form part of a complex society can thus be viewed no longer as self-contained and integrated systems in their own right. It is more appropriate to view them as the local termini of a web of group relations which extend through intermediate levels from the level of the community to that of the nation (Wolf 1956:1065).

This simple, but insightful, quote by Wolf highlights the relational and recursive nature of local social groups and the scalar relationships between individuals and larger social and political formations.

The concept of community[2], and the study of larger social collectives, has a long history in the social sciences (*e.g.* Durkheim 1933 [1893]). Early usage of the term stems from attempts to differentiate between a body of direct interactive social relationships distinct from the state. Tönnies (1967[1887]) initially distinguished the dichotomy between relations of community (Gemeinschaft), and those of the state or society (*Gessellschaft*).

For mid-20th century ethnographers, communities were inherent in all societies (*e.g.* Bell and Newby 1971; Firth 1936; Murdock 1949; Redfield 1955) representing “cultural facts” that could be revealed and documented through ethnographic fieldwork

[2] Etymologically the term community is derived from the Latin *communitas* consisting of a compound of the morphemes *cum* (with/together) and *munus* (gift) (Oxford English Dictionary 2010).

(see Knapp 2003:566 for discussion). With the proliferation of ethnographic research during this era the community came to be seen as "natural and necessary, a homogenous integrated whole without segmentation or factionalism, and a bounded self sustaining unit…" (Isbell 2000:246-248). In these early studies, the community became an essentialized entity, with distinct organizational, behavioral and evolutionary properties homogenizing space, culture, economic interests, and worldview.

As a spatial entity the term community typically references the "village" or cluster of associated domestic structures. However, it has only been within the past decade that epistemological consideration has been given to its broader social connotations and application in archaeological research (Hegmon 2002; O'Gorman 2010; Pauketat 2008; Varien and Potter 2008; Yeager and Canuto 2000). Recent archaeological approaches emphasize that the community and village (or residential settlement) are not necessarily synonymous and the relationships that form the basis of social groups extend beyond the boundaries of a single spatial location or "site". This idea is based on the non-mutual exclusivity of various social relationships (*e.g.* religious, kin, corporate work groups etc.) and their reproduction as durable social institutions.

Social Composition of Communities

At the heart of concepts of community is the condition of human sociality—that is the tendency of *people* to form social links with others, coalesce, and live in social collectives. This dimension of humanity is fundamental to our understanding of people as social beings and the rise of "human histories…" that contextualize "social, political, economic and cultural actions which create ever new variations on the theme of social existence" (Carrithers 1990:189). An understanding of sociality entails characterizing the composition and morphology of social groups and the ways in which they are linked and differentiated. These linkages assume a variety of forms that possess both centripetal and centrifugal properties in which social identities within and between groups emerge. It is because of this differentiation that higher level integrative institutions or order often develop “to cut across social divisions and recombine them in order to form community whose borders may be harder or looser, politically defined and/or culturally manifested….” (Yoffee 2005:15).

Communities are not homogenous, to the contrary the various social relationships that compose them promote differences within and among them (Joyce and Hendon 2000; Pauketat 2000). People simultaneously belong to multiple communities; some are nested in a scalar fashion, while others are cross-cutting. At the heart of these various relationships are interactions amongst individuals that compose kin groups, corporate domestic units, localities, and broader social and political imaginings.

Kinship and Community

Traditional studies of communities were primarily concerned with the reconstruction of kinship systems and post-marital residence patterns (*e.g.* Murdock 1949). For archaeologists, the problems in identifying the material correlates of ancient kinship systems has been sufficiently addressed over the last 40 years (Ember 1973; Gibson 1973; Gillespie 2000; Peregrine 2001). As a result, many have shifted away from kinship studies and adaptive/functional approaches to households (Beck 2007; Gillespie 2000, 2007). At the core of the kinship critique is the notion that it does not necessarily govern social life and that kinship studies emphasize aspects of society that do not necessarily conform to categorical classification or practice. The primary problem for archaeologists also is the difficulty in identifying kinship in the archaeological record as any number of kinship structures can produce similar material signatures (Gillespie 2000). However, as noted by Gibson and Carr "Agency theory, although clearly recognizing the kin basis of political economy, seems to ignore or underplay the importance of kinship in both economic and political spheres" (Gibson and Carr 2004:238).

In general I tend to agree with arguments that kinship rules do not rigidly determine all dimensions of social life and that the identification of social structure in the archaeological record is difficult at best (*e.g.* Gillespie 2000:1). At the same time, I realize that kinship and descent are central factors influencing the organization of relationships among individuals through establishing "strands of mutual amity and obligation in the individual's group and in other groups" (Keesing 1975:14; Fortes 1969).

These rules, while not always adhered to, cause us to think about some of the fundamental structures that influence social relationships and connect individuals at varying scales within society. Further, it is important to recognize that emerging polities are often organized based on kinship associations that consist of a "royal" or entitled group such as a lineage (Ferguson and Mansbach 1996; Leach 1964; Yoffee 2005; also see Curet 2002 for discussion regarding succession and descent in the Caribbean).[3] Here kinship forms a central aspect in the constitution of political communities particularly in processes of alliance building, ritual consolidation, the communal construction of social spaces (or *places*), and durable social institutions. This is particularly evident where ancestry legitimizes access to social and natural resources.

[3] As noted by Heckenberger, "Formalized rank distinctions and defined elite status, wherever they are widely recognized as legitimate, depend to a large degree on actual genealogy" (Heckenberger 2007:293).

At a basic level kinship offers a way to negotiate organizational problems associated with the maintenance of social and political order, land rights, and access to resources through time (Fox 1967; Fried 1960; Leach 1964; Murdock 1949). A key point in this regard are emic concepts of kin or kindreds (Thomas 1982) that structure the basic relationships that bind people together in an enduring social order that is inherently political. To tie kin groups together in a wider system, and to perpetuate the biological reproduction of its members, marriage rules and alliances are critical (Ensor 2003, n.d.). In many kin based social groups, descent and social membership is often traced through a common ancestor.

Critical to this point is that fact that kin based social groups often have their social base in a physical space or *locale*. Locally based kin groups are often exogamous and marriage within a lineage or clan is typically prohibited. Marriage relations between kin groups shape alliances that structure social and political life in important ways and the spatiality of these relationships underscores the idea that communities are not necessarily neatly bounded entities. For instance, because of marriage rules local social groups may include in-marrying spouses but not out-marrying siblings. Hence if a lineage is localized in a single spatial location or village then, based on the rule of descent group exogamy, spouses will have to come from one of the other surrounding villages—a process which binds such villages together. This will provide outside political alliances at wider spatial scales across the landscape.

In contrast, it is not unusual for several different kin groups to reside in a single residential settlement. In this case, if the lineages or clans are strongly corporate they are likely to be separated into wards or sectors with each descent group occupying its own segment of a village (Tuzin 2001). Marriage in this case can take place within the village among the various kin groups. In situations where a hamlet or town includes several kin groups, each may be related to groups in other villages. So in another village, perhaps several miles away, there are other lineages related to the first. In this system the ties between the lineages in different villages may transcend the social propinquity of everyday affairs with the ties of common descent linking dispersed groups in different villages. This is important, as wherever several descent groups live in a single settlement or spatially contiguous locality, what they do collectively as members of separate descent groups or lineages may be as important as what they do within the local contexts of their residential settlement.

Conversely, there are cases where social propinquity may override kinship rules, forming an important aspect of structuring relations between unrelated social groups. For instance, in studies of Guianese groups researchers note that those “who live together tend to be identified as consanguineal kin, whether through the use of consanguineal terms of reference or through the use of teknonyms” (Vilaça 2002:351). Similarly Riviére notes, “Most languages in the region have a term which applies to a group of which the criteria of membership are indistinguishably kinship and co-residence” (Riviére 1995:199). So, while formal links of kinship serve an important facet of social cohesion and identity, the associations with places and the consistent day-to-day interaction of non-co-resident social groups can also act serve as a form of self identification and group affiliation.

Finally, in marriage relations between groups the relation of affinity seldom connects all members of one group with all members of another. Some systems of affinial relationships are pervasive, stable, and enduring across generations. These systems are generally known as alliance systems (Levi-Strauss 1949; as discussed for the Taíno in Ensor 2003).

There are many problems associated with developing an understanding of kinship in archaeological research; however, the concepts discussed above hopefully bring to light some of the organizational dynamics of small-scale social groups and how they can be organized and linked to other groups at broader scales. These structures have interpretive ramifications for the ways in which ritual and sociopolitical relations are played out across the landscape in terms of how social groups identify themselves with each other and the places in which they live.

Households and Houses

Households are traditionally conceived as basic reproductive social units, sharing economic tasks, social and natural resources and generally co-residence and kinship (Ashmore and Wilk 1988:6; Blanton 1994:6). However, house and the household are two separate things with the former referring to the physical structure and the latter to the people who dwell within it. As a concept, and social reality, households are dynamic entities. Household members are generally part of larger corporate groups linked at varying scales including the supra-household, the residential settlement, the local community, and polity. Hence interactions between households within a given village or locality, creates opportunities and constraints that are constantly structured and negotiated. This view of the household as an activity group moves away from "formalism and pre-given definitions and towards a focus on the actions and interactions of people through household co-membership and cooperation in set practices" (Souvatzi 2008:10).

Whether dispersed or nucleated, residential settlements are composed of households (Wilk 1988). In traditional horticultural and agricultural communities, households often form the basis for the most fundamental economic and social units in society (Blanton 1994). Ethnographic data from lowland South America shows that in some cases households consist of either singular nuclear families residing in a single dwelling or several related nuclear families that are spatially clustered forming a domestic compound (Butt 1970; Meggers 1971; Roe and Siegel 1982; Siegel 1990; Siegel and Roe 1986; Yde 1965). In other cases, extended families reside in a single large communal dwelling (*e.g.* Crocker 1985; Gregor 1977; Heckenberger 2005; Jackson 1983; Seeger 1981; Wilbert 1981; Yde 1965).

The interaction of communal or large extended households structures social action in a variety of ways. The extended family has tensions which are not as evident as in the nuclear family (Wolfe 1966:68) and the social mechanisms used to integrate small dispersed village settlements are often inadequate for those that are larger and more densely populated (Tuzin 2001). These relationships are intensified within and between settlements with increases in size and population (Johnson 1978, 1982).[4] In this context, the opportunities and constraints by which households are organized and integrated in small scattered populations may be quite different from regions with larger more concentrated populations. In the case of the latter, perpetuation of the residential settlement can only be achieved through the production of organizational structures flexible enough to maintain social cohesion in the face of changing social and

[4] And while political formations do not necessarily conform neatly to demographic or economic conditions (Heckenberger 2005:16) there are aspects of population that facilitate an understanding of the historical properties of settlement and a context that influences (not determines) organization at varying levels.

demographic factors. There are several choices people can make to relieve social pressures within the residential settlement including labor exchange, food sharing and integrative mechanisms for solidarity (Hegmon 1989).

In recent years, Lévi-Strauss' concepts of *Maison* and *Sociétíes á Maison* (Lévi-Strauss 1982; 1987) or notions of the "House" and House Societies have gained momentum as an interpretive model guiding social and political process at varying scales (Beck 2005; Gillespie 2000). As originally conceived by Lévi Strauss (1982), the House is a corporate body whose material and immaterial wealth constitute an estate that is perpetuated through the transmission of name, nobility, materiality, and ideology or symbolism through time. This temporal dimension the "House" is legitimized through kinship, affinity, or both. The advantage of the House concept is that it attempts to overcome and integrate principles related to alliance, descent, endogamy, and exogamy that are incompatible with traditional kinship studies (Riviére 1995). In house societies the estate is primary and kinship is one of several dimensions used to preserve it through time (Gillespie 2000). From this perspective, Houses represent long lived self identifying corporate social formations of which kinship is but one underlying element (Gillespie 2000).

Rituality, Memory, and Place

While many archaeologists have veered away from causal explanations associated with population/resource imbalances, few would disagree that with increases in population social life becomes complicated and new "social synapses" are necessary to maintain order and social cohesion. These synapses are both relational and scalar linking people, places and time and require mechanisms that integrate social groups at varying spatial and demographic levels within the society. Without these structuring principles to order social life and the capacity to accommodate social change, the fabric of sociality and the bonds of community will unravel. According to Tuzin, “Without hereditary rank and wealth, without stable judicial and police mechanisms for discouraging disruptive, divisive behavior, and without the rules of the political game allowing actors to shift allegiances fairly readily, local communities are never secure in their integration” (Tuzin 2001:67).

Theories of social complexity have predicted that sedentary population concentrations will frequently be unstable, with fissioning the predominant mechanism for resolving conflict (Bandy 2004; Chagnon 1968; Carneiro 1998). It is also suggested that village fissioning will cease with the emergence of higher-level integrative institutions (Tuzin 2001). Because of this, group-oriented ritual activity is central to the survival of any community in order to reinforce sociopolitical and religious ideologies, social relationships, and resolve disputes (Adler and Wilshusen 1990; Cohen 1985; Connerton 1989; Earle 1997:153-154; Geertz 1980; Inomata and Coben 2006; Hegmon 1989:6-9; Turner 1969). Shared sacredness centralizes the interests of local groups in a variety of ways including property and politics. As Stanley Tambiah notes, “What western tradition separates and identifies as religion, economy, and politics may have either been combined differently or more likely constituted a single inter-penetrating totality” (Tambiah 1985:257).

Ritual practices bring together social groups that often act separately in observance of an apical ancestor (or ancestors) which unite participants in shared sacredness. Hence, communities can consist of living and deceased members and the communications and transactions between the living and the dead are central to reaffirming group membership through shared histories (Connerton 1989; Keesing 1975; Kopytoff 1971; Hoffman *et al.* 2010). Because of the importance of ritual in social reproduction it is also an important arena for competition and social change. Ritual practices can be altered and manipulated to transform power structures, ideologies, and histories. Institutions of rank and social power often become encapsulated in myth and rituality (Leach 1964; Geertz 1980). For this reason ritual and the organization and control of communal ceremonies is highly political. The contentious nature of ritual performance as a political tool is often exacerbated during times when regional populations are in flux (Pauketat 2007; Schachner 2001).

Ritual practices are often conducted within spaces characterized by spatially segregated public or civic architecture and a fundamental characteristic of the community is its creation through the shared construction and use of the integrative ceremonial facilities (Adler and Wilshusen 1990; Geertz 1980; Earle 1997:155-158; Hegmon 2002; Inomata and Coben 2006). Through the construction of these features, and the perfromative rituals that occur at them, communal identities are produced and inscribed in place (Tambiah 1979; Connerton 1989; Meskell 2007; Santos-Granero1998; Thomas 2001). The importance of ceremonial architecture within a sociopolitical landscape is therefore evident in the function it serves to crosscut metaphysical domains, gather meaning and cite broader social frameworks. As such, the archaeological examination of ritual facilities is fruitful for understanding community morphology and the ways in which people socially produce their collective identities.

Community Geographies and the Structuration of Society

As implied throughout this discussion communities are both people and *place* (Varien 1999:21; Pauketat 2008; Rodman 1992; Soja 1985). Communities have spatiality and are *locales* or micro-regions which situate co-present social actors in their daily lives and tie them to other proximally related communities (Giddens 1984). In this section I provide a brief discussion of the conceptual relations between community, spatiality, landscapes, and the structuration of society. I offer additional methodological consideration of these issues in Chapter 4.

As a framework for discussing social groups within the contexts of history and place, the concept of landscape is an important element of archaeological and anthropological research (*e.g.* Anscheutz *et al.* 2001; Bender 1993; Crumley 1990; Knapp 1999; Low 2003; Thomas 2001). Traditional perspectives of landscape in the social sciences tend to view it as the physical or ecological setting for social action. However, recent perspectives recognize that landscapes emerge through lived experiences and are both a medium and product of social actions (Thomas Tilley 1994:23). These two perspectives of landscape reflect differences between concepts of space and place.

Space is usually defined as the physical setting within which everything occurs. It is conceptualized in mathematics and physics as Euclidean, topological, and infinite. This perspective is attributable to Descartes, who conceived space as an absolute containing all senses and bodies (Smith 2003). In contrast places can be regarded as the outcome of the social process of valuing space (Lefebvre 1991). Hence, landscapes can represent predominant patterns of social action and thought that form an emergent system of reference underscored by materiality (Soja 1985; Ingold 1993).

Landscapes are socially produced and consumed and social networks, economic activities, and political opportunities are influenced by the physical reality of geography as well as the historical contingencies and relationality of people and place (Pred 1985). A central component to this is how people create their social realties in relation to particular places and how these identities and places are juxtaposed in relation to other identities and places. Landscapes are thus an outcome of practices of identity formation since ‘‘people create their sense of identity – whether self, or group, or nation state – through engaging and re-engaging, appropriating and contesting the sedimented pasts that make up the landscape” (Bender 1992:735).

The application of structuration theory within geographical analysis offers a basis for conceptualizing these relations. The use of structuration theory initiated in the 1980s explored the ways in which social theory could inform understandings of the socio-spatial dialectic (Soja 1980). For Giddens, the problem of social order and the constitution of political society was not discovering the innate underlying patterns of social life, but rather a concern for how social systems are bound together in time and space (Giddens 1979, 1984).

Central to this perspective of social relations within time and space is Giddens' concept of the duality of structure in which neither human agent nor society is regarded as having primacy in sociopolitical formation. Rather, this duality is a recursive process (Giddens 1981:5) fuelled by intended and unintended consequences of human action. In this context, social systems are regularized relations between individuals and groups founded on habitual social practices within time and space. These engagements are enabled and constrained by rules and resources (*i.e.* structure) available to social actors. It is the recursive relationship between rules, resources, and social action that dialectically reproduces social systems. Agency, exhibited through social action, is embodied in experience and therefore indivisible from time and space. Hence, people are spatially and temporally constrained. By extension, social action and interaction can only occur within particular spaces and times which limits the settings in which such interactions occur, structures how these settings are organized, and results in the social production of space (Giddens 1984).

Understanding community organization, and the structuration of broader sociopolitical formations, requires an examination of landscapes through the materiality of lived spaces (Soja 1980, 1985). From this perspective residential settlements may be best considered not as individual sites, or points on a landscape, but as events or nodes in a network of relations based on kinship, social propinquity, the physical resistances of the land, resource locations, and the historically contingent circumstances related to their emergence. Therefore, rather than viewing ceremonial architecture or clusters of residential settlements simply as indicators of community interaction these should be seen as the materialization of social organization, the outcome of complex social negotiations and about the form and function of local sociopolitical networks across time and space (Schachner 2008). As cogently noted by Heckenberger, "Landscape is thus a thing of memory, that reflects history, as well as a thing of land and body, and a critical element of this is the history of places, and how they fit together into cohesive territories" (Heckenberger 2005:242 [emphasis added]).

Residential settlements, localities (or locales [Giddens 1979]), and regions are the spatial units of analysis used in this research to study communities. Residential settlements have distinct boundaries evident in the material remains of archaeological residues of recurrent past human activities—features, middens and artifact scatters.

Residential settlements defined in this study are interpreted as the primary dwellings (or habitations) of individuals and their respective households. The identification and examination of residential settlement clusters has been central to identifying communities (Varien 1999:23; Varien and Potter 2008:2) and has forced archaeologists to move beyond individual sites as the primary unit of analytical interpretation.

In this research I define a local community as a supravillage social group who live in proximity to one another within a geographically limited area, who have face-to face interaction on a regular basis, and who share access to critical social and natural resources (Varien 1999:4). As a function of these relationships, the spatial proximity of communities and the location of the residential settlements of their constituent members will influence the degree to which social groups interact and share forms of meaning and behavior relative to their unique space/time contexts (Giddens 1984; Varien 1999; Yeager and Canuto 2000:125). Here the community and the village are not synonymous and the relationships that form the basis of social and political groups extend beyond the boundaries of a single spatial location or "site" (Varien 1999).

By extension, the members of a political community are tied to individuals in other communities through social relationships that influence their social roles and behaviors within their own, as well as within neighboring ones. The material manifestations of these linkages are evident not only in the interconnections between residential settlements, but also through nodes of ritualality and gathered humanity in the form of ceremonial spaces (Adler and Wilshusen 1989; Sassaman and Randall 2006). Therefore, the organization and development of social groups within the landscape are influenced through the interactions among these networks forming an "arena in which sociopolitical relationships are negotiated or played out" (Blanton et al. 1996; Kolb and Snead 1997:610).

The social production of space, and the control over places, is a focal point for understanding the social dimensions of political communities. According to Heckenberger "Space and control over it is thus an important instrument of power and ritual centralization, even in the absence of economic or administrative centralization; it forms a distinctive aspect of power critical in many non-western chiefdoms and states" (Heckenberger 2005:25). It is through the production of these spaces that the sociopolitical relations within and between groups materializes in particular geographic localities (Leach 1964).

Summary: Communities in Archaeology and Practice

Regardless of what approach we take to understanding social and political life in the past whether they be kin groups, households, *Maisons,* religious sects or other inclusive social, ideological or political imaginings they are all tied to notions of community. In contrast to early conceptualizations of community used by mid-20th century ethnographers, I consider communities as both people and place historically situated and emergent based on networks of social interactions at varying scales. In this context, people make informed choices and pursue goals that have different sources of motivation and varying outcomes, with intended and unintended consequences, circumscribed and configured by spatiality, social practice, and historical contingency.

Further the community is here not considered a single location or site but at one scale a local network of social relations and at another a broader social imagining. As cogently noted by Adler, "In theory "community" provides a conceptual context within which social identity, residence, occupational history, land tenure, and resource use are "socially spatialized" on a supra-household level" (Adler 2002:26; Leach 1961)

Following this perspective, the construction of ancient political communities necessarily involves the development of social institutions to cut across social divisions and recombine them to form broader social and political imaginings. This process of community formation is in a constant state of "becoming" that entails multiple social groupings contesting rights, privileges, histories, and resource access on a local level. Hence, in developing the problem orientation to examine the political landscape through community organization, I do not presuppose a societal typological construct to conceptualize the polity. Rather, I suggest critical study of the relations between humans and landscapes and the underlying conditions indicative of political structure at smaller scales as well as how communities construct and promote their own identities.

CHAPTER 4
METHODOLOGICAL CONSIDERATIONS FOR THE ARCHAEOLOGICAL STUDY OF COMMUNITIES

This chapter provides analytical strategies and some of the methodological considerations for the archaeological study of communities presented in this research. Beyond the chiefdom attribute list of Peebles and Kus (1977), I contend that an understanding of incipient political institutions begins with examining small-scale local social groups or communities. To pursue this endeavor it is necessary to link concepts about what communities are to how they are manifested in the archaeological record. This discussion builds off of conceptions of community presented in Chapter 3 and focuses on how small-scale social groups settle, inhabit, and ultimately produce local and regional landscapes.

In the first section of this chapter, I discuss the analytical domains explored in this work. This section provides the epistemological approach that informs the progression of analyses and subsequent interpretations throughout this research. As settlement data forms a primary line of evidence in this research, the second portion of this chapter offers a general review of settlement studies with particular emphasis on previous studies from the Caribbean. The final section of this chapter offers a detailed discussion of the socio-spatial factors influencing settlement, community formation, and social interaction at local and regional scales.

Analytical Strategies

A variety of approaches have been use to study communities archaeologically (Canuto and Yeager eds. 2000; Kolb and Snead 1997; Varien and Pottery eds. 2008). Recent research focuses on detailed studies of domestic life (Horning 2000), the use of integrative ritual facilities for solidifying social and political identities (Inomata and

Coben 1996; Kolb and Snead 1997), the creation of social and symbolic landscapes (Snead 2008), and/or population movement (Schachner 2007). In this research I focus on three analytical domains directly linked to these aforementioned topics including: the 1) *composition* and 2) *organization* of communities, evinced through the materiality of settlement, and 3) their *symbolic construction*, through the building and use of integrative ritual facilities. Taken together, these analytical domains provide a rich view of local social groups, their articulation within the social landscape, and the creation of contexts conducive to social change.

Central to examining communities is a need to understand the composition of the social groups which comprise them. A necessary step in this endeavor is the identification of residential settlements and characterization of the regional settlement pattern. Through an examination of the size, distribution, and occupational continuity of residential settlements analysis can be conducted to posit group size, variability in organization, and how they articulated to the broader social landscape through time. Moreover, examination of the size and occupational duration of settlements offers insight to potential relationships between settlement density, nucleation, and its impacts on social and political centralization in particular localities (Fletcher 2007; Roscoe 1994).

Social and economic distances, such as those that posit a relationship between the distance of agricultural fields from residential settlements (*e.g.,* Chilsom, 1979; Stone 1991; Varien 1999) and/or the social spacing of settlements, can also be identified. Distance between settlements, while potentially reflecting dimensions of the subsistence economy, can yield clues to the social interactions among community members and how they may have interacted as larger corporate collectives (Hayden and Cannon 1982; Varien 1999). Other organizational dimensions, such as degree of integration, competition, and authoritative control or autonomy can also be gleaned through analysis of settlement distributions, sizes and/or sizes of ritual integrative facilities (Adler and Wilshusen 1990; Li Lu 1997; Johnson 1980).

Critical examination of factors of distance and the distribution of residential settlement allows for an analysis of how physical and human geographies create opportunities for or constraints on agency and action. This relational approach differs from traditional perspectives of landscapes reliant upon central place concepts because it focuses on the structure of interacting units. Here actors and their actions are viewed as interdependent rather than independent and the links between actors are channels for the transfer of information and resources (either material or nonmaterial).

The organization of communities and the distribution of their residential settlements structures and is structured by access to social and symbolic resources, notably people in neighboring communities. Such access depends on a variety of factors including relative topographic position within the region (Clarke and Blake 1994; Johnson 1977:492). For instance, some basic features of the landscape (*e.g.,* mountains, steep valleys, and rough coastlines) will inhibit travel and communication to some areas; other features (*e.g.,* mountain passes, level terrain, and navigable rivers) funnel social contact into specific areas. Inherent potential for travel, coupled with distribution of critical resources, influences settlement locations, sizes, population densities, permanence, and future growth (Fletcher 2007). Hence, in the broader contexts of the settlement system some residential settlements will be central and others peripheral to differentially distributed social groups and critical resources (Clarke and Blake 1994).

By examining the composition and arrangement of social groups in particular localities it also possible to discuss aspects related to territorial development and the sociopolitical landscape at broader scales (Sack 1986). For instance, Netting (1990) and Stone (1991) have argued that systems of land tenure and boundary maintenance are central to the organization of small-scale agricultural groups. Congruently, many researchers have indicated that the formalization of land use and property rights are primary evidence for political consolidation (see Gerritsen 2003; Hayden and Cannon 1982; Sack 1986). Here the limiting of people's associations to land, tied to social identity and history, are inherently political (Delaney 2005; Smith 2003).

Land tenure and territory have symbolic as well as physical components evident in settlement patterns. For instance, spatial manifestations of territoriality are also evident in the distribution of ritual integrative facilities which legitimize land rights and access to local resources. Further, investments in distinctive stylistic features of various components of material culture (*e.g.*, pottery, petroglyphs) may reflect community identity and boundaries at different scales (Barth 1969; Hodder 1985; Wobst 1977). Such boundaries are both communal and political in that their construction yields divisions in identities that establish differences between social groups at local and regional scales.

The social and symbolic construction of communities is perhaps most conspicuous in landscape modifications entailing the construction of integrative ritual facilities (Adler and Wilshusen 1990). The symbolic and ideological dimensions of these features serve to sediment social groups in places by acting as visible referents for the community and differentiating them from others. Further, examination of the use and quantification of the construction of ritual integrative facilities yields clues to the composition of communities through indentifying potential associations between their size and the number of people that may have used them (Kolb and Snead 1997).

Methodologically, this work takes a relational perspective to landscapes and the study of community organization that while recognizing the influence of central(ized) spaces (and places), seeks to unpack dimensions of the social, political, and historical processes that formed them. In developing the problem approach, I avoid a falsificationist methodology focused on a hypothetico-deductive logic. Such approaches in archaeology are often employed for rejecting grand and complex theories that, more often than not, overstep the scale at which the archaeological data at hand is able to address (Hodder 2000; 1987b). Reliance upon such approaches to the past promote a dichotomous black/white yes/no mode of categorical thinking that omits large amounts of useful and interesting subject matter necessary for contextualizing and interpreting the archaeological record (Hodder 1986, 1987a; McIntosh 1998, 2005; Shanks and Tilley 1992).

There are no "standardized measures" that allow us to contrast social processes in different contexts, thus, the best way to examine the origins and effects of similarities and differences is through comparison of the archaeological record on its own terms. A historical comparative perspective allows us to determine what is unique about certain social contexts that promote (or inhibit) change (Pauketat 2001). Hence, analysis and interpretation throughout this work relies on identifying and interpreting central tendencies in the data. A productive way for approaching this is to focus on variables and analyses that identify commonalities or divergences based on empirical examination of the data at hand. In this context, the identification of central tendencies in the data facilitates the detection and interpretation of structural patterns. This approach does not seek to promote a normative perspective to the structure of social and political organization in the sense of suggesting universal patterns. To the contrary, it acknowledges that variability exists and recognizes the need to explain both patterns of similarity and differences present in the data.

In the following sections I give a review of settlement pattern studies as relevant to this research. I specifically focus on the spatiality of small-scale agricultural communities which provide analytical and interpretive foundations for the settlement analysis conducted in Chapters 7 and 8. These sections seek to flesh out some of the settlement factors structuring social life and in particular those which contribute to the organization of locally distinct social groups. These sections also deal with methodological considerations including conceptualizations of region, locality, time, and settlement nomenclature. Details regarding ritual integrative facilities are reserved for a detailed treatment presented in Chapter 9.

Landscapes of Settlement: Concepts and Contexts

Settlement landscapes are the fundamental empirical component of human geography and regional studies in archaeology. A settlement is generally defined as a place in which people live and dwell, and where they are most involved in aspects of daily life. The variability in settlement, as discussed in geography, is based on population size and identifiable structural (often architectural) features that represent functional differences in them. Such typologies are the cornerstones of modern geographical research and founded on principles of transportation, administration, and economics which are used to characterize settlement systems.

In geography, settlement systems are generally classified as urban or rural (Aitken and Valentine 2006). In the case of the former, analytical categories focus on high-density, large population centers generally characterizing modern settlement systems and industrial complexes composing cities and towns. In the case of the latter, the focus is on smaller population aggregates of low-density settlement systems within agricultural communities like villages, hamlets, and farmsteads (Fletcher 2007). The adaptation of these categorical descriptors in archaeological research generally employs elements of either or both simultaneously depending on the scale of the society under examination.

In archaeological research, the discussion of settlements and settlement patterns have become so common that many researchers take for granted the terms utilized to describe and interpret settlements. However, recent research of ancient social and political landscapes brings into question our ability to readily define or identify immediate differences between urban and rural, city and village (see Heckenberger 2008, 2009; McIntosh 1998, 2005; Pauketat 2007). These shifting epistemologies are a product of refocused views of human sociality in the social sciences. For the purposes of this research I generally follow concepts and terminology associated with the study of rural agricultural settlements in geography (Nagle 1996; Roberts 1996). As archaeological research in Puerto Rico and other areas of the Caribbean continues, it will be useful for researchers to critically engage their conceptions of settlement to fully interpret the social implications of the archaeological patterns observed.

Geographers, generally describe settlement distributions as either dispersed or clustered (nucleated) (Nagle 1996). These terms usually refer to the distribution of individual domestic structures across the landscape; however, they also can describe the spatial organization of settlements themselves such as villages, towns, and/or cities. Dispersed settlements are those that are widely distributed over a broad area. In contrast, a clustered pattern is one in which structures or settlements are nucleated in a smaller area. Clustered patterns of settlement tend to develop where natural resources are patchy, although there are other socially mitigating factors that can contribute to the nucleation of settlement.

Clustered patterns often take a variety of configurations including variations of dendric (web-like) and linear formations. Linear patterns of settlement refer to the distributions that tend to follow roads, coastlines or rivers and are common in regions where such features define the physical landscape. Dendric or open patterns are common in areas where resources or topography is more evenly distributed. Critical examination of the form and distribution of settlements facilitates an understanding of the factors structuring them and the composition of the social groups that create them.

Settlement Patterns Studies in Archaeology

The study of regional settlement patterns has been an important aspect of archaeological research since the 1950s (Chang [ed.] 1968; Trigger 1967, 1968; Willey 1953, 1956). Stimulated by innovations in quantitative spatial analysis developed in geography in the 1950s and 1960s, the study of settlement patterns grew in practical application in archaeological research throughout the 1970s (*e.g.,* Flannery 1976; Hodder and Orton 1976). This trend has gained momentum over the past 25 years; largely a result of advancements in computer technology and the development of

Geographical Information Systems (GIS) for managing, generating, storing, manipulating, analyzing, and presenting spatial data (Aldenderfer and Maschner 1996, Maschner [ed.] 1996; Wheatly and Gillings 2004).

Settlement studies in archaeology are typically approached from one of two perspectives focused either on human-environmental relationships or political/economic organization. While complementary in many respects, each possesses their own objectives and underlying assumptions. Recognition of these differences and their impact on how archaeologists think about social and cultural processes has been a point of debate since the inception of the approach (*e.g.,* Rouse 1968).

Environmental approaches to settlement patterns in archaeology grew out of cultural ecological studies in the 1960s where analyses focused on discerning the logic of settlement distributions to explain local cultural phenomenon as environmental and ecological adaptation (Steward 1955). Later studies focused on economic organization and resource exploitation of natural environments. For example, catchment analysis (Viti-Finzi and Higgs 1970) offered a useful tool for examining subsistence exploitation strategies by developing ranges of distance from a given settlement and calculation of resource types that could be tapped within the area defined by it.

Subsequent research in this vein emphasized quantification of environmental variables to develop locational or predictive models of where various archaeological sites might be located (Kvamme 2006). Both models assume a least-cost perspective in which humans are seen as situating their activities in such a way as to conserve the amount of energy needed to access or distribute resources. The major critique of this approach has been that human-environmental interaction determines the spatial arrangement of settlements and ultimately the organization of society.

Sociopolitical Approaches to Settlement Patterns Research

Contrasting with settlement studies focused on human-environmental interactions, sociopolitical approaches seek to interpret organizational dynamics by identifying social and/or political rules or conditions which influenced the distribution of material remains across the landscape. In this context, the focus is on identifying centers of political power and their position in regional administrative hierarchies (*e.g.,* Flannery 1976; Johnson 1977; Li Liu 1996). At the heart of these analyses is a hierarchical conceptualization of space founded on Central Place Theory (CPT). CPT assumes major centers will be equally spaced from one another and surrounded by a nested hierarchy of increasingly smaller sites (Losch 1954; Christaller 1966).

CPT theory was developed to explain the spatial distribution of modern urban societies engaged in market economies. German geographer Walter Christaller was the first to notice that towns of a certain size were roughly equidistant from one another and surrounded by smaller settlements (Christaller 1966 [1933]). By examining and defining the functions of the settlement structure and the size of the hinterland, Christaller was able to model the pattern of settlement locations using hexagons based on hierarchical principles of organization.

Two principles of Christaller's model have been central to archaeological studies of settlement and regional sociopolitical organization: the transport and administrative principles. According to the transport principle, central places are evenly distributed with lower order centers located at the midpoint between larger centers of greater importance. This principle highlights patterns of equal spacing in which settlements minimize their costs and maximize efficiency of economic transport networks. In his administrative model, the organizing principle was based upon the notion that political or administrative centers could not be overlapping and that subordinate centers were directly tied to a primate center.

Following Christaller, archaeologists generally view the regional distribution of central places, and their subordinate settlements, as an indicator of decision making levels within a regional sociopolitical hierarchy (de Montmillon 1989; Johnson 1977; Wright and Johnson 1975). Settlement hierarchies are typically based on site size and relative amounts of ceremonial/public architecture or public space at a given settlement (de Montmillon 1989; Flannery 1976; Spencer 1998; Steponaitis 1981; Wright and Johnson 1975; see Siegel 1999 for discussion on Puerto Rico). Rank-size studies suggest that the intensity of centralization in a settlement system is a function of the degree to which a site is dominant based on its size (*i.e.,* assumed population) relative to associated sites (*e.g.,* Johnson 1977; Li Liu 1996; Savage 1997).

Centralized political control is often considered evident in regional settlement hierarchies represented by two or three tiers. At the top of the hierarchy, is often an identifiable regional center characterized by either the largest in size or possessing the most ceremonial/public space in the region (Flannery 1976; Spencer 1998). According to Anderson, “the number of levels in the administrative hierarchy, or steps in chiefly command structure thus provide an effective measure of the organizational complexity of chiefdoms” (Anderson 1996:232). Further, settlements of primary importance (*i.e.*, centers) are often considered proximally located in relation to other settlements and critical environmental resources. Lower levels in the hierarchy tend to be smaller in size with less ceremonial/public space attributed to them. These spatial characteristics are generally ascribed to the regional organization of chiefly polities and indicative of "control-based hierarchies" (Johnson 1982). However, there are several problems associated with CPT that are ignored in archaeological settlement studies and which obfuscate our understanding of social and political landscapes.

CPT is essentially static, explaining the existence of a regional spatial structure but failing to explain the historical contingencies of how the structure emerges and changes through time (Smith 2003). Further, CPT assumes that regions are isotropic (flat), that populations are evenly distributed, that resources are evenly distributed, and that development and change generally follows a mathematical pattern based on exponential growth. Hidden within these idealized patterns are histories, horizontal power structures, social rules, and tensions influencing the spatiality of living peoples.

In this research examination of the morphology of settlement and organization of communities is inspired by studies that examine the relational linkages in similar but spatially discontinuous supra-village groups that "avoid laying stress upon relations of dominance and subordination…." (Renfrew 1986:1). Here emphasis is placed on the morphological and relational constructs of these formations that seek to explain how they were ordered, articulated, fractionated, and mutually constituted at local and regional scales.

Settlement Patterns Research in the Caribbean

In spite of its long and rich archaeological history, the study of regional settlements in the Caribbean is limited. Early settlement research focused on the Greater Antilles and Virgin Islands with an emphasis on site locations in relation to their natural environments for inferring subsistence exploitation and processes of island colonization (*e.g.,* Rouse 1956; Sleight 1965). Due to the complexity and diversity of island ecologies, these approaches have maintained their currency over the past 30 years.

Since the 1980s settlement studies in the region have focused on human-environmental relationships to examine economic organization and potential change through time (Armstrong 1980; Bradford 200, Keegan and Diamond 1987; Keegan 1985; Lundberg 1985; Righter 1999; Siegel 1993; Torres 2001). In more recent studies, human environmental interactions have been utilized to document and test models related to island demography and the capacity of specific geographic settings to support regional populations (Curet 1992, 2005; Torres and Curet 2008). Settlement studies emphasizing human-environmental relationships have also been utilized to assist in the development of predictive models to identify potential site locations as a management tool for regional survey and site inventory programs (*e.g.,* Cooper 2007; Rodríguez Lopez 1985; Reid 2008).

In contrast, studies emphasizing sociopolitical perspectives of settlement are limited with most research focused on determining the structure of the *cacicazgos* on Hispaniola and Puerto Rico at, or immediately prior to, European contact (*e.g.,* Wilson 1992; Siegel 1996). Wilson's (1989) research on Nevis is perhaps one of the few settlement studies to take a holistic perspective by employing an array of spatial analyses to explore Saladoid and Ostionoid sociopolitical organization on the island. More recent research related to sociopolitical settlement patterning comes from the Lesser Antilles. In her recent doctoral dissertation, Hardy examined exchange networks among pre-contact social groups in the Virgin Islands (Hardy 2008). Using GIS and systems theory approach, she identified spheres of interaction founded on a complex network of exchange relationships which she interprets as the basis of an emergent regional political economy as early as AD 400. In her research, Hardy postulates these connections as conforming to a “small-world” network model in which local spheres of interaction become the nexus for broader regional patterns of sociopolitical relations. However, the processes by which these networks emerged and the outcomes on the regional social and political system are not explained.

Keegan and Mclachalan (1989) presented one of the few studies to emphasize social organization as central to the spatial structuring of sociopolitical groups. As the authors cogently note, “Studies of prehistoric settlement patterns emphasize resource distributions, production, exchange, and political relations as the determining factors of settlement locations. Settlement patterns are also influenced by social organization” (Keegan and Mclachalan 1989:613). In their research in the Bahamian archipelago the authors suggest that Taíno settlements evolved over time in three phases. The first was made up of settlements which were randomly distributed. During the second the settlements became regularly spaced pairs. Finally, settlements become clustered and plaza communities emerge (Keegan and Mclachalan 1989:624-626).

Based on the preponderance of proximally related settlement pairs[1] observed during the study, they interpret the relationships between communities representing intermarrying clans. For Keegan and McLachlan, the settlement pairs “reflected the practice of localizing males in a society that practiced matrilineal descent and matrilocal residence” (Keegan 2007:155). In this context they posited that the aggregation of males represented a shift to avunculocal residence among Taíno elites. However, the

[1] Over 90 percent of the settlements occur in pairs (Keegan 1992, 2007).

major criticism leveled against the model (as with many settlement studies) relates to contemporaneity of sites and the idea that patterns of kinship are not readily visible in the archaeological record (Gillespie 2000). Despite these critiques, it is important to note that they recognize the influence of social organization in the spatiality of the archaeological landscape.

Studies of migration and demography have also been a focus of inquiry. Haviser's 1997 settlement study of the Caribbean islands, in conjunction with radiocarbon dates, offered one of the earliest and most interesting views of non-linear migration in the region. In terms of demography, recent work by Curet (2005) examined settlement patterns from four drainage basins in Puerto Rico (including Yauco and Salinas). Curet's research revealed that different regions, while showing similarities in growth during Period III, displayed considerable demographic variation.

The majority of the settlement-oriented research in the Caribbean has been product of survey projects resulting in general descriptions and documenting site inventories (Haviser 1985; Maíz López and Questell Rodríguez 1990; Tronolone and Cinquino 1990; Rodríguez Lopez 1985). However, rarely are studies carried to their logical conclusion leading to a fully developed perspective of the regional sociopolitical history. A notable exception is presented in the recent work of de Waal (2006) who surveyed and tested several sites in eastern Guadeloupe. Focusing on micro-regional dynamics, de Waal was able to not only characterize regional settlement variability but also document substantive changes in settlement through time which served to form the foundation for broader social and political interpretations in the region.

Regional Studies and Settlement Research in Puerto Rico

Early anthropological research documenting the spatiality of sociopolitical organization in Puerto Rico can be traced back to Fewkes who provided a synthesis of the geographical descriptions of the *cacicazgos* from ethnohistoric accounts (1907:35-41). In later work, Rouse presented the potential location of the villages of Puerto Rican *caciques* at the time of contact in map form (1952:370). Rouse's initial work in Puerto Rico, was highly developed for its time. His survey and testing program facilitated an understanding of the islands regional sociocultural variation and continues to be utilized as a primary resource today. However, it was not until the 1970s, with the work of Gary Vescelius, that the spatial organization of regional polities was critically examined. In his 1977 paper Vescelius studied the distribution of ballcourts for the island of Puerto Rico and noted that they tended to be distributed on or near the proposed boundaries of *cacicazgos* documented at the time of European contact. This prompted Vescelius to suggest that these features served as integrative facilities between locally competing sociopolitical groups.

In more recent work, Siegel conducted rank-size analysis on a sample of plaza/ball court sites to model the sociopolitical landscape (Siegel 1996, 1999, 2004). For Siegel, variations in the amounts of ceremonial space associated with particular sites through time is considered evidence of competitive regional building episodes and the centralization of political control (1999). Oliver, (1998, 1999, 2007) also examined the organization of the political landscape based on the distribution of plaza/*bateys* in the region surrounding Caguana in the mountains of central Puerto Rico. Oliver observed a tiered network of settlements with larger ceremonial sites representing higher positions in the regional hierarchy (Oliver *et al.*1998, 1999, 2009). However, he suggests that the ubiquity of ceremonial features throughout the landscape indicate a more complex picture of sociopolitical organization likely involving the shifting importance of local lineages or clans (Oliver 2007, 2009).

In an earlier study, Lundberg examined settlement trends for south-central Puerto Rico through time (Lundberg 1985). Lundberg's analysis took into account both environmental and political factors by examining physiographic settings and the distribution ceremonial centers. For Lundberg the analysis of both (environmental and political) factors was not conducted to "indicate theoretical incompatibility but rather to find out how far each may be pursued on its own merits and to make apparent those specific areas in which current data deficiencies prevent progress" (Lundberg 1985 L:4). Lundberg's research identified shifts in the location of ceremonial sites through time and was perhaps one of the first to suggest the instability of pre-Taíno polities. This research also demonstrated trends in the movement of settlements inland through time and the concomitant emergence of ritual facilities. The observations and gaps in knowledge pointed out in her research catalyzed subsequent investigations (Curet 2005; Torres 2001, 2005, 2010) and are influential in the research presented in this dissertation.

To conclude this brief overview, settlement pattern analysis offers an important tool for characterizing regional viability and changes in the organization and development of regional social groups. Settlement studies in the Caribbean are gradually moving from the definition of first order variables and predictive location modeling to an understanding of second order variables and analysis of social and political organization and change through time.

Inferences resulting from settlement studies can yield an understanding of human-landscape interactions and sociopolitical organization of human populations through time. Importantly settlement studies provide a means for contextualizing the spatiality of social life and the history of lived landscapes. The underlying implication here is that *these patterns represent processes that are both the medium and outcome of historically mitigated social practices which come to form the landscape*. When used in conjunction with other lines of data, settlement patterns provide a powerful tool for examining the organization of sociopolitical formations and change through time.

Regions and Localities

Archaeological definitions of region vary with particular research interests, but are usually defined by topography and the distribution of material culture traits (Crumley and Marquardt 1990; Duff 2000; Willey and Phillips 1958:19). Regions are often a spatially defined scale within which archaeologists believe some type of social phenomena or social interactions of a particular group of people during a particular period were concentrated. However, a closer look at regions suggests that they are less internally coherent than we might expect (*e.g.,* McGuire 1996). The question then becomes not only whether we can identify coherent regions but how to study lived landscapes in a meaningful way through those that constituted them (Duff 2000:71).

In this work the region as a conceptual entity is the outcome of the relational links between localities. The identification of these relationships, and the ability to interpret the organizational properties of the settlement landscape, lies in discerning similarities and differences in the distribution of material culture through time and space.

Locales (Giddens 1984) or localities are defined here as micro-regions in which social interactions are concentrated in particular geographic locations based on social propinquity and the friction of distance (Soja 1989:149). It is through the social propinquity of residential settlements that allows for regular face-to-face interaction among individuals which promotes the identification and examination of "interactions with others who are physically co-present" (Giddens 1979:64-72). In this work locales/localities denote enduring social spaces that are stabilized socially and spatially through the settlement of habitation sites (Soja 1989:151; Varien and Potter 2008). The physical geography and materiality of locales give form to communities and the persistence of some habitations form enduring institutions within the social and political landscape.

As noted in the previous discussion, settlement pattern studies are typically focused on examining hierarchical relationships among sites contingent upon concepts associated with CPT (Christaller 1966; King 1984). In archaeology, critiques in the application of CPT note that the model was originally developed to examine economic relationships in modern European industrial societies (Hassig 1991:19; Smith 2003). From this perspective the model relies on innate assumptions of social interaction and power that dictate the underlying form of hierarchical structures among social groups. Problematically, these assumed relations of power and centrality *are what need* to be discovered by archaeologists and cannot be assumed *ipso facto*. Hence the role of centers should neither be viewed strictly in and of themselves nor should we assume that these places are entirely synonymous in function. In this work the Ceremonial Center of Tibes offers a conceptual focal point for examining community organization and the sociopolitical landscape. While Tibes and other sites with ceremonial architecture are certainly "central places" in the social sense, it is important to view them as lived communal spaces, or nodes in a network, where power and identity were negotiated through their social and material construction.

While this research examines the organization of community groups of the south-central region, it should be understood that this represents one small snapshot in a wider Circum-Caribbean "World System" (*c.f.*, Peregrine *et al.*, 1996) of social, cultural and historical processes. In contrast to recent trends that emphasize broad macro-regional connections of materiality and sociality (Bright 2011; Hofman 1995; Hofman and Hoogland 2004) it is the purpose of this work to examine social processes at smaller regional and micro-regional scales of analysis so that we may begin to develop local histories of the communities that once lived in them.[2] As cogently noted by Ortman, "This dialectical relation between *place*, the community scale of direct lived experience and interpretation, and *space*, the regional-scale which aggregate human action and socionatural forces impact local places, necessarily leads to understandings as to what was going on among the people who created the archaeological sites we study" (Ortman 2008:154 [original emphasis]).

Spatialities of Social and Political Life

To interpret the settlement patterns presented in the proceeding chapters, it is important to consider how concepts of territory and the physicality of distance serve to structure social relationships by enabling and constraining human interactions. Distance and the distribution of settlements denote inherent properties related to emic constructions of social and political spaces (Soja 1985; Santos Granero 1998). In most pre-Columbian societies the primary mode of transportation was walking. In the

[2] Also recently noted by Curet "the best way to understand [pre-Columbian] populations is by analyzing small localities, and not whole islands, at a time" (Curet 2010:153).

contexts of the ancient Caribbean, walking is supplemented by water travel of marine environments and navigable inland waterways. In the case of the study region, all navigable watercourses flow north to south and are limited to their inland extent by the narrowing of watercourses as distance from the coast increases. This is particularly evident in the uplands and foothill regions of the island where the shallow and rocky nature of these watercourses precludes travel by canoe. While these waterways were certainly corridors, interaction between most social groups would likely have been based on travel by foot.

Traditional archaeological studies regarding the movement of people through a given landscape have emphasized the relationships between resource locations and the travel distance necessary to acquire those resources by individuals (*e.g.,* Arnold 1985; Chisholm 1968; Varien 1999; Viti-Finzi and Higgs 1971). Cross-cultural studies established travel cost as a critical factor in movement through landscapes which offers insight to the interaction between local social groups. The speed at which one can walk has been documented between approximately 2.75 km and 3.5 km per hour (Arnold 1985:34; Cotterell and Kamminga 1990:193-196; Drennan 1984; Stone 1991). Based on this calculation, an individual could travel between 22 and approximately 28 km walking eight hours, non-stop in a single day (over level terrain).

These studies have been summarized in a number of works regarding sedentary agricultural groups including research presented by Arnold (1985), Stone (1991) and Chisholm (1968). Research conducted by Chisholm (1968) examined distances farmers would walk to fields from their settlement and concluded that distances were typically less than 1 km with trips beyond 3 to 4 km the upper threshold. In more detailed studies, Stone (1991) examined how far Kofyar farmers travelled to participate in cooperative work groups and found that travel was limited to less than 1 km with 2 km the upper threshold.

For societies with shifting cultivation practices, such as in New Guinea (Tuzin 2001; Clarke 1971) and Amazonia (Gregor 1980; Carneiro 1960) agriculture is generally conducted within 5 km of the habitation site and distances greater than this require substantive modification to the settlement system (Arnold 1985). Usually, such modification entails settlement fissioning through the development of a farmhouse adjacent to cultivated land which is initially occupied on a semi-permanent basis. In this Garden Plot model (Butt 1971) the household responsible for its upkeep will often permanently relocate to these locations. Once residence is permanently established, these farmsteads tend to develop into hamlets or small villages based on attraction of additional households or through birth and rules of residence in subsequent generations (*e.g.,* Heckenberger 2005).

In general, cultural studies of small-scale agricultural communities supports that 2.5 to 5 km as a reasonable estimate for the size of the area most frequently utilized areas for cultivation and the activities associated with daily social life around the residential settlement (Arnold 1985; Stone 1991). This area in the immediate vicinity of the residential settlement or “near-village territory” is an important space often materially constituted by numerous specialized activity sites (Gregor 1977; Heckenberger 2005:238). These socially created places, also known as “taskscapes” (Ingold 1993), become constituted and structured through people’s engagements with the physical world and each other.

The connection between a people and the physical spaces they occupy is central for considering local histories and the development of supravillage social groups not only because of familiarity and dependence, but also because people come to think of themselves and places as organically and even spiritually linked (Basso 1996; Naranjo 2008; Santos-Granero 1998). From this perspective, residential settlements are fixed localities in the organization of the landscape and become places to which histories and myths are attached, which play a role in the way that communities identified themselves with the land and legitimized claims to it.

The emergence of community as place, *vis-à-vis* territoriality, can be expected in sedentary societies because it is an efficient device for establishing differential access to locally social and natural resources as well as instilling in those that dwell within it a sense of identity (Gerritsen 2003; Sack 1986:59). Increases in local populations and infringement on these spaces create new challenges for the maintenance and reproduction of social and biological life (Sack 1986:59; Tuzin 2001). While I certainly do not advocate monocausal explanations for social and political change, few would argue that substantial increase in population places stress on the organizational capacity of social groups (Carneiro 1992; Giddens 1984; Johnson 1977). Hence, factors of demography and the distribution of regional populations influence the organization of social groups and the structure of the networks among and between them. In turn, historical conditions predicate how local social groups will situate themselves in geographical spaces and develop social relationships.

Social Considerations for Residential Settlements

While archaeologists tend to focus on ecological and economic factors affecting the locational choices of settlements, there are other social factors contributing to the spatiality of ancient communities. Without denying that it is important for people in formative agricultural communities to settle in close proximity to natural resources (especially cultivable land and water) there are several other factors (as alluded to in the previous section) which contribute to the location and organization of settlement.

For instance, factors which favor nucleation include joint and cooperative working of the land, social organization, defensibility, rules of inheritance (Ross *et al.* 2000). Nucleated patterns also emerge where people are blood related and/or have strong social ties. Cross-cultural examples are readily evident where toponyms refer to particular families and the locales in which they live. Areas of nucleated settlement may also emerge from patterns of inheritance. Where land is divided equally between sons and daughters of landowners, a nucleated pattern will form as successive generations build houses on the same site. Finally, a nucleated patterns or large settlements promote safety through the availability of a pool of warriors in the event of intergroup violence (*e.g.,* Chagnon 1968).

Social conditions which favor dispersed settlement can be seen in situations where settlement was conducted by individual pioneering families where blood ties and group belonging are weaker (Keesing 1975). Further, dispersed patterns are also prevalent where inheritance is decided on the law of primogeniture (land is passed to the eldest son or daughter) and family member's fission off to build their own farmsteads (Murdock 1949). Dispersed settlement is also conducive to slash and burn agriculture where immediate areas surrounding settlements are necessary for the cultivation of domesticates.

Political Distances and Territories

Settlement patterns are also tied to social valuation of spaces and ingrained in community and political identities. The control, rights, and identities fused with land gives substance to political formations and their existence. Territorial associations and rights to land were likely a central dimension to the historic Taíno and it is logical to assume that this condition had its roots in earlier process of settlement and regional interaction.[3]

Previous archaeological studies regarding the spatial dimensions of social interaction, particularly related to the territorial extent of fledgling polities, suggest that most territories encompass an area within about a one-half days travel from administrative residential settlements. This distance is variable based on local physiographic conditions and has been differentially documented in previous research. In one instance, Spencer has suggested that the spatial limit of "chiefly" territories in Venezuela is a radius for about a half day travel from the regional center, or about 11 km (Spencer 1982:6-7, 1987:375). In another case from the American Bottom, Hally suggests that Mississippian political centers (AD 1000 – AD 1550) greater than 18 km apart belonged to different polities (Hally 1993). Finally, in her study of Panamanian chiefdoms, Helms found that regional paramount centers were spaced about one day's travel apart (1979:53). These distances conform to independent observations made by Roscoe (1993) who indicates that political centralization is tied to the connections

[3] As noted by Lovén, "The degree of Tainan territorial union in the Greater Antilles depended politically on the culture, quality and extension of the *cacicazgos*. Taínos lived on the islands in distinct dominions, bounded politically, by one another. No one could hunt or fish in a domain, foreign to him. Such a trespass constituted grounds for war. The cacicazgos possessed different territorial extension in the various regions, over the village alone, or over an Indian province with its several village-caciques" (Lovén 2010:71).

between individuals and the ability of rulers to consistently interact with their political constituency.

Spatial distances between larger social aggregates promote local group identities and connections to place. Such identities are often defined by affiliations of kinship and as such social or political locales define areas inhabited by lineages, clans or local descent groups. Emphasis on spatiality of these relationships facilitates broader social ordering and the development of structural order for marriage partners and political alliances in various ways. The delineation of such areas and their control by locally related kin groups may cause increased focus on the underlying ancestral relations defining them (Siegel 1999).

A final, yet important factor, to consider is the gravitational affects of particular localities and larger settlements-- particularly those with ceremonial architecture. Since these places operate as specialized centers of communal activity they may have been visited by people from more distant locations (DeBoer and Blitz 1991; Lekson *et al.*1988). Travel to and from these locations, particularly for extended ritual activities or feasting events, may have entailed travel times beyond a single day. While such ritual migrations of gathered humanity brings to mind annual pilgrimages to Mecca, or travels among ancient societies of the southwestern United States to Chaco, this research is emphasizes immediate and localized patterns that form the base for these social and political experiences.

Project Approach Summary

In this research communities are seen as local social groups for whom the spatial proximity of their constituent residential settlements and households allowed members to interact on a frequent basis in first-order or co-present (Giddens 1984) social relationships. As such, the residential settlement forms the smallest archaeological unit of analysis for identifying locales of persistent interaction as well as for exploring the organization and articulation of social groups in broader social and political networks.

In developing an approach to studying the regional landscape, I chose to emphasize aspects of spatiality pertaining to the composition of communities and the implications of the available archaeological data to characterize organizational dynamics and the underlying conditions leading to social change. Hence my focus is on analytical dimensions associated with these problems and variables.[4] In this work, I view the emergence of communities as part of a recursive and historically mitigated processes involving settlement, population dynamics, and negotiations of status and identity within particular localities. As such, it is necessary to provide an understanding of communities both within their local contexts as well as beyond their perceived "natural" boundaries.

At the outset of this chapter, I identified the analytical domains and strategies which form the basis for the research presented in this work. These entail determining the 1) *composition*, 2) *organization* and 3) *symbolic construction* of communities. To examine these analytical domains of community, the following chapters address local and regional settlement patterns and the construction and use of integrative ritual facilities present in the form of plaza/*bateys*. In this work I employ a historical, comparative perspective that attempts to situate and understand social practices within

[4] While I view the human- environmental relationships as important in influencing social life I feel that "…political themes cannot be addressed as a simple by-product of a study of environment acting on subsistence acting on settlement" (de Montmollin 1989:9).

specific temporal and regional contexts instead of relying on overarching determinative models or power relations.

In the two chapters which follow this one (Chapters 5 and 6), I characterize the settlement variability of the local landscape associated with Tibes. In these chapters I focus on the identification of residential settlements to provide a basis for developing interpretations related to those findings in the Río Portugués as a comparative tool for examining the organization and structure of other similarly constructed localities in the south-central region. This chapter also provides data for conducting regional (Chapter 7) and local (Chapter 8) analysis and interpretation of communities. These chapters are then linked to aspects of the symbolic construction of local communities within the broader landscape through a critical examination of plaza/ball court features (Chapter 9). Rather than give a compartmentalized discussion of the data and individual methods for the varying analyses presented in this work, I explain them as they are employed to assist the reader in following the logical progression of the study.

CHAPTER 5
SEEKING THE COMMUNITY: THE TIBES ARCHAEOLOGICAL SURVEY PROJECT (TASP)

Situated along the Portugués River, where the coastal plains begin their ascent to the steep, mountainous interior, I conducted an archaeological surface and subsurface survey to identify residential settlements associated with the ceremonial center of Tibes (Figure 5-1).[1] This chapter provides the methods and results associated with this survey—the Tibes Archaeological Survey Project (TASP). I chose this area because the number and size of the plaza/*batey* features documented at Tibes suggested that it was focal point of social activity potentially serving a large local population (Curet *et al.* 2006; Curet and Stringer 2010; Gonzalez-Colon 1984). Supporting this idea is the discovery of, and recent excavations at, the extraordinary site of PO-29, located approximately 4 km up river from Tibes (Espenshade *et al.* 2011). The presence of two temporally sequential[2] and elaborate ceremonial sites so close to one another is unprecedented in Puerto Rico and suggests that the Portugués drainage was an important and persistent place of social activity in antiquity.

But where are the residential settlements composing the supporting community? Is there more to the local settlement structure than Tibes and PO-29? If so, what does the timing and distribution of these settlements tell us about the composition and organization of the social community associated with Tibes and how do these patterns translate to other contemporaneous localities in the south-central region?

[1] The survey was conducted with funding from the National Park Service Historic Preservation Fund and administered through the Oficina Estatal de Conservación Histórica (Puerto Rico State Historic Preservation Office [PRSHPO]) as part of a program geared towards increasing their cultural resource inventory. The survey was conducted between May and July 2008

[2] Current median (cal. 2 σ) radiocarbon dates from Tibes indicate occupation between approximately AD 450 and AD 1320 with PO-29 indicating occupation between AD 600 and AD 800 and 1300 and 1500.

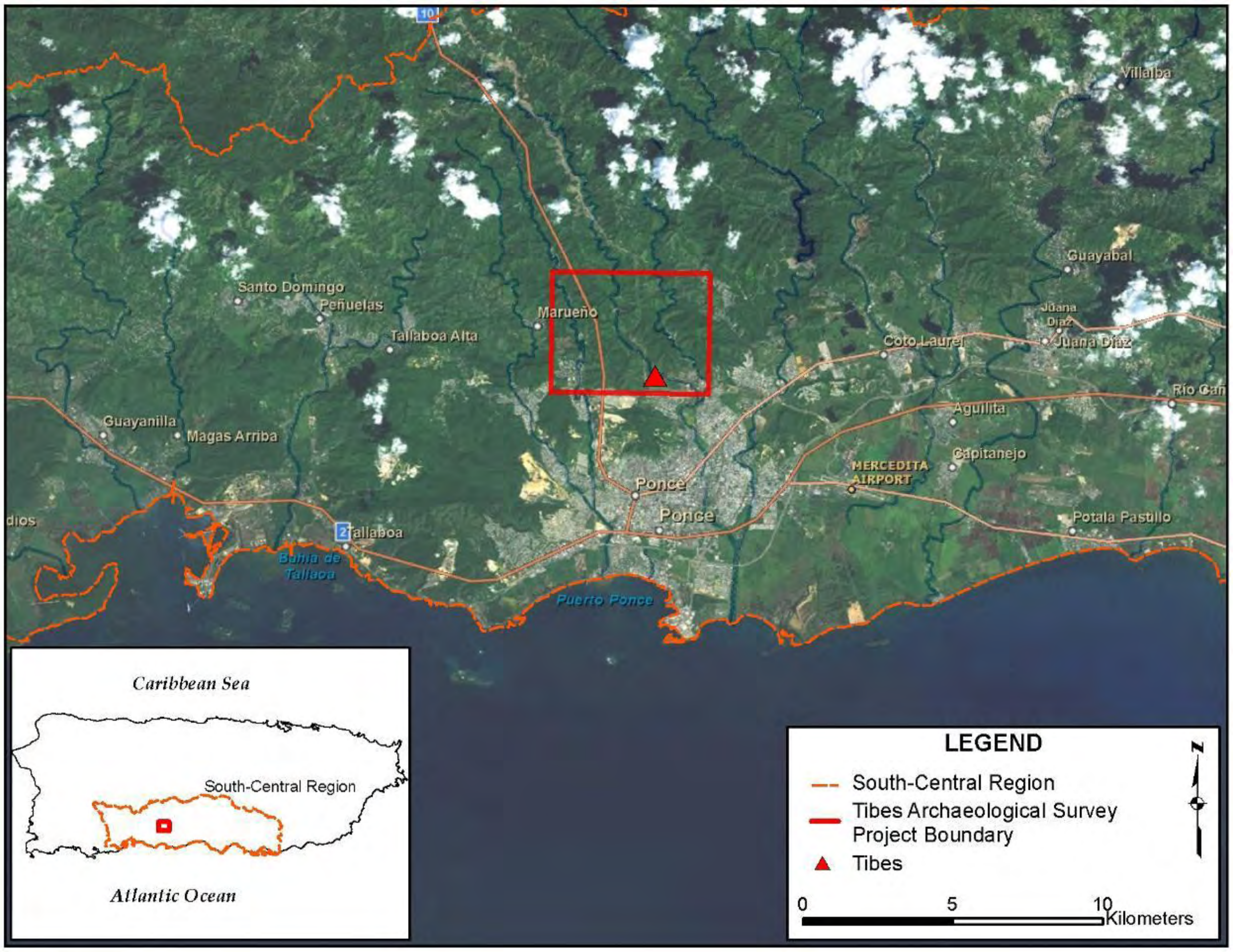

Figure 5-1. Tibes Archaeological Survey Project (TASP) location. Base map: ESRI World Imagery 2010.

While regional settlement data exist to explore these questions (as discussed in Chapter 7); it is necessary to establish a baseline for relative comparison in terms of what residential settlements look like. This first entails identifying the residential settlements and analysis of the artifacts that compose them. Through this it is possible to characterize local settlement variability and their situation in time and space. Diachronic examination of the distribution of residential settlements also provides a basis for examining process of community growth and settlement change through time.

I anticipated that the local landscape associated with Tibes comprised several residential settlements and that data from these would characterize settlement variability and the population density of the area immediately associated with it. This data can then be compared to other coeval localities in the south-central region to understand regional settlement variability, community organization, and the political landscape.

To contextualize the local and regional landscape, the first section of this chapter describes the geographical and environmental setting of the area. The second portion of this chapter details the survey design, and methods pertaining to the execution of fieldwork and collection of data. I then provide the results of the survey with a description of each new site.[3] To conclude this chapter, I summarize the survey findings which from a basis for contextualizing the analysis of recovered artifacts (Chapter 6), a detailed settlement pattern study (Chapter 7), and reconstruction of communities in the south-central region (Chapter 8).

Environmental Contexts of the South-Central Region

South-central Puerto Rico is part of the Subtropical Dry Forest Life Zone and is the driest part of the island (Ewel and Whitmore 1988). Prevailing winds produce heavy rain on the northern and eastern slopes of the island's mountainous interior leaving the south coast in a shadow of decreased precipitation. Rainfall in Ponce averages 21 inches annually, 60 % of which occurs between April and November (Gierbolini 1979). Hurricane season is from June to November. The region is relatively hot throughout the

[3] A detailed field report of the project was submitted to the PRSHPO (Torres 2008) in accordance with the conditions of the HPF grant (Contract Number 2008-155037) and provides additional information regarding field procedures and cultural resource management recommendations for sites documented during field investigations

year with winter temperatures averaging between 77 and 67 degrees (F) and 82 to 89 degrees (F) in the summer (Gierbolini 1979). The study region encompasses three broadly defined physiographic zones including coastal plains, foothills, and uplands (Figure 5-2).

The coastal plain begins at the southern coastline and extends to the base of the semiarid foothills (about 70 m AMSL). This zone is relatively flat ranging between 0 and 7 percent slope. The width of the coastal plain varies considerably within the study region where areas in the east, such as Santa Isabel and Salinas, are broader and more open than Peñuelas and Yauco in the west. The coastal plains are composed of sand, loam, and clayey soils that are well suited for a variety of agricultural crops (Gierbolini 1979). Vegetation consists of grasses and shrubs suited for the dry environment with mangroves and marsh areas along the coastline.

The foothills zone constitutes a transition between the coastal plains and the upland region of the study area. This zone is topographically diverse with steep to moderately steep sloped low-lying ridges that converge with moister upland environments. Elevations in this zone begin at about the 70 m contour interval and extend to approximately 350 m AMSL. Low lying portions of river valleys in the foothills are characterized by river terraces adjacent to streams and rivers.

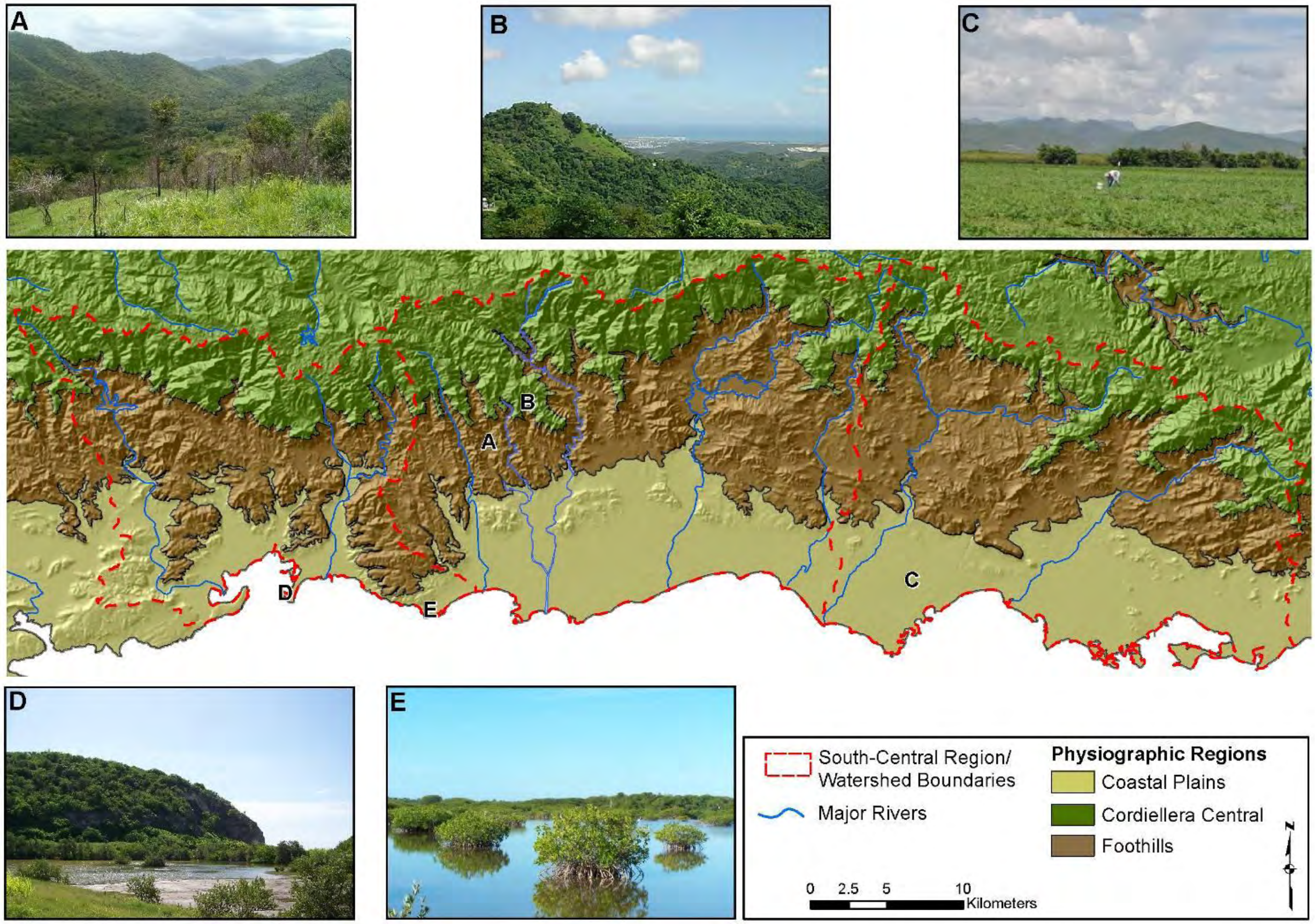

Figure 5-2. Physiographic regions of the south-central region. A. Looking north to the uplands from the foothills of the Portugués river drainage. B. Looking to the coast from uplands in the Chiquito river drainage. C. Looking north across the coastal plains in Santa Isabel. D. Looking to a lagoon and ridges near Punta Guayanilla. E. Mangroves at Punta Cucharas. (Photos courtesy of Joshua Torres; Base map: modified USGS Digital Elevation Model based on Gould 2004).

The upland zone is associated with the steep slopes of the islands central mountainous interior--the Cordillera Central. Elevations in this zone (within the study region) range from approximately 350 to 900 m AMSL. The foothill and mountainous zones are composed of uplifted igneous rock formations, overlain by sedimentary beds of limerock and sandstone (Picó 1974). The potential for landslides is high due to steep inclines, rainfall, and shallow soils. Because of the steep topography and shallow soils in the uplands, their agricultural productivity is limited (Gierbolini 1979).

Rivers of the south-central region originate on the southern slopes of the Cordillera Central. Drainages are deeply weathered narrow valleys that meander south through the foothills gradually widening as they open onto the coastal plain and empty into the Caribbean Sea. Natural erosion in the foothills and uplands is a product of scouring caused by high flow rates of streams and rivers during the rainy season. Hence, the riverine processes in this area are primarily erosional rather than depositional. During the rainy season, increased flow rates scour interior valleys transporting and depositing sediments at the base of the foothills with most of the alluvium carried to the coastal plains.

Despite the dry climatic conditions caused by the rain shadow effect, much the foothills and uplands are densely forested. Natural vegetation includes a variety of trees with Guamá Americano, Flamboyán, Capá Negro, Capá Blanco, Almácigo, Algarrobo, Tamarindo, Mabí, Acacia, Higuero and Ceiba being common species (Ewel and Whitmore 1973; Gierbolini 1979; Miner Solá 2000). The understory consists of vines, native grasses and shrubs (Gierbolini 1979). Several of trees are indigenous fruit producing species including, Genip (*Genipa americana*), Mamey (*Mamea americana*), Soursop (*Annoa americana)*, and Cocoplum (*Chrysobalanus inaco*) (Miner Solá 2000). Palm (Palme) fruit remains were identified by Pearsall (1985: B:15) in pre-contact archaeological contexts at the site of El Bronce just southwest of Tibes. Wild papaya also was identified from the site of PO-38 approximately 2 km west of Tibes (Weaver *et al.* 1992).

The prehistoric forests of the foothills were rich in a variety of avian, terrestrial, and aquatic riverine species (Curet *et al.* 2006; deFrance *et al.* 2010; Maíz 2002, 2004). Several species of bird have been identified in midden deposits at Tibes and other sites in the region including Herons and bitterns (Ardeiformes*),* West Indian tree duck (*Dendrocygna arborea*), dove, and pigeon (Columbidae). Terrestrial fauna includes lizards (Lacertilla), turtles (Testudines), snakes (Serpentes), spiny rat (*Heteropsomys sp.*), guinea pig (*Cavia porcellus*), hutia (*Isolobodon portoricensis*), and frogs (Anura) (deFrance *et al.* 2010; Maíz Lopez 1996, 2002). The rivers contain gobies (Gobiodea) and mountain mullet (*Agonostromus monticule*) as well as freshwater shrimp. These diverse terrestrial resources formed a central component of the diet of ancient social groups in the region (Pestle 2010).

Removal of vegetation and intensive monocroping for sugarcane over the last 100 years has eroded and destabilized soils throughout the region—especially on the coastal plains. Intensive cultivation of sugarcane and other cash crops, particularly coffee, in the Portugués and adjacent river valleys ceased in the middle of the 20th century and ranching activities have been limited since the mid-1980s (Solís Magaña 1985). Coffee production was the chief economic focus of foothill sections in the Cañas drainage with cattle ranching the main activity in the Chiquito drainage. However, intensive agricultural production throughout the survey area is now almost a distant memory. Cultivated domesticates still produced in the area are limited, consisting of small-scale horticultural crops for household consumption (Solís Magaña 1985). Cattle ranching and dairy production in the study area is also virtually non-existent and small numbers of horses roam open pastures. With the abandonment of intensive agricultural production of sugarcane in the area, native vegetation is beginning to regenerate (Gierbolini 1979).

Previous Archaeological Investigations in the Survey Area

Extensive background research provided a basis for developing field methods and identifying patterns of historic land use in the survey area. Background research entailed examination of aerial photos, historic and topographic maps, and various published (and unpublished) sources on previous archaeological investigations. An archaeological records search was also conducted at the PRSHPO and the Consejo para la Protección del Patrimonio Arqueológico Terrestre de Puerto Rico (Instituto de Cultura Puertorriqueña [ICP]) in July 2007 and June of 2008.

Archival research at the PRSHPO and ICP indicated two surveys and five pre-Columbian sites within the boundaries of the survey universe (Figure 5-3, Table 5-1). Previous archaeological surveys in the Portugués drainage were associated with the ACE Portugués and Cerrillos/Bucana River water control projects (Oakley 1990; Pantel 1978; Solís Magaña 1985). Additional survey was also conducted at the confluence of the Portugués and Chiquito drainages at a historic thermal spring (Baños Quintana); however, these investigations yielded scant evidence of pre-contact material (Koski Karrell and Ortiz 1984). Another small survey was identified in association with the Portugués River dam project but was not filed with the PRSHPO at the time of the field investigations (Cinquino *et al.* 1997). No surveys or sites were registered in the proposed survey area for the adjacent Cañas and Chiquito river drainages at the time this research was conducted.

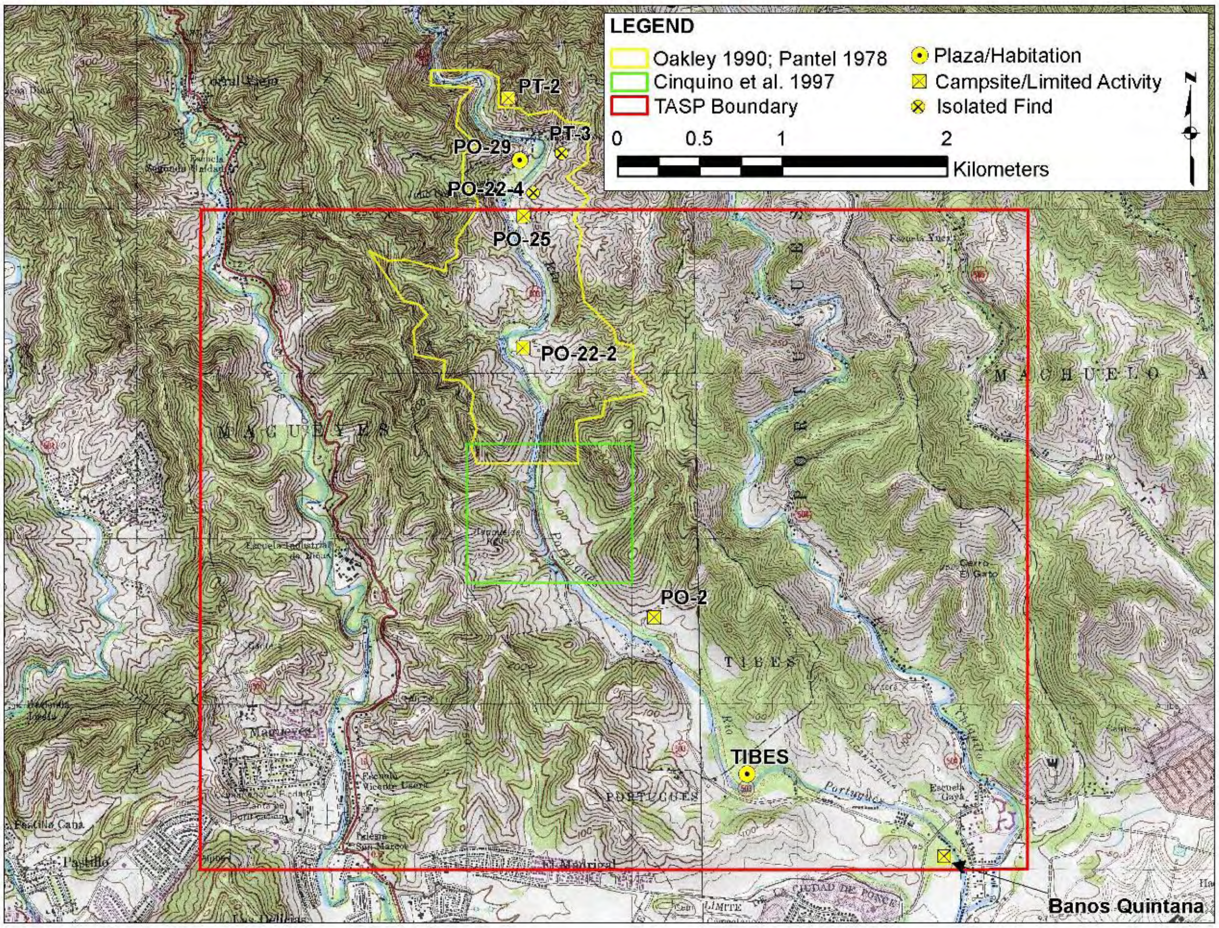

Figure 5-3. Previous surveys and sites within the TASP survey area. Base map: Ponce (1982), Peñuelas (1982) USGS 1:20,000 quadrangle

Table 5-1. Previously documented pre-Colonial sites in or immediately adjacent the survey universe.

Site Number	Name	Component	Description	Reference
PO-1	Tibes	PII-PIII	Settlement/*Batey*s	González Colón 1984
PO-2	Tibes II	PII-PIII?	Limited Activity	Pantel 1978
PO-25	Hacienda Tibes	Prehistoric/Historic	Limited Activity	Oakley 1990; Pantel 1978; Solís 1985
PO-22-2	No Name	Prehistoric/Historic	Limited Activity	Oakley 1990; Pantel 1978
PO-22-4	No Name	Prehistoric/Historic	Isolated Find	Oakley 1990
N/A	Baños Quintana	Prehistoric/Historic	Thermal Baths	Koski-Karrell and Ortiz 1984
PO-29	Jacana (Rodriguez Soler)	PIII-PIV	Settlement/*Batey*s	Oakley 1990: Espenshade 2007
PT-2	No Name	Prehistoric	Limited Activity	Oakley 1990
PT-3	No Name	Prehistoric	Isolated Find	Oakley 1990

Pantel conducted the first archaeological survey of the Portugués River drainage in the 1970s during the early phases of the ACE water management project (Pantel 1978). Pantel's survey did not entail systematic subsurface testing, but nonetheless lead to the discovery of several sites. At the time of these investigations, test excavations at the Ceremonial Center of Tibes were underway (González Colón 1984). Although Pantel's survey located a number of sites, subsequent evaluation of the intensity and coverage of the survey was considered insufficient (Solís Magaña 1985; Espenshade *et al.* 1987). This led to additional subsurface survey within selected areas to be impacted by dam construction in both the Portugués and Cerrillos/Bucana drainages (Oakley 1990; Solís Magaña 1985). This work yielded several new sites followed by test excavation of several sites identified during Pantel's initial survey. The majority of these sites are in the Cerrillos River drainage.

Previously identified sites in the Portugués drainage, save for PO-29, did not yield substantive subsurface archaeological deposits (Oakley 1990). Arguably, landscape modifications, associated with historic agriculture and settlement of the area, could have obliterated extant archaeological deposits. However, even though major historic disturbances were documented in previous investigations, as well as during TASP fieldwork, these activities would not have erased all archaeological evidence for substantial residential settlements, as the middens that compose them would still be evident as dispersed surface scatters or intact deposits below the plow zone. Hence, the general lack of substantive sites with midden deposits and large surface scatters identified during previous surveys gave the initial impression that the Portugués drainage was not intensively settled in antiquity.

Survey Universe and Methods

The TASP sampling universe encompasses approximately 20 km^2 (2,000 ha), extending 5 km east-west by 4 km north-south, and includes portions of the Cañas (in the west), Chiquito (in the east) and Portugués River drainages (Figure 5-1 and Figure 5-3). Two factors contributed to defining the survey area. First, lands south of Tibes are densely populated urban areas that are not conducive for archaeological survey due to logistics of property access and the lack limited potential for intact deposits due to modern development. Second, while small portions of the Portugués River drainage have been previously surveyed, virtually no intensive systematic archaeological subsurface survey exists for the area. The intermediate foothills and mountainous portions of the island, covering 75% of the islands surface, are relatively understudied and research from the region shows these areas contain significant pre-contact residential settlements (Espenshade *et al.* 1987, 2007; Garrow *et al.* 1995; Rodríguez López 1983; Weaver *et al.* 1992). Finally, the survey universe was determined by what could be sampled considering available time and resources.

Areas further up the Portugués drainage were considered for survey; however, these areas were politically sensitive at the time of field investigations due to the controversial excavations at PO-29. Further, the adjacent Cañas and Chiquito River drainages (within the survey universe) had no survey coverage and therefore additional efforts were placed on identifying residential settlements in these drainages parallel to the Portugués River. It was assumed, that the identification of residential settlements in these adjacent drainages could contribute to understanding of the extent and timing of settlement in foothills and provide additional units of comparison for anticipated finds within the Portugués drainage surrounding Tibes.

Due to the steep terrain and general lack of surface visibility, linear transect survey was deemed impractical and pedestrian survey, relying on surface observations alone, insufficient for the identification of archaeological remains (see Zeidler 1995 for discussion of survey in the tropics). Therefore, TASP field investigations focused on archaeological subsurface shovel testing supplemented by pedestrian surface inspection. Pedestrian surface survey consisted of a combination of systematic surface examination, following proposed shovel test transects, and opportunistic ground inspection in areas of exposed soils such as road cuts, plowed fields, eroded river banks, and trails.

Topography was likely major factor limiting the physical location of pre-contact residential sites and areas greater than 20 % slope compose approximately 60 % of the physical landscape in the survey universe (Figure 5-4). Since freshwater resources are located in the valley bottoms, and these areas are generally associated with level terraces, I assumed settlements would be located in these areas and off the steep ridge slopes. Following these assumptions, I used topographic data and distance to water to develop three levels of probability to guide the sampling strategy.

- HIGH POTENTIAL. All areas less than 20 % slope and within 100 meters of water.
- MEDIUM POTENTIAL. All areas less than 20 % slope and over 100 meters from water.
- LOW POTENTIAL. All areas greater than 20 % slope and over 100 meters from water. These areas are low potential due to the distance from potable water and the inhospitable nature of steep and rocky ridge slopes in the area.

Survey efforts concentrated on sampling areas determined to be high and medium potential. Areas of low potential were not intensively examined; however, a sample of these areas, including side slope terraces and ridge tops, were judgmentally inspected and shovel tested to avoid overt sampling bias. Finally, as some portions of the Portugués River were subject to previous investigations, emphasis was placed on areas lacking prior intensive archaeological investigation.

Because of the constricted topography, the survey universe was divided into 200 x 200 m sampling units (equaling 4 ha or approximately 10 acres each). Sampling units were judgmentally selected based on the potential for archaeological sites and consideration of other factors including: extent of development, historic land use, and landowner access. The number of sampling units initially proposed was based on a 7% sampling fraction of the total area within each of the major drainages, totaling 36 sampling units (140 ha) of the 2,000 ha survey universe.

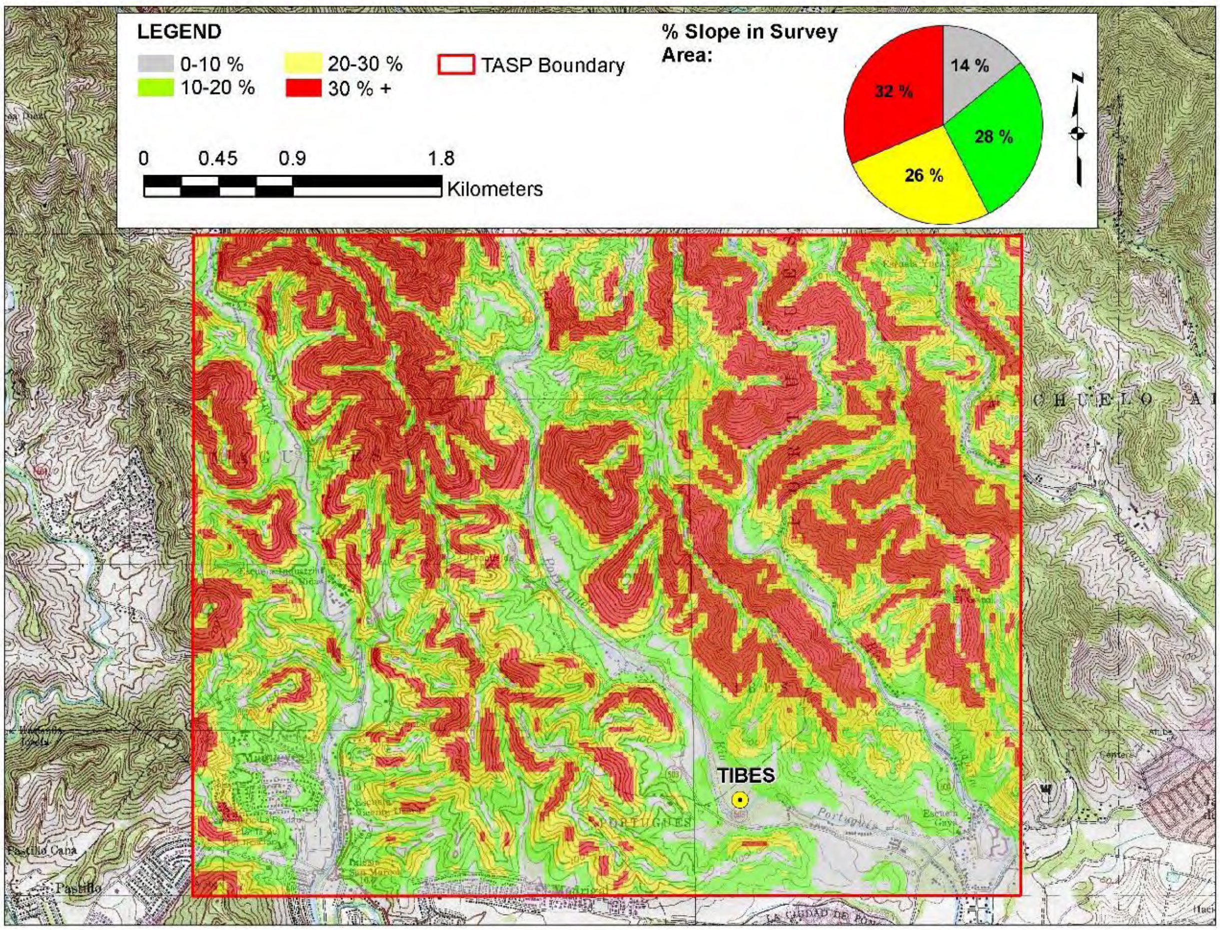

Figure 5-4. Percent slope and relative area proportions in the survey area.

Subsurface survey entailed the excavation of shovel tests at regularly spaced intervals to identify archaeological sites, delimit horizontal and vertical extent of cultural deposits, and collect sufficient artifact samples for temporal and functional interpretations. As mentioned in Chapter 3, pre-contact settlements in Puerto Rico are often circular or semi-circular with an open or cleared central plaza (in some cases with a ballcourt/*batey*) surrounded by domestic structures bounded by trash middens (*e.g.,* Siegel 1996). Although no substantial sample of site sizes for any period or region is available for the island, I assumed that settlements were at least 50 m in diameter. Assuming a 25 m radius, I developed a sampling interval for shovel testing based on a simple geometric equation.

As proposed by Krakker and colleagues (1983), to find a site of a known radius (*r*) the sampling interval (*i*) can be calculated as: $i \leq r\sqrt{2}$. Hence, in addition to encountering every site with a radius at least equal to the sampling interval divided by $\sqrt{2}$, the survey *will* encounter some smaller sites in the area (Krakker *et al.* 1983:471). Using the 50 m diameter site size the sampling interval was calculated as $i \leq 25\sqrt{2}$ with *i* equal to 35 m. Based on this calculation, the sampling interval needed to be at least 35 m in high probability areas to locate a site with a 25 m radius (or 50 m in diameter). Hence, at a 35 m interval there is almost a 100 % chance of finding sites 50 m or greater in diameter provided subsurface deposits are evenly distributed (Krakker *et al.* 1983).

To increase potential for site discovery, shovel tests were reduced to 25 m intervals in areas of high potential. Areas of medium potential were sampled at 25 and 50 m intervals based on field conditions defined by soils and vegetation. Positive shovel tests were delineated by additional shovel tests placed in a cruciform pattern at minimum of 25 m intervals. However, in this interval was often reduced to 12.5 m to acquire finer grained resolution of the horizontal and vertical distribution of subsurface deposits.

Judgmental shovel tests complemented systemic testing in areas identified in the field as having potential to yield subsurface archaeological deposits. This included some areas outside of selected sampling units. These locations were typically prominences overlooking river terraces or small ridge benches adjacent to the river. In selected areas near the river with potentially deep soil deposition, a 4" clay auger (10.16 cm), with a 56" handle (142 cm) was used in the bottom of excavated shovel tests to test for potentially deeply stratified deposits.

All shovel tests were 50 x 50 cm and excavated in 20 cm levels within natural soil strata. Shovel tests were excavated to a depth of 1 m or until bedrock or sterile soils were encountered. Shovel tests were excavated with digging bars and shovels. Soils were sifted in the field through with ¼-inch hardware cloth. *All* artifacts (historic and pre-contact) from *all* positive shovel tests were collected and retained for analysis. Further, *all* visible artifacts on the surface within a 1 m square around shovel tests also were collected.

Six column samples were excavated and collected from midden deposits identified during field investigations. Column samples were selected based on the results of post-field processing of shovel test data and focused on areas containing high quantities of artifacts, shell and/or faunal material. Column samples were 50 x 50 cm square and hand excavated in 10 cm levels within natural strata. Each 10 cm level was bagged in total and transported off-site for processing. The units were profiled and photographed to document stratigraphy of the deposits. The samples were later water screened through 1/16" mesh and the large fraction of pottery, lithics, and shell removed and incorporated in the analyses presented in this research. All faunal material and the small fraction of the column samples were retained for future analysis and are not presented here. This material is part of a future study that will compare the faunal assemblage amongst several sites in the Portugués drainage to examine dietary patterns and land use (DuChemin 2009, 2010).

Shovel tests were documented using specialized field forms denoting test unit location (based on an arbitrary grid coordinate system), soil stratigraphy, dominant vegetation, proximity to natural and cultural features, and presence/absence of cultural material. Additional comments also were made regarding field conditions and any unique or unusual circumstances in field notebooks. Field maps, consisting of 1:10,000 modern aerial photographs, were maintained denoting shovel test locations. Sites were photographed and sketch maps produced in the field. All shovel test locations and survey tracks were recorded using WASS enabled Magellean eXplorist Global Positioning System (GPS) units accurate to +/- 3 meters. The shovel test log containing details of the depth, stratigraphy, disturbances and presence or absence of cultural material is presented in Appendix B.

Local area residents also were consulted during the course of field investigations to assist in the identification of archaeological sites. Discussions with local residents also helped in documenting historical land use activities and areas of disturbance.

TASP Results

As completed, approximately 192 hectares (48 sampling units) were intensively surveyed within the survey universe. This totals 9.6% of the total project area and 22% of the total area defined as high and medium potential (Figure 5-5, Table 5-2). Field investigations included intensive surface inspection of an additional four sampling units

(16 ha) to the east of the survey universe near the Bayagan River drainage where an undocumented settlement was reported by a local resident.

Table 5-2. Total proportion of the river drainages sampled.

Drainage	Total drainage area in the survey universe	# of 200 x 200 m sampling units surveyed	% of drainage surveyed in the survey universe
Cañas	614 ha	9	5% (36 ha)
Portugués	697 ha	31	17% (124 ha)
Chiquito	525 ha	8	6% (32 ha)
Bayagan	N/A	4	N/A (16 ha)

Seven hundred and thirty-seven shovel tests were excavated and approximately 35 linear km examined through surface inspection. The survey identified four pre-contact sites, five colonial/historic era structures/sites, nine multi-component sites and five isolated finds (Figure 5-6). The following discussion and artifact analyses presented in Chapter 6 focuses on the pre-contact sites.

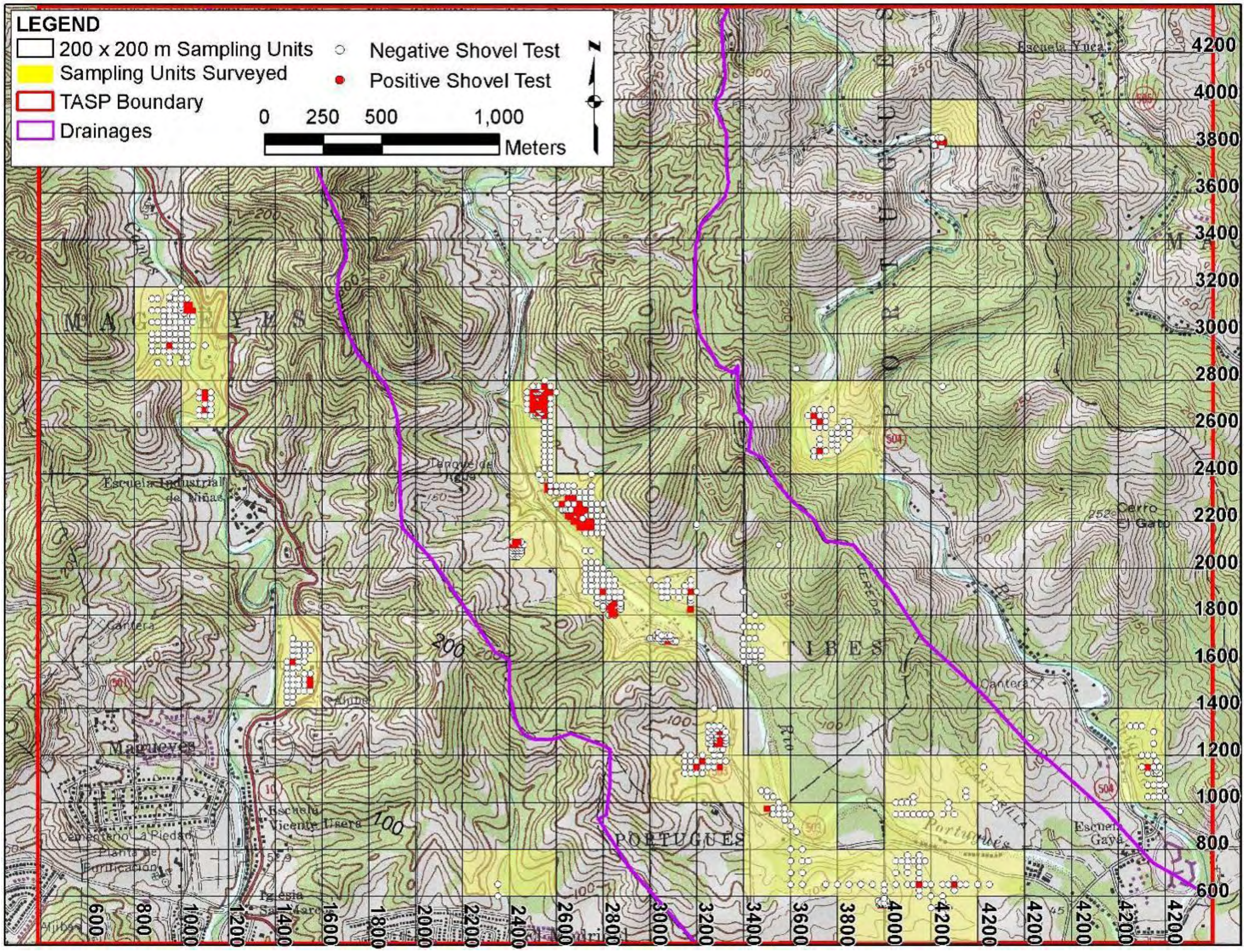

Figure 5-5. Shovel test map and sampling units intensively surveyed within thin the survey universe.

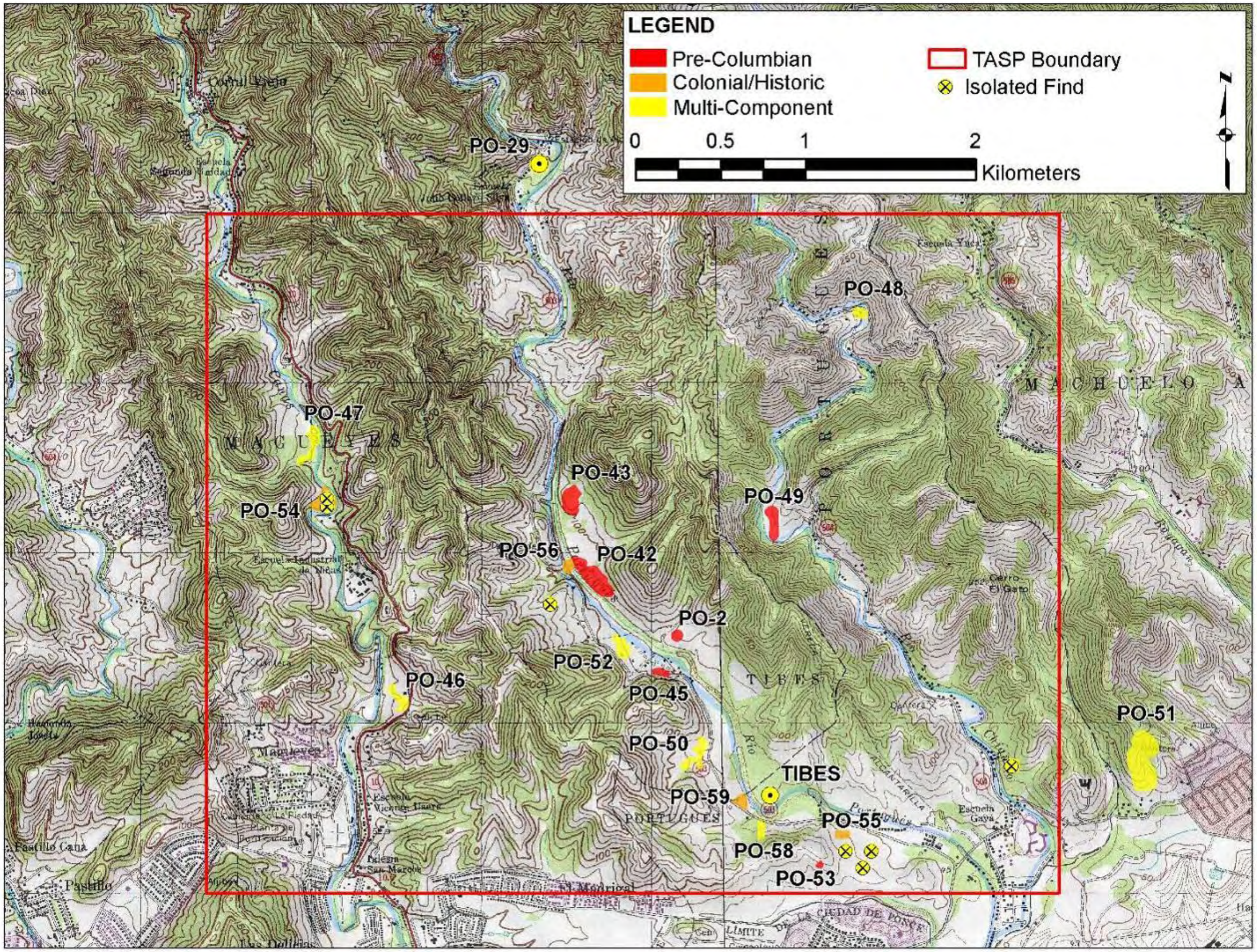

Figure 5-6. Sites identified during the survey. (Note: PO-51 outside the formal survey universe.)

Table 5-3. Site artifact summaries.

Sites	Pottery Ct	Pottery wt (g)	Lithic Ct	Lithic wt (g)	Shell ct	Shell wt (g)
PO-2	2	3.2	0	0	2	47.8
PO-42	668	3,056.1	52	1,891	5,701	9,041.5
PO-43	646	2,370.8	86	483	8,181	11,469.7
PO-44	0	0	0	0	10	51.6
PO-45	10	34	1	58	99	78.5
PO-46	4	25.4	0	0	3	4.1
PO-47	54	205.6	2	12	0	0
PO-48	74	424.2	34	516	0	0
PO-49	5	34	4	200	0	0
PO-50	54	1,978.1	2	257	11	25.9
PO-51	59	406.8	0	0	62	276.9
PO-52	73	1,509.9	26	3,820	506	2,331
PO-53	32	289.7	16	194	212	361.5
PO-54 (Isolate)	1	3.6	1	8	1	5.6
PO-55	0	0	0	0	0	0
PO-57 (Isolate)	1	4.5	0	0	0	0
Isolated Finds						
N650 E4150	0	0	1	385	0	0
N650 E4300	1	5	0	0	0	0
N550 E4250	1	1.9	2	3	0	0
Totals	1,685	10,345.9	227	7,827	14,788	23,694.1

The Cañas River Drainage

The Cañas River drainage is in the western portion of the study area. Topographic and soils maps show the river valley is restricted by increasingly steep slopes (ranging from 20 to 40 %) as it winds north from Ponce through the foothills. Level landforms are limited and few are undeveloped. The main cultural feature of the river drainage is Hwy 123 (or the old PR-10) which is the historic route connecting Ponce and Arecibo.

Modern settlement along the Cañas River within the survey area is limited to small clusters of homes on the few available flat landforms adjacent to the river. Areas of highest population and historic disturbance are at the mouth of the river at the base of the foothills. Areas on the west side of the river (in the foothills) were historically used for agriculture--primarily coffee production. At the time of this survey, no archaeological sites were documented in this drainage within the survey universe. However, a few kilometers south of the survey area, on the east side of the river, is the Cañas site (PO-8) which, Rouse and Rainey excavated in the 1930s and early 1940s (Rouse 1952).

Nine sampling units (36 ha) were tested for archaeological deposits in the Cañas drainage (Figure 5-5). Survey of these areas identified two multi-component sites (PO-46, PO-47) and one historic site (PO-54) with a pre-Columbian isolated find.

PO-46 (Cañas II)

PO-46 is on a terrace on the east side of the river. The site is somewhat cleared of vegetation and in secondary growth. Scattered throughout the property, along the edges of the surveyed area adjacent to the river, is a mix of hardwood trees including Mangó, Acacia, and Capá. Forty-three shovel tests were excavated in two sampling units (Figure 5-7). The dominant stratigraphy in the majority of shovel tests consisted of compacted pale to dark brown clays to a depth of 60 cmbs over dense impenetrable yellowish brown gravelly clay.

The area is heavily disturbed from historic settlement of the terrace and the extent of historic refuse defines the boundaries of the site (Torres 2008). Pre-Columbian artifacts were evidenced by a few pieces of pottery and shell found on the surface south and west of an abandoned house (within one meter of N1525 E 1550) and one positive shovel test unit northwest of this area (N1600 E1475) (Table 5-3).

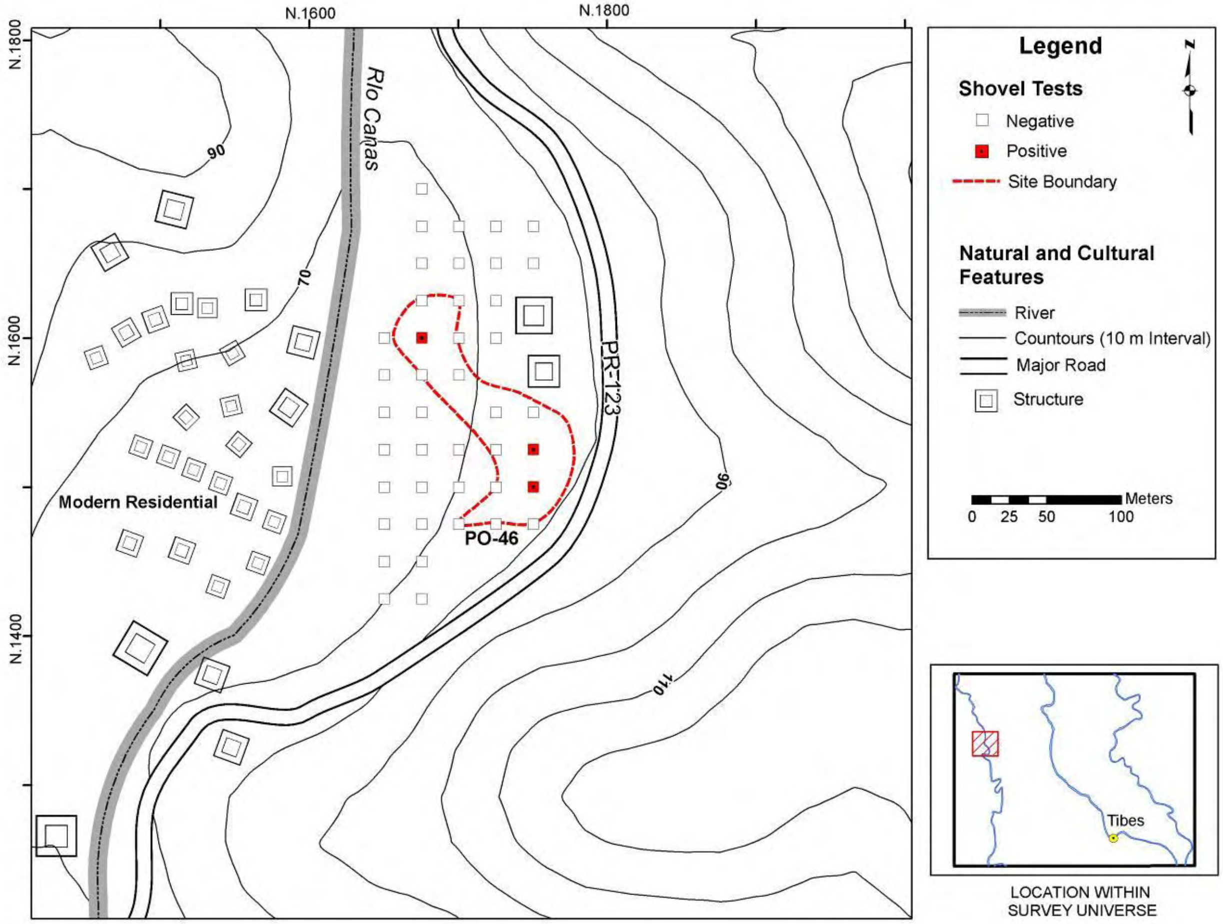

Figure 5-7. Location and ST map of PO-46.

PO-47 (Cañas I)

PO-47 is multi-component site just north of PO-46 and PO-54. The site boundaries measure 230 m north-south and 50 m east-west (Figure 5-8). The site is sparsely vegetated with Guinea grass and scrub with hardwood trees limited to the edges of the river terrace. Portions of the area, particularly along the base of the western slopes, were historically leveled and plowed.

Eighty-one shovel tests were excavated in four sampling units. The dominant soil stratigraphy in the survey unit consists of highly compacted brown to dark brown clays to a depth of 60 cm, underlain by highly compacted yellowish brown gravelly clay and eroded bedrock. Pre-Columbian artifacts were recovered from 6 shovel tests containing sixty-three pottery sherds, two lithics and a small amount of charcoal (Table 5-3). No shell or faunal material was recovered from this site.

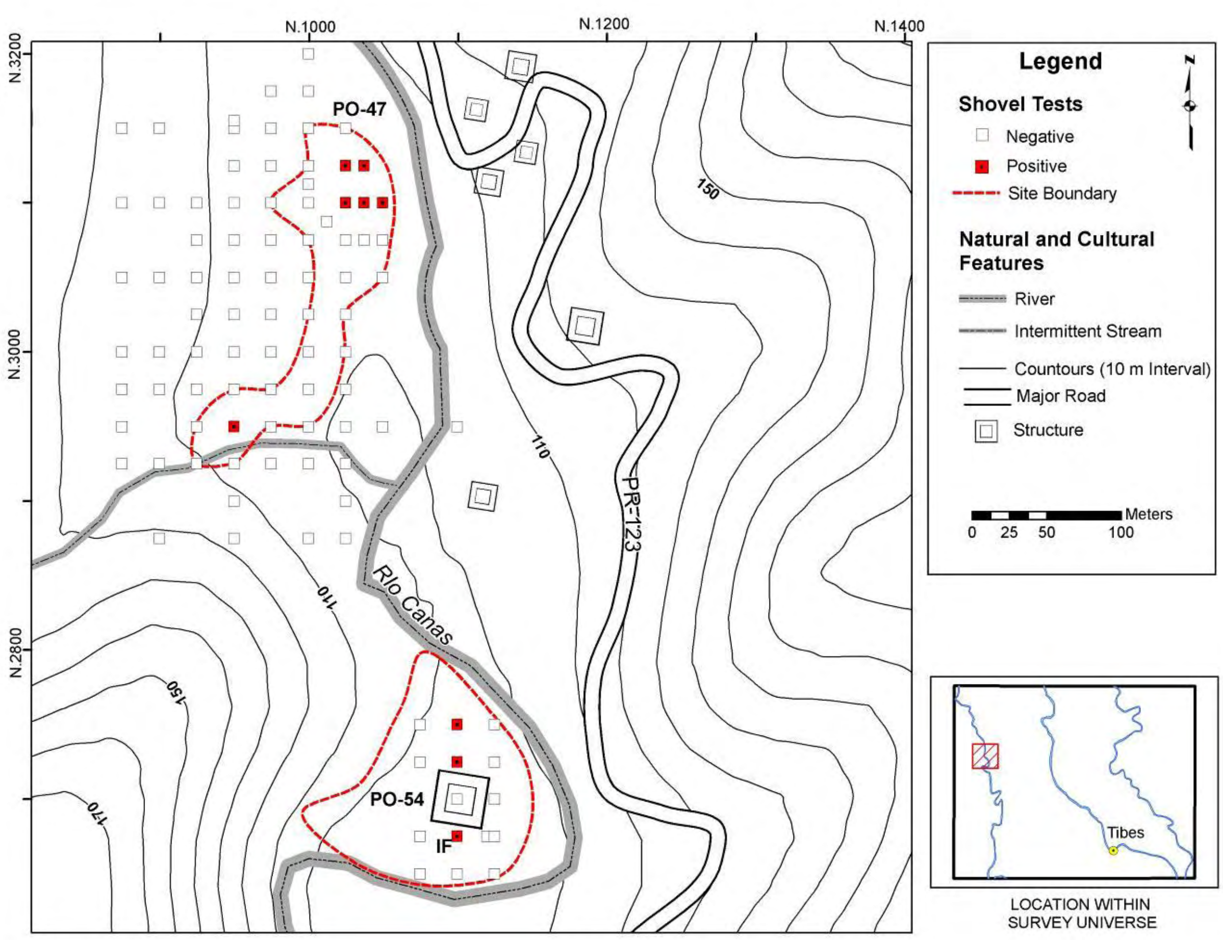

Figure 5-8. Location and ST map of PO-47 and isolated find at PO-54.

Isolated Finds

One historic site, PO-54, was identified approximately 250 m south of PO-47. The site consists of a historic stone structure measuring approximately 40 x 40 x 35 ft. and associated historic artifact scatter. The structure appears to date between the late 18th to early 19th centuries--its function is unclear. Positive shovel tests yielded historic structural remains consisting of brick fragments, historic ceramics and nails.

Fourteen shovel tests were excavated in this area. Stratigraphy in this area consists of a highly compacted pale brown silty loam to 100 cmbs and dense clayey soils mixed with unconsolidated bedrock beyond this depth. An isolated find, consisting of a small piece of pre-Columbian pottery, one piece of lithic debitage, and one shell fragment were recovered (Figure 5-8).

The Portugués River Drainage

The Portugués drainage occupies the central portion of the project area and is the largest of the three investigated. In comparison to the adjacent drainages, the Portugués drainage is wider and less constricted with more level landforms conducive for prehistoric settlement. Because of this, and the location of Tibes and PO-29, field investigations focused the majority of its efforts on this drainage.

Thirty-one sampling units (approximately 124 ha) were shovel tested with portions of an additional 15 surface inspected and judgmentally tested (Figure 5-5). Substantial areas of land within the Portugués drainage are in low brush and grass consistent with secondary growth associated with abandoned pasture; however, many areas, especially steep slopes, are heavily vegetated. Survey investigations identified six new pre-Columbian sites and four isolated finds in the drainage.

PO-53 (PR-10 Midden)

PO-53 is a disturbed midden deposit about 500 m southeast of Tibes. The site sits on a bench at the southern base of a small ridge overlooking highway PR-10 (Figure 5-9). The area is sparsely vegetated with few Acacia trees, scrub and Guinea grass. The site is evidenced by a surface scatter and limited subsurface deposits composed of pottery and shells that extend east-west along an existing fence line. The site was reportedly much larger prior to the construction of the adjacent highway extending approximately 50 x 75 m (Curet, personnel communication 2008, Juan personnel communication 2008).

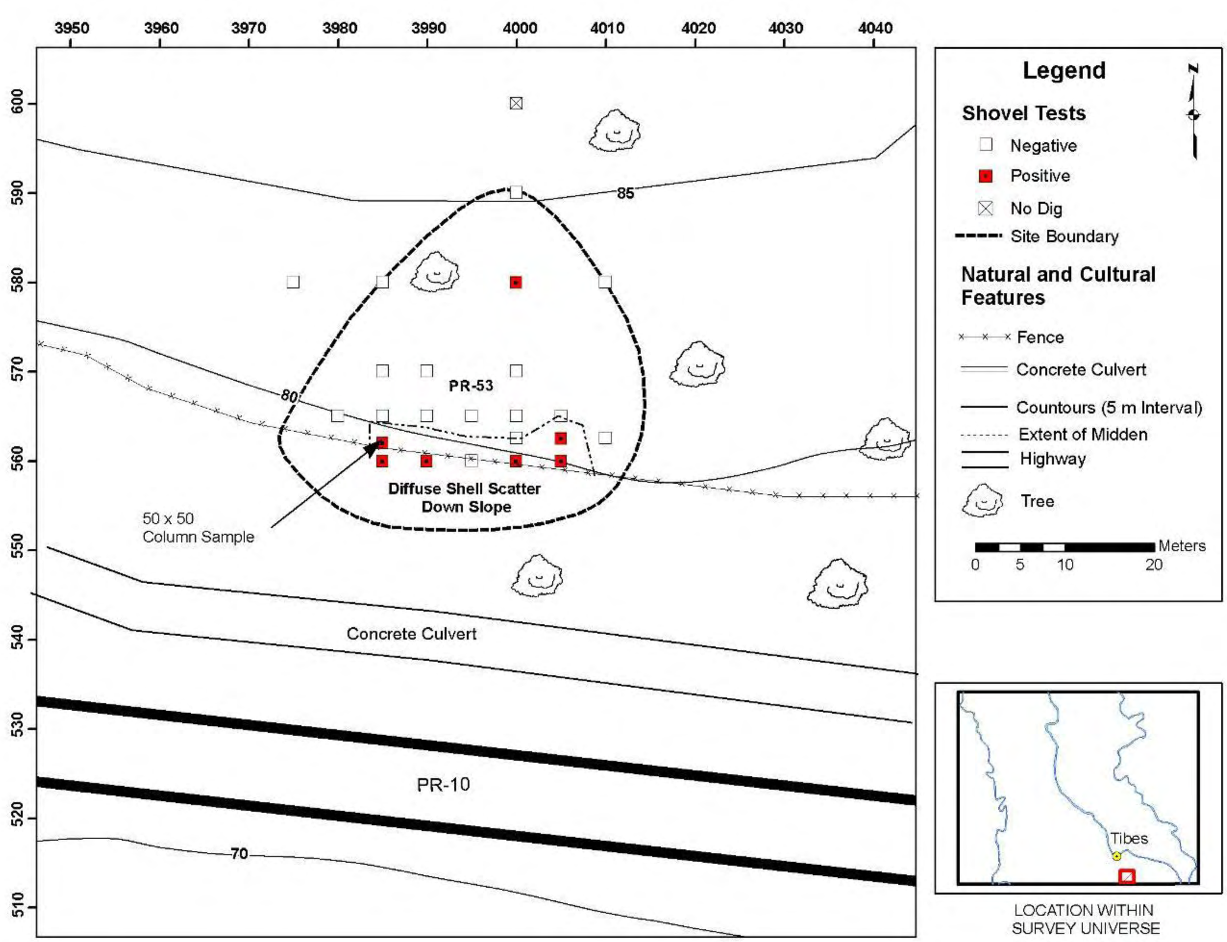

Figure 5-9. Location and ST map of PO-53.

Shovel testing at the site consisted of two transects oriented east-west at 5 m intervals. The close interval sampling at this site was employed to ascertain the extent of the midden and identify any intact subsurface deposits or features. Additional judgmental shovel tests were placed in areas surrounding the midden to clarify its boundaries and to make sure no associated deposits were left undiscovered. One column sample (N562, E3985) was hand excavated and collected from the site. Stratigraphy consists of two strata: a dark brown compacted clayey loam layer to 20 cmbs underlain by a brown clayey loam substrate with pale brown clay inclusions between 20 and 50 cmbs. At approximately 50 cm there is a layer of unconsolidated bedrock composed of highly compacted yellowish brown gravelly clay.

Survey of the site yielded 7 positive shovel tests. Shovel tests contained pottery, shell, and lithics between 0 and 45 cmbs (Table 5-3). One clay bead was also recovered. Surface inspection on the opposite side of the highway south of the site did not reveal any evidence for cultural material.

PO-50 (Pico's Ranchero)

PO-50 is a multi-component site situated in a horse pasture at the base of a steep hill west of PR-503, and approximately .6 km northwest of Tibes. The site is approximately 160 x 70 m (at its widest extent in north-south and east-west) extending from the pasture south, across a small relic drainage running southeast to the Portugués River. Vegetation consists of Guinea grass and shrubs on the north side of the drainage with a mix of hardwood tress to the south. The site is disturbed from historic farming activities. The north-central portion of the site contains an intact colonial trash scatter underlain by a pre-contact ceramic deposit.

Shovel testing was conducted at 25 m intervals with several shovel tests staggered at 12.5 m to define the extent of the cultural deposit. Fifty-four shovel tests were excavated with 11 yielding cultural material (Figure 5-10). Shovel tests and surface scatter yielded pre-Columbian pottery, lithics and historic ceramics (Table 5-3). Soil stratigraphy consists of dark brown compacted clays to 65 cmbs, underlain by highly compacted impenetrable yellowish brown gravelly clay substrate.

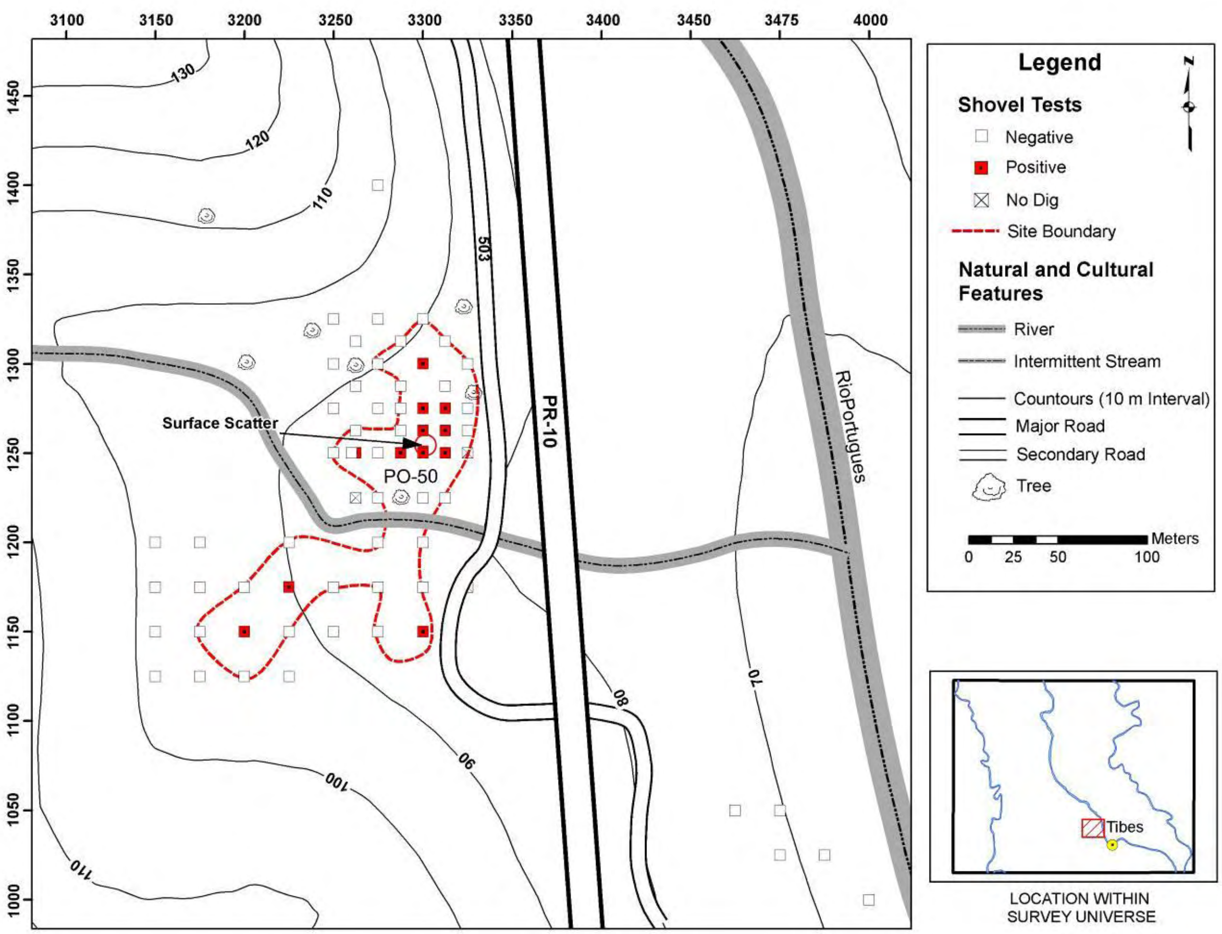

Figure 5-10. Location and ST map of PO-50.

Shovel tests yielded 52 pre-Columbian pottery sherds. Pottery was recovered from 0 and 40 cmbs with densest concentration between 0 and 20 cmbs. The majority of the sherds are large (>10 cm in diameter) indicating limited post-depositional disturbance. *Buren* fragments were also recovered indicating activities associated with food preparation. Neither shells, nor bones were recovered from this site.

PO-52 (Finca Feliciano)

PO-52 consists of foundation of a historic *finca* (*i.e.,* rural residence or country home) situated on top of a pre-contact domestic midden (Figure 5-11). The site is approximately 190 x 63 m. The historic foundation and midden, the area of densest artifact concentration, are in the southern portion of the site. The area is overgrown with Capá, Guamá Americano, Mangó, Higuero and Genip trees and a dense understory of vines. Soil stratigraphy at the site is compacted clay to 40 and 60 cmbs underlain by impenetrable compacted yellowish brown rocky clay.

The pre-Columbian component at this site consists of a dense midden deposit of pottery, lithic and shell measuring approximately 12 m in diameter with areas of lower density artifacts scattered to the north of this area. Sixty-two shovel tests were excavated with 13 positive shovel tests and the extent of the surface scatter defining the site's boundaries. Shovel testing in this area was conducted at a 25 m interval with several units placed at 12.5 m to define the extent of subsurface deposits. A surface collection was made of all materials within 1 m of shovel tests.

Testing of the adjacent dairy farm property, just east of the site, was prohibited by the property manager. Hence, it is quite possible that additional subsurface deposits are located there as well. However, visual inspection of that area and interview with the *mayordoma* (female property manager) suggested that no known pre-Columbian remains are within the property (Doña Carmen 2008, personal communication).

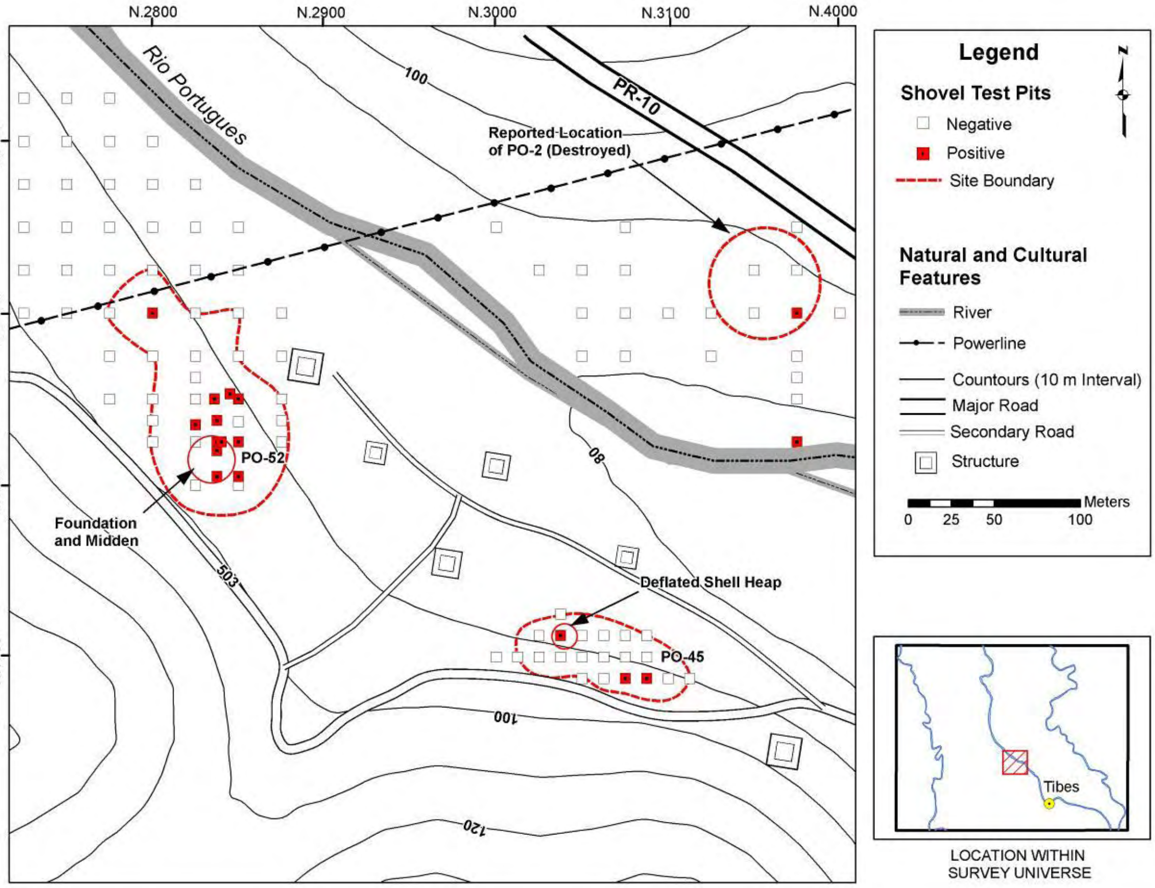

Figure 5-11. Location and ST map of PO-52, PO-45, and PO-2.

Ninety-four pieces of pre-Columbian pottery, 26 lithics, and 2.3 kg of shell were recovered from the site (Table 5-3). Sherds tended to be large (> 5cm in diameter) indicating minimal post-depositional disturbance; however, several looter pits were noted in the immediate vicinity of the midden. Contact was made with a local resident during the course of filed investigations of this site who possesses pottery and a fragment of a massive stone collar which all come from the site. If the provenience of the stone collar fragment is true, it would be one of a limited number documented for the Portugués drainage (González Colon 1984; Walker 2010). As stone collars are considered property of the elite (Walker 1993; Oliver 1999) the site may have been the residence of an important individual in antiquity.

PO-42 (La Mineral)

PO-42 is on the east side of the Portugués River near an old water pumping facility known as *La Toma*. The site straddles a small drainage that descends west from the adjacent side slopes to the river (Figure 5-12). The drainage is deeply cut, with large boulders scattered throughout. The site is vegetated with Capá Negro and Blanco, Mangó, a few young Ceiba trees and an understory of vines and shrubs.

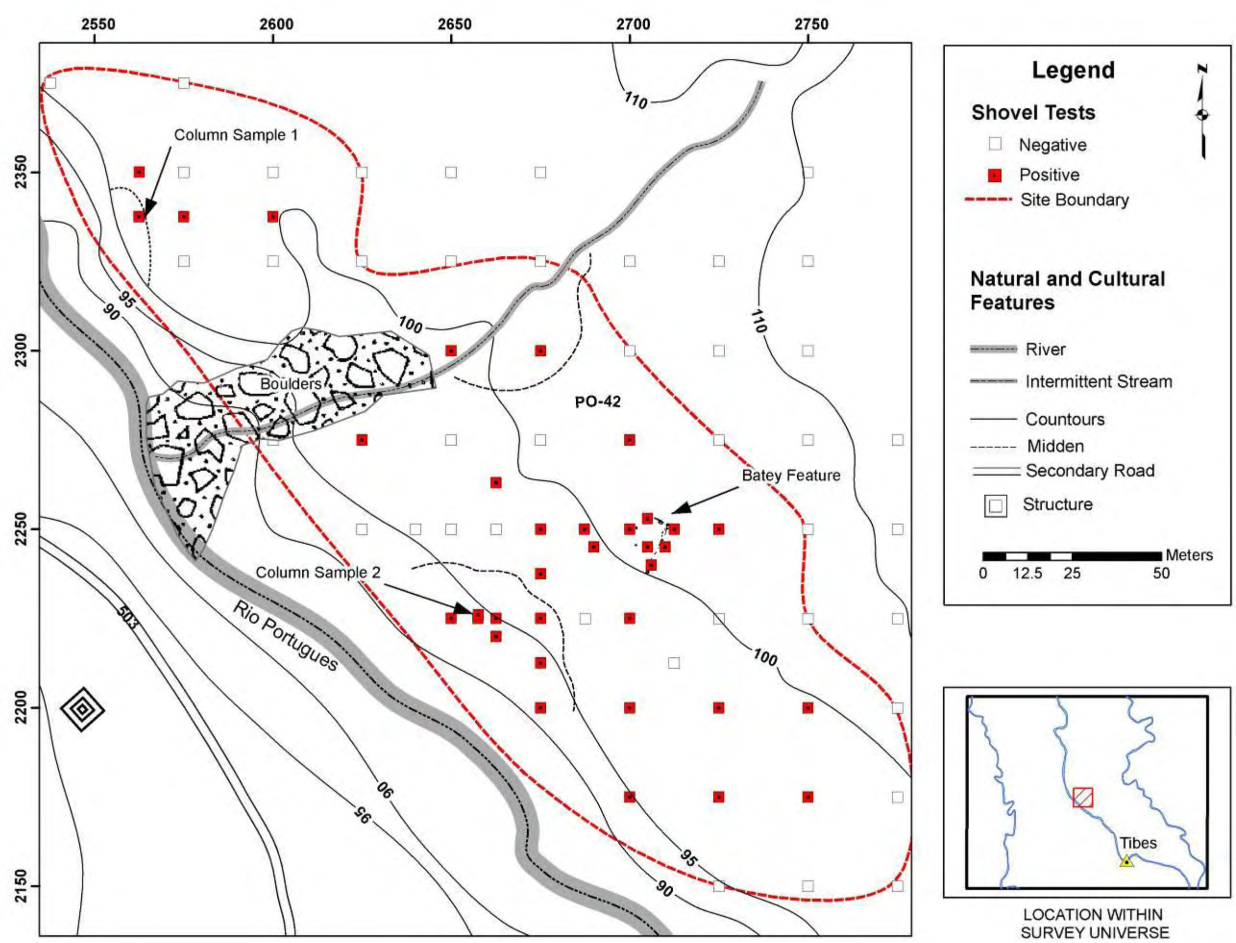

Figure 5-12. Location and ST map of PO-42.

The site is oriented northwest to southeast along edge of the river terrace and measures approximately 300 x 100 m at its widest dimensions. On the south side of the relic drainage are several intact midden deposits that run along the edge of the river terrace which delimit the site's western border. The remains of a small *batey* (6 x 15 m) were identified within the boundaries of the site (Figure 5-13).

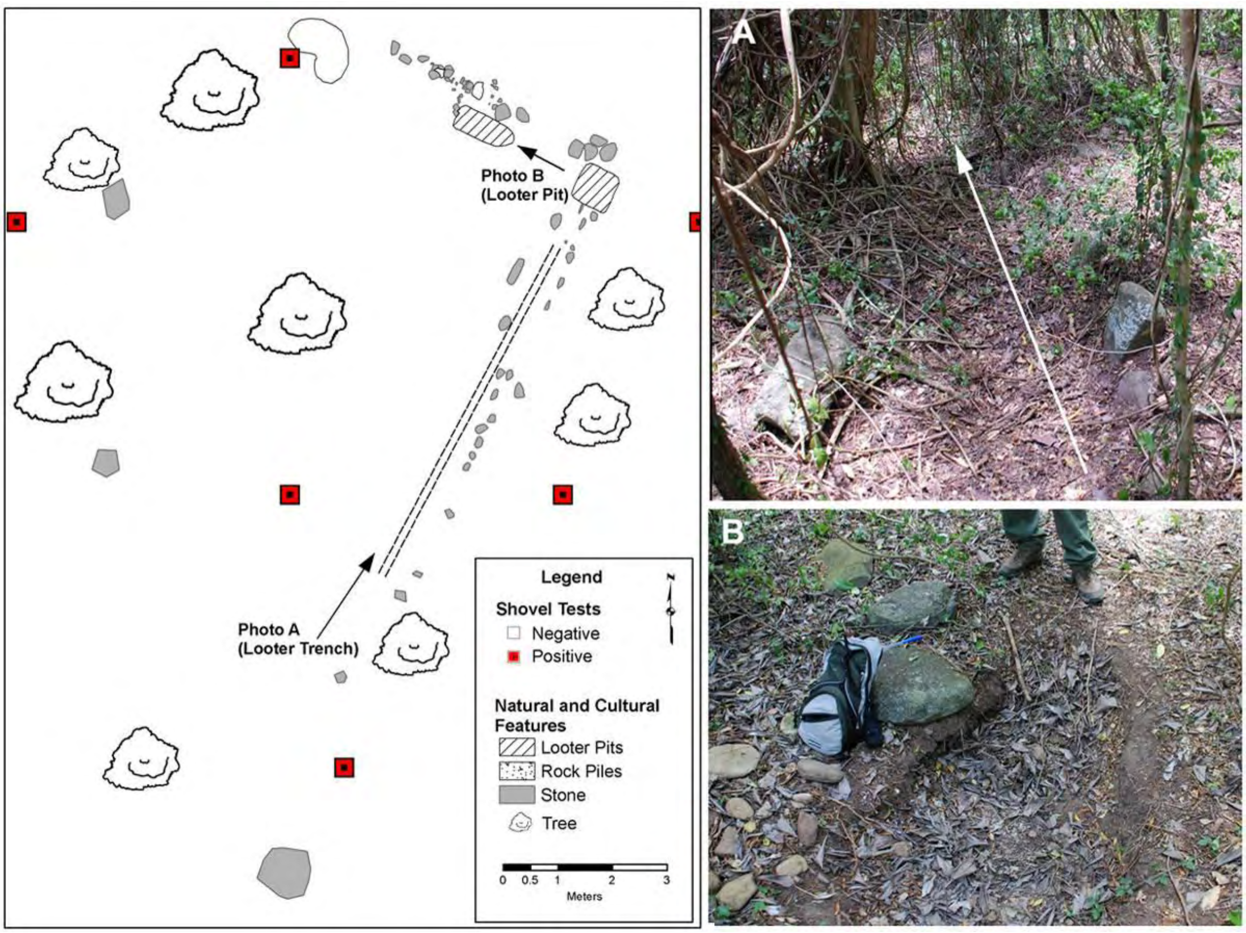

Figure 5-13. Map of *batey* feature at PO-42. A: Showing east wall and looter trench. B: Showing looter pit.

The *batey* is composed of two simple and fragmented stone rows that define its northern and eastern boundaries. The stones, elongated river cobbles set on end, appear to be of local origin (primarily andesites). The east wall of the *batey* is oriented 155 degrees northeast to southwest. Shovel testing and subsurface probing did not find any indication that western or southern walls of this feature existed. Recent looting activities are evident in the area of the *batey*. One relatively large looter pit (1 x 2 m) runs roughly east-west 5 cm south of the north wall of the *batey* (Figure 5-13A). A looter trench approximately 15 m long and 20 cm wide parallels the east wall along its length (Figure 5-13B). Several stones are missing from the eastern wall potentially indicating the removal of petroglyph bearing stones.

Eighty shovel tests were excavated and 36 were positive for cultural material. The site was tested at 25 m intervals and reduced to 12.5 m in areas of high artifact concentrations. Shovel tests in midden locations yielded artifacts between 0 and 50 to 60 cmbs. Soil stratigraphy at the site consisted of dark brown compacted clayey soils to depths of approximately 60 cmbs, underlain by a highly compacted clay and rocky yellowish brown sterile substrate. Several judgmental shovel tests were also placed in areas surrounding and within the *batey* as well as along the edge of the river terrace. Judgmental shovel tests inside the *batey* yielded a limited number sherds and no other artifacts were recovered within the *batey* area.

Two column samples were collect from the site—one from a midden deposit on north side of the drainage (N2337.5, E2562.4) and one from the south side (N2245, E2705). The column samples and shovel tests placed in these areas, yielded substantial quantities of pottery, lithics, shell and bone. Six hundred and sixty eight pieces (after cross mends) of pottery, and 9 kg of shell were recovered from the site (Table 5-3).

PO-43 (Los Gongolones)

This site sits on a small bluff on the east bank of the Portugués River approximately 400 meters north of PO-42. The site measures 140 x 90 m (Figure 5-14). The northern portion of the site terminates at the base of a hill that ascends sharply to a ridge. The western boundary is a steep slope that descends to the Portugués River. The south side of the site begins 60 m from the river's edge and rises gently to the top of the bluff. Vegetation at the site consists of a canopy of Capá Negro and Blanco, Mangó, Ucar, and Acacia trees with an understory of vines and shrubs.

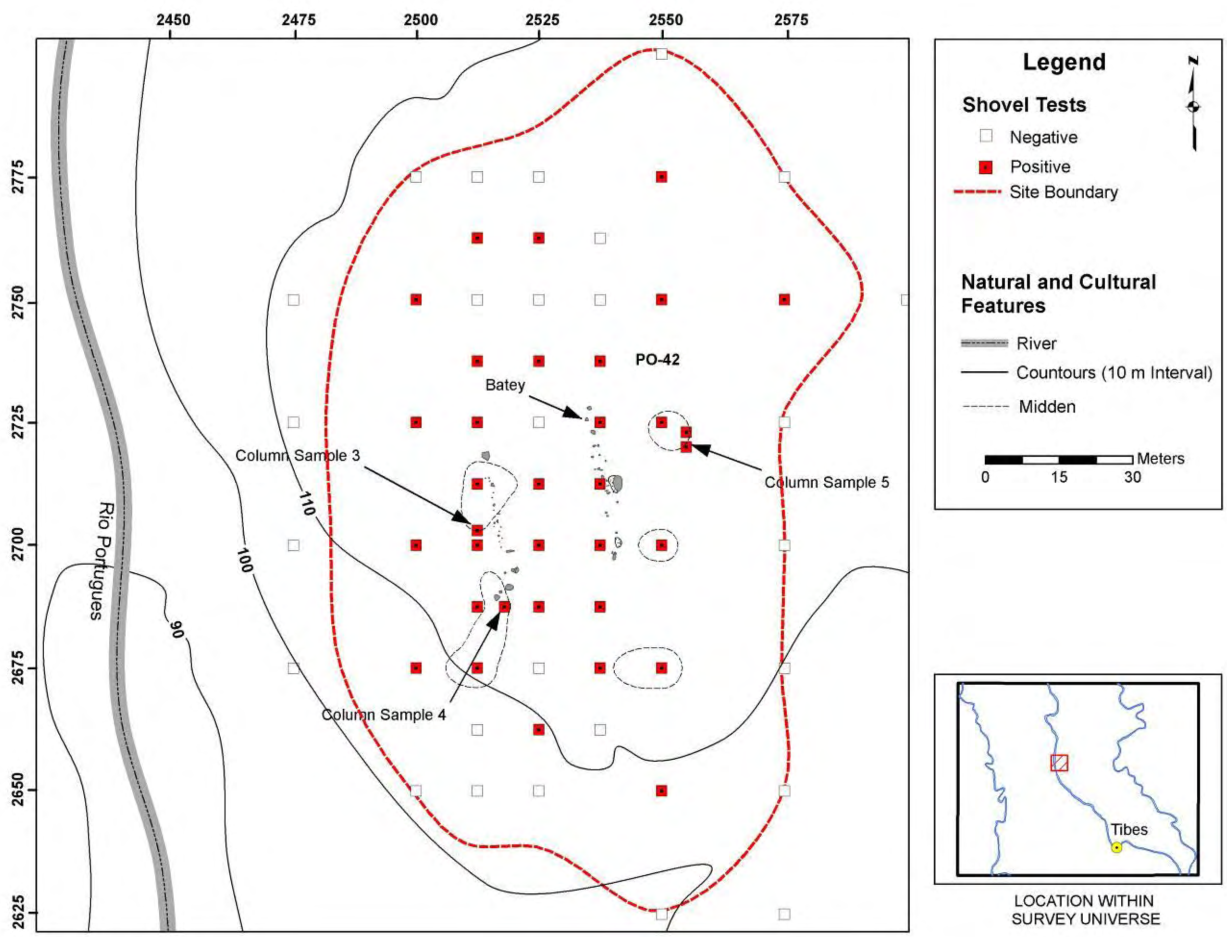

Figure 5-14. Location and ST map of PO-43.

Previous research in the area originally documented the site as a low mound/midden with three stone features (Cinquino *et al.* 1997:3). At the time of TASP investigations the report and site had not been registered with the PRSHPO. TASP field investigations relocated the site which revealed a series of discrete midden deposits surrounding a cleared open area potentially representing a *batey* (Figure 5-15).

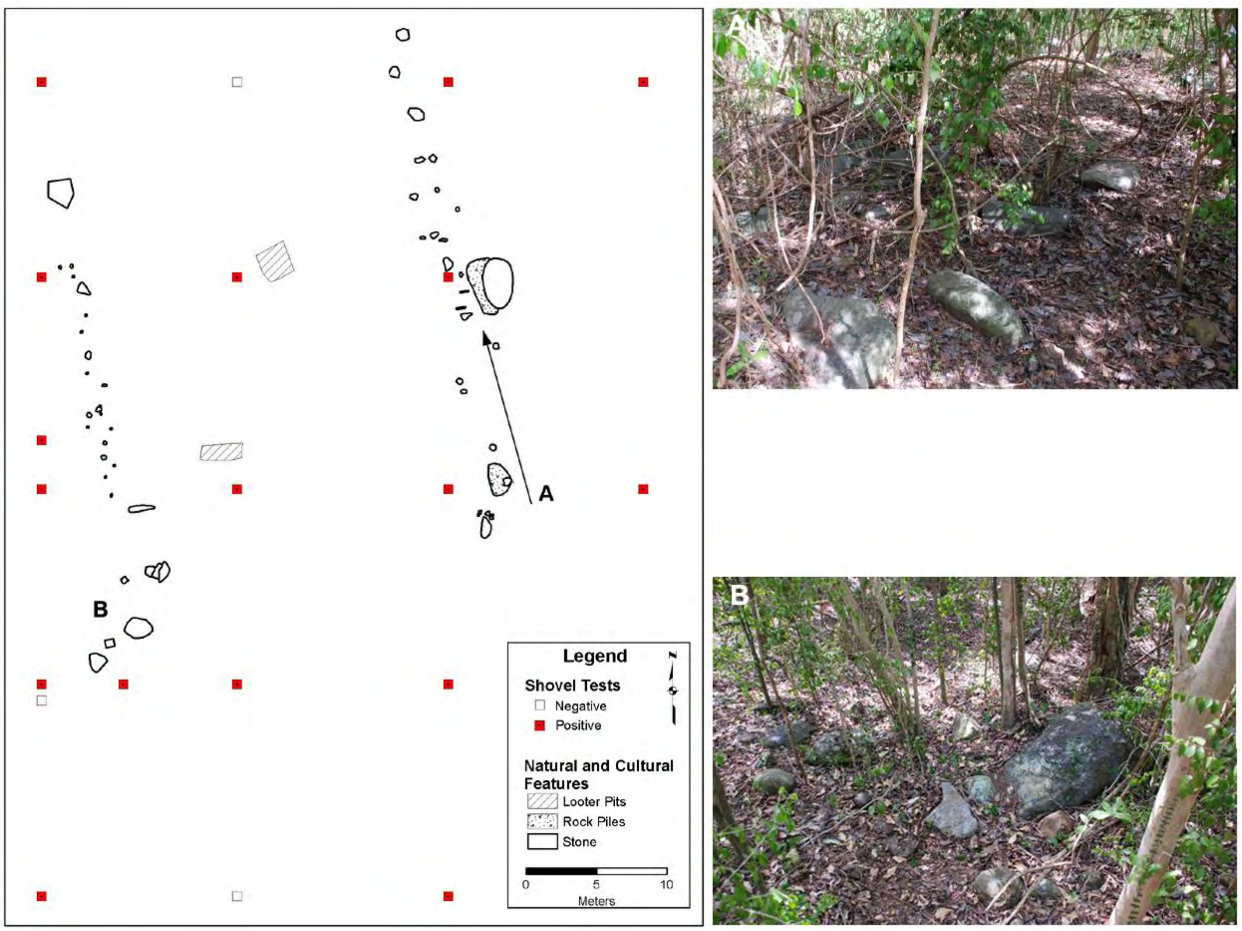

Figure 5-15. Map of potential *batey* feature at PO-43. A: Looking north along east line of stones. B: Triangular stone and pile at south end of west alignment.

The *batey* delineates the central portion of the site and is composed of two disarticulated parallel rows of boulders and river cobbles oriented roughly north-south.

The stone rows are approximately 25 m apart (east-west) and extend approximately 30 m north-south. The west wall is partially buried under cultural and natural deposition and is difficult to fully discern. There is a large looter pit in the center of the possible *batey* feature (approx 2 x 3 m) and midden deposits on the southwest side of the site show additional evidence of minor looting activities. However, these disturbances are isolated to a few discrete areas and several intact midden deposits border the western and southern edges of the site.

Shovel testing at PO-43 began with testing at a 25 m sampling interval. This interval was reduced to 12.5 m through the center of the site to refine the horizontal and vertical distribution of subsurface deposits. Sixty-two shovel tests were excavated and 35 tested positive for pre-Columbian artifacts. Three column samples were collected from PO-43: one from the southern (N2703, E2512.5) eastern (N2687.5, E2512.5) and western (N2723, E2555) middens at the site. These columns, as with those collected from PO-42, yielded a high quantity of pottery, lithics, shell, and bone. One shovel test (N2700 E 2525) excavated inside the *batey* yielded a small quantity of what appear to be large mammal bone fragments at approximately 60 cmbs. However, due to the fragmentary nature of the specimen, positive identification is not currently possible.

Soil stratigraphy consists of compacted dark brown clayey soils to a depth of approximately 60 cmbs underlain by highly compacted, sterile eroding bedrock parent material. Six hundred and forty six pottery sherds (after cross mends), 87 lithics and 11.5 kg of shell were collected from this site (Table 5-3).

PO-45 (La Vaquería)

PO-45 is on the southern edge of the abandoned dairy farm (as discussed for (PO-52) and is comprised of a small midden deposit of shell and low density scatter of pottery along the north edge of an existing road (Figure 5-11). The site measures approximately 100 m east-west and 30 m north-south. Vegetation at the site consists of Almacígo, Higuero, Mangó and Capá Negro trees. The understory of the area consists of grasses, shrubs and vines. The northern portion of the site, to the banks of the river, is disturbed from historic leveling for agriculture and house construction. This area received only limited surface inspection due limitations of access enforced by the property manager.

Thirteen shovel tests were excavated. Soil stratigraphy consists of light brown compact loam between 0 and 20 cmbs, underlain by compact brown clay between 20 and 40 cm and a light brown highly compacted and gravelly substrate between 40 and 80 cmbs. At 80 cmbs the soils became impenetrable due to dense gravel and eroding bedrock. Artifacts recovered from this site consist of 10 pieces of pre-Columbian pottery, shell, and one lithic (Table 5-3).

Isolated Finds

In addition to the sites documented in the Portugués drainage, four isolated finds were identified in the drainage (Figure 5-6). Three are in the southeastern portion of the survey area near PO-53. The location coordinates and materials recovered are listed in Table 5-3. The proximity of these materials to Tibes and PO-53 suggests that the artifacts are likely associated with these sites. However, based on the lack of contiguity with other positive shovel tests and the lack of association with other artifacts or features, they are designated isolated finds.

PO-44 (La Mineral II)

The fourth isolated find was originally documented as a “site” atop of a hill approximately 200 m west of the Portugués River and 100 meters west of an abandoned motel on the west side of Route 503 (Torres 2008). The area is approximately 50 meters in diameter on a level area on top of a hill. An unimproved road cuts the southern edge of the hill with the north and west sides defined by relatively steep slopes in either direction. This area was rumored to have a *batey* and *conchero* based on discussion with local residents and the property owner (Juan 2008, personal communication; Angel Pérez 2008, personal communication). However, field investigation revealed that the site was historically leveled and did not contain any observable pre-Columbian artifacts beyond 1 possible lithic and a few pieces of shell (Table 5-3).

Twenty-three shovel tests were excavated in this area on a 12.5 meter grid in hopes of capturing a portion of a remaining intact deposit. There is little surface deposition on the site and bedrock is at or close to the surface in many places. Soil stratigraphy at the site consisted of a pale yellowish brown rocky clay soil to 40 cmbs underlain by dark yellowish brown highly compacted rocky clay between 40 and 70 cm in areas with soil deposition.

Due to the limited quantity of material recovered from this site, its function in antiquity is not clear. For management purposes for the PRSHPO, based on the recovery of the lithic and shell as well as discussion with local residents, the site was given a formal site number. However, for the purposes of this study it is treated as an isolated find.

Chiquito River Drainage

The Chiquito River drainage, like the Cañas drainage, is steeply cut with few naturally occurring level landforms. Historic and modern settlement in this river valley is restricted to the few terraces and artificially leveled areas where it converges with the

Portugués River. Eight sampling units (48 ha) were surveyed in portions of this drainage (Figure 5-5).

At the time of archaeological investigations, no archaeological surveys had been conducted and no pre-Columbian sites were documented in the upper portions of the drainage. Interviews with local residents yielded no additional information regarding potential sites in the area. Moreover, local residents that were interviewed intimated that the valley was uninhabited in antiquity, emphasizing the Portugués River as the primary area of settlement in pre-Columbian times.

PO-48 (Escuela Río Chiquito)

PO-48 is a multi-component site on the grounds of an old school. This site sits on the western side of the Chiquito River adjacent to a small barrio in the northern part of the sampling universe. The site is approximately 40 x 60 meters and conforms to the extent of the abandoned school grounds (Figure 5-16).

The site is likely to extend along the edge of the river terrace and into the adjacent cattle pasture an additional 50 m south where it terminates at the base of a step ridge. However, the *mayordomo* of the property refused the survey crew access to this area. Vegetation at the site consisted of a few small tress bordering the eastern portion the edge of the river.

Twelve shovel tests were excavated at the site supplemented by intensive surface inspection of the surrounding property. Soil stratigraphy at the site consisted of dark brown, highly compacted clay to a depth of one meter on the east side of the site. The western portion of the site contained compacted pale brown soils to a depth from 0-50 cmbs. Sherds were visible on the surface of the site and shovel testing yielded pottery, lithics and animal bone (Table 5-3).

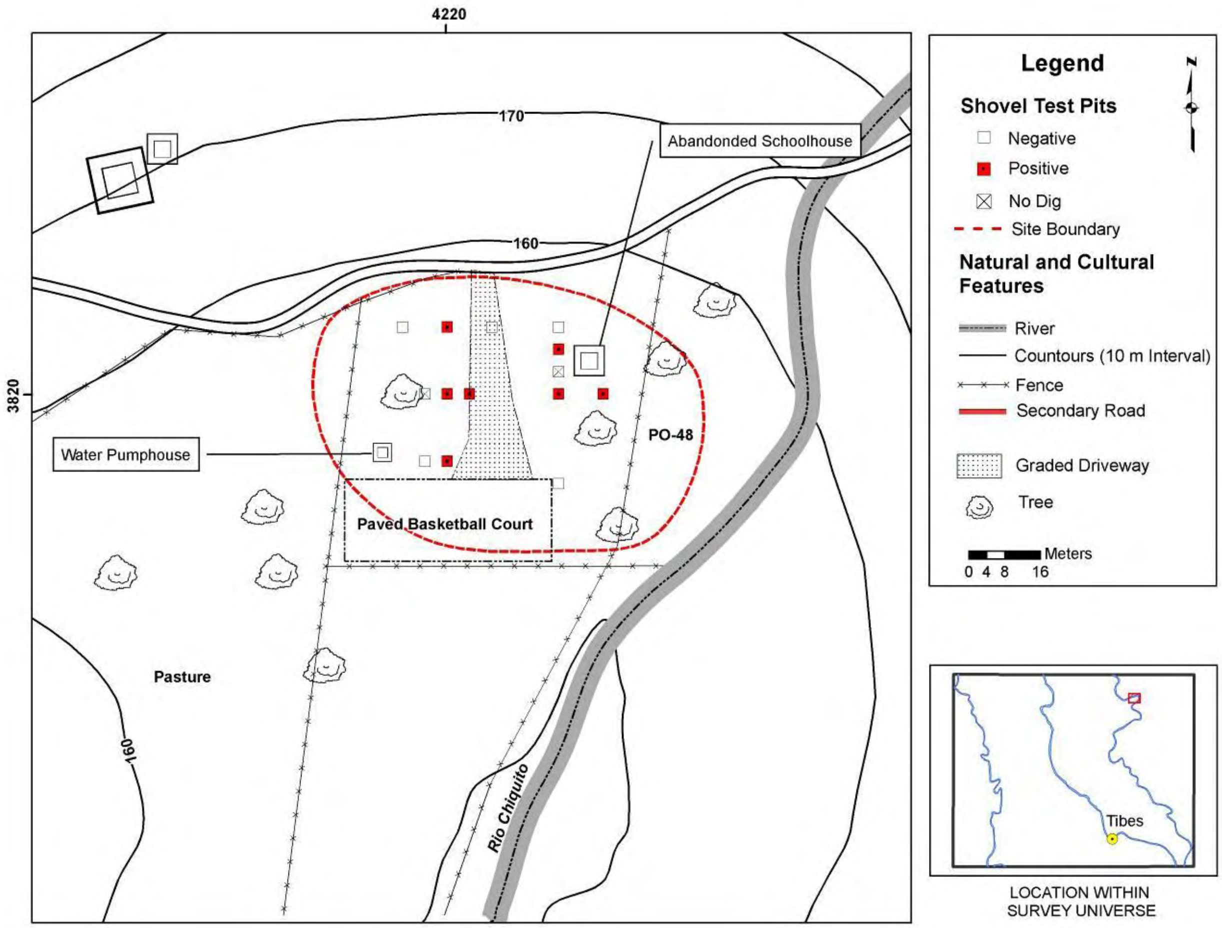

Figure 5-16. Location and ST map of PO-48.

PO-49 (Reyes' Ranchero)

PO-49 is a multi-component site located on a large river terrace on east side of the Chiquito River midway up the drainage. Portions of the property were historically leveled and graded. An interview with the adjacent landowner, who was born and raised on the property, was not aware of any pre-Columbian sites in the area (Juni, 2008, personal communication).

Thirty-six shovel tests were excavated of which four were positive for cultural material. An additional 800 meters on both sides of the river were surface inspected for cultural materials (Figure 5-17). Soil stratigraphy at the site yielded highly compacted and rocky yellowish-pale brown clays to depths of approximately 40 cmbs underlain by a layer of impenetrable eroded bedrock. Subsurface survey in northwestern portion of the property produced a small quantity of pre-Columbian pottery and historic ceramics (Table 5-3).

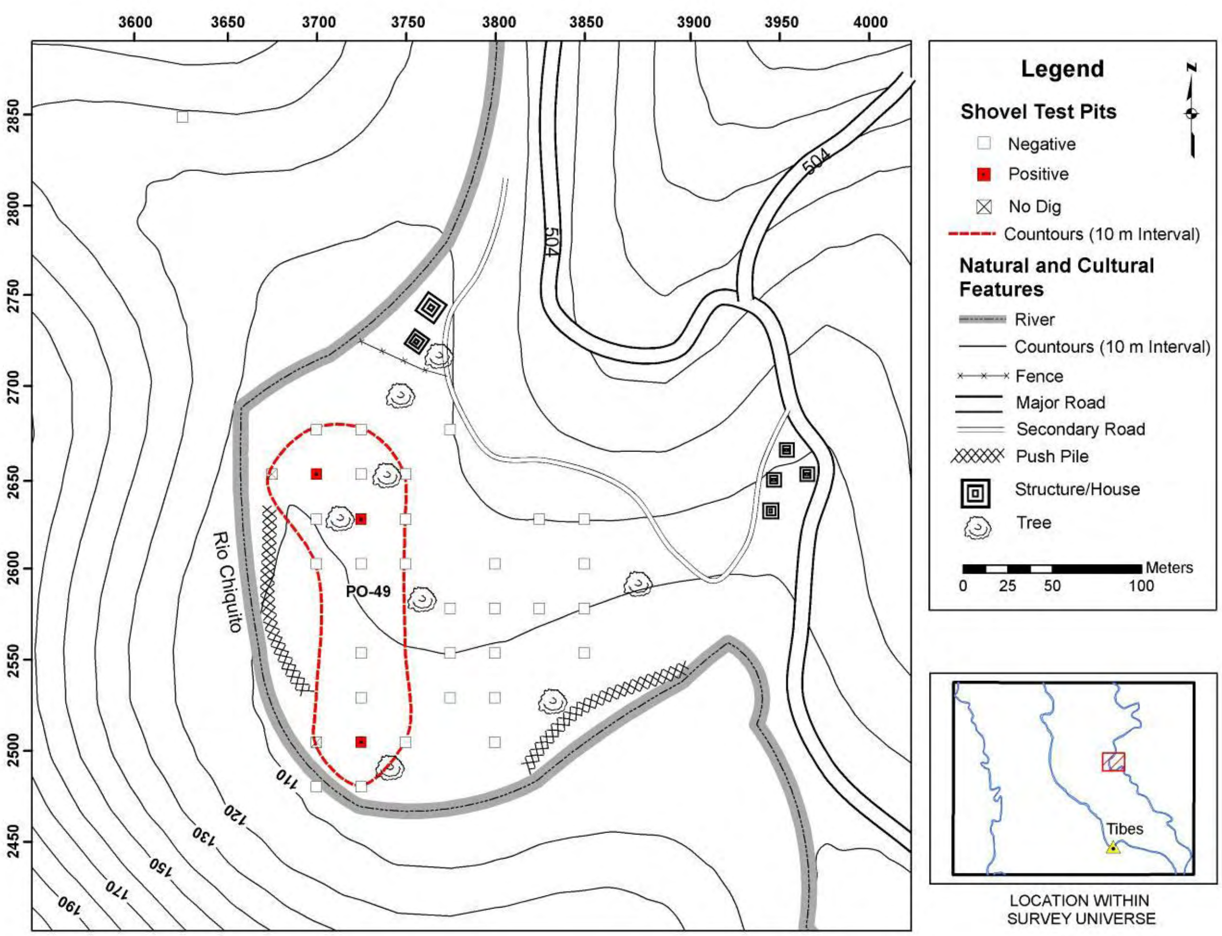

Figure 5-17. Location and ST map of PO-49.

Isolated Finds

One pre-Columbian isolated find was documented in the Chiquito River drainage associated with PO-57. PO-57 is a multi-component site primarily evidenced by its historic components that include the remains of an aqueduct and brick wall/foundation and a few colonial/historic era artifacts.

Shovel tests yielded soil stratigraphy characterized by compacted pale brown loamy clay to a depth of approximately 60 cmbs underlain by an impenetrable pale yellowish rocky substrate. One pre-Columbian pottery sherd was recovered from one shovel test in the western portion of the site (Table-5-3). No additional material or evidence of pre-Columbian activity was noted during survey of the area.

Additional Investigations

In addition to the systematic survey within selected sampling units, field investigations conducted additional work focused on surface inspection and judgmental testing of a sample of ridge tops within the sampling universe. No cultural material was documented in examination of these areas. This observation is important because marginal areas such as ridge tops would have been settled if severe limitations to available settlement locations and or for defensibility.

Additional work also included attempts to relocate PO-2 (Pantel 1978) as well as verify the existence of one site, located outside the sampling universe, reported by a local resident (Juan 2008, personal communication) to possess a *batey*. The results of these efforts are discussed below.

PO-2 (Tibes II)

Pantel originally documented this site in his 1978 survey. The site was not located through subsurface testing but rather a limited surface inspection at an unspecified survey interval. The site was originally identified as a small campsite with late (Modified) Ostionan Ostionoid pottery (Pantel 1978).

TASP field efforts attempted to relocate and provide better documentation of the site. Investigations in this area consisted of twenty-two shovel tests and intensive surface inspection (Figure 5-11). Two of these tests yielded pre-Columbian pottery in the vicinity of the reported site. Soil stratigraphy in the area yielded mottled brown and pale brown gravelly clay to a depth of 60 cm indicating modern grading and leveling. Two shovel tests yielded two pieces of pre-Columbian pottery and one small shell hammer fragment (Table 5-3).

It was determined that the site has recently been destroyed by the construction of PR-10 and a large concrete culvert. The area is currently under several meters of fill and heavily vegetated. Young Acacia and Capá trees are present in this area substantiating recent clearing and leveling activities. No additional evidence for prehistoric cultural activity matching Pantel's initial recording could be identified.

PO-51 (Río Bayagan I)

PO-51 is just outside of the southeastern portion of the sampling universe. The site encompasses a slope that ascends to a series of naturally level benches leading to a small ridge top. Most of the area is in pasture with Guinea grass and patches of trees such as Acacia, Mabí, Higuero and Guamá Americana. The site was reported to have "had two *bateys* surrounded by *conchero*" (Juan 2008, personal communication), which stimulated investigation of this area.

Survey of the property consisted of a systematic walkover that yielded a multi-component (historic and pre-Columbian) artifact scatter in the southwest corner of the property on the north side of Calle A. A 1 x 1 m surface collection of material was gathered from the area of densest surface materials. Surface inspection of the balance of the property led to the identification of the rumored pre-Columbian site.

The site is located on the first major bench as one ascends the slope to the ridge peak just north of an existing residential housing development (Figure 5-18). The area has been recently cleared and graded and large quantities of pre-Columbian pottery and shell are scattered across the site and in push piles along the edges of the bench. Collections were made from the push piles consisting of two 1 x 1 m areas on the east and western portions of the site. Sixty-nine sherds and sixty-four shells were collected from the site (Table 5-3).

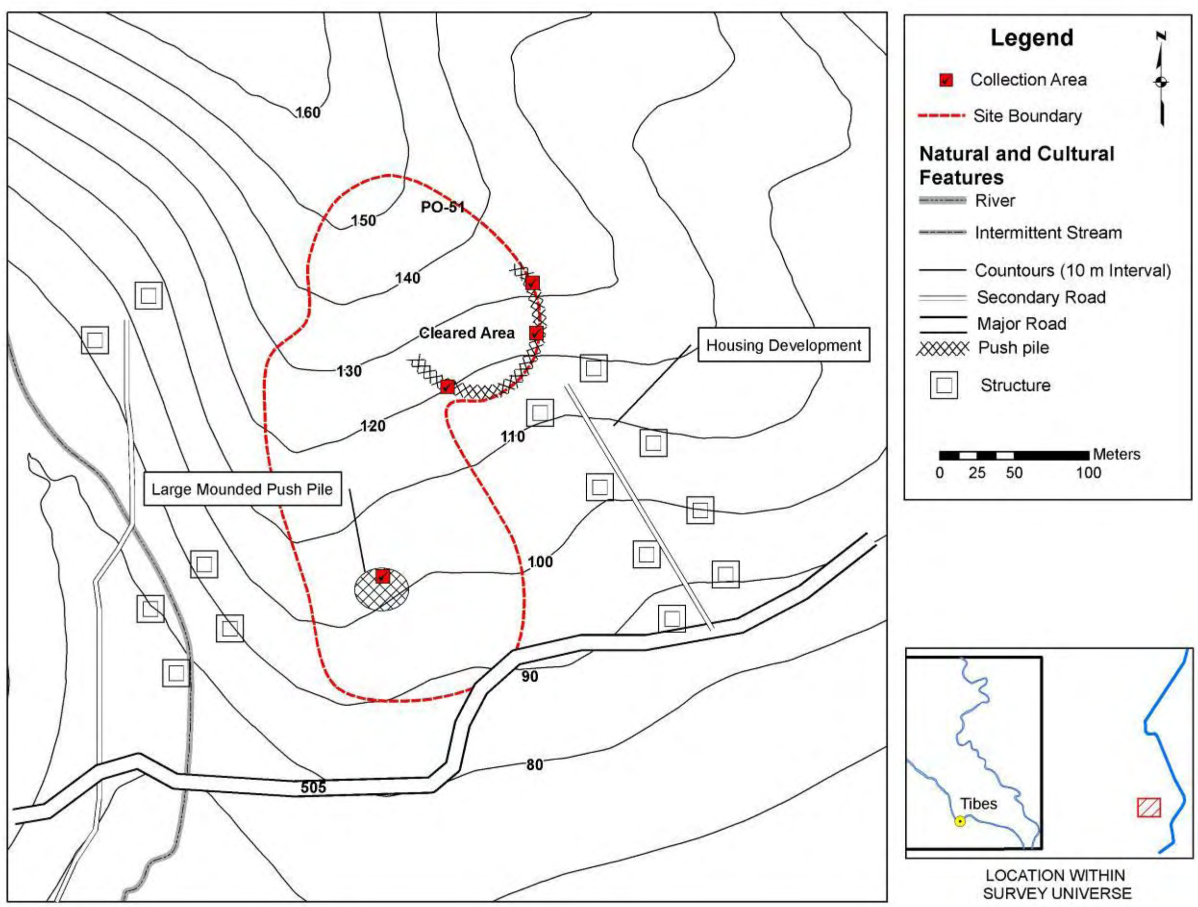

Figure 5-18. Location map of PO-51 showing push piles and collection areas.

No *batey* structures were observed during site inspection, as these would have been destroyed during clearing of the area. Based on the size of the bench (which undoubtedly represented the boundaries of the site on three sides), and the quantity and diversity of material it is likely that this was a substantive residential settlement in antiquity. However, the site is not close to any natural water resources and its location atop the steep slope may be related to its commanding view of the southern coastal plains.

Summary of Survey Results

Archaeological survey of the Portugués and adjacent river drainages yielded eleven archaeological sites with pre-contact components and five isolated finds. In general, the sites tend to be small, yielding a limited quantity of artifacts from discrete locations. Several sites exhibited evidence of disturbance from historic and modern settlement and agricultural practices of area. However, despite the modest survey results, several important observations can be made that set the stage for detailed examination and interpretation of the community associated with Tibes. It must be noted that the quantity of recovered artifacts is a relatively small sample from extant deposits at the sites. Hence, my interpretations are conservative based on the available data.

Preliminary evaluation of the sites based on size, quantity, and diversity of recovered material indicates small residential settlements and limited activity areas in the Portugués and adjacent river drainages (Table 5-4). Six sites (PO-42, PO-43, PO-48, PO-52, PO-53, and PO-51) provide strong evidence for permanent long-term residential settlement. PO-42 and PO-43 yielded substantive quantities of pottery, lithics, and shell as well as two ceremonial structures (*bateys*) suggesting an even more complex ritual landscape than previously conceived in the Portugués drainage. Several other sites (PO-45, PO-47, PO49 and PO -50) also suggest the presence of additional residential settlements however; the disturbed nature of these sites limits detailed interpretation of their functional use and duration of occupation.

Table 5-4. Sites identified during the course of field investigations.

Site No.	Area (m^2)	Positive shovel tests	Disturbances	Description
PO-42	24,570	36/Surface Collection	Looting, Cattle Grazing	Midden deposits with *batey* (surface and subsurface)
PO-43	13,705	35/Surface Collection	Looting, Cattle Grazing	Midden deposits with possible *batey* (surface and subsurface)
PO-45	3,414	2	Heavily Disturbed	Deflated surface shell heap and light subsurface deposits
PO-46	7,533	3/Surface Collection	Residential Development	Light surface scatter and subsurface deposit
PO-47	11.254	7	Agricultural Plowing	Subsurface deposits (pottery only)
PO-48	4,426	7	School Construction	Subsurface deposits (bone present)
PO-49	10,566	3	Heavily Disturbed/Land Clearing/Plowing	Subsurface deposit (light)
PO-50	9,193	11	Agricultural Plowing/Horse Pasture	Surface scatter and subsurface deposit
PO-51	47,455	Surface Collection	Heavily Disturbed/Land Clearing	Surface scatter possible subsurface deposits intact
PO-52	8,656	11/Surface Collection	Historic Settlement, Looting	Surface and subsurface deposit
PO-53	1,101 (partial)	7	Road Construction	Surface scatter and subsurface deposit

Based on the results of the survey, the general characteristics of documented sites is inconsistent with what would be expected from burgeoning sociopolitical systems characterized by densely clustered settlements indicative of large residential populations (*e.g.,* Johnson 1982: Figure 21.1). This pattern also contrasts with Saladoid settlements that tend to be much larger than those documented in the survey. Instead, settlements are relatively small and dispersed with multiple, closely related *batey* features. This pattern of settlement also appears to be similar to the recent findings of Oliver and colleagues who found small, dispersed, late-pre-contact settlements throughout the mountainous interior of the island in the region surrounding Caguana (Oliver 2007; Oliver *et al.* 1999).

The settlement pattern suggests a low-density residential population which is supported by three observations. Given high-density residential populations, it would be expected that sites: 1) have *large* mounded middens with *extremely* dense concentrations of artifacts and food refuse, 2) be tightly spaced (*i.e.,* even closer together), and 3) be located in more marginal areas of the landscape (*e.g.,* ridge tops and side slopes). None of these expectations were met based on the results of the survey; and in the case of the last point, while the survey sampling strategy did not specifically target areas considered poor for settlement, shovel testing and inspection of a sample of ridge tops and side slopes did not yield any evidence of human occupation.

To conclude, *small* residential settlements appear to have been the prevalent form of settlement for the foothills and mountainous regions of the area. The results of these findings lead us to ask why did settlements conform to this pattern, which varies considerably from the Saladoid era, and how did they get that way? Both of these questions are explored in further detail in the following chapters.

CHAPTER 6
WHAT THEY LEFT BEHIND: TASP ARTIFACT ANALYSES

In the previous chapter I presented the results of an archaeological survey that I conducted in the foothills immediately surrounding the ceremonial center of Tibes. In this chapter, I analyze and discuss the artifacts recovered during the survey. These artifacts are fragments of the lives of people who once constituted part of the social community associated with Tibes. An examination of the recovered artifacts offers a glimpse of the activities performed by these people at various locations in the local landscape, and gives insight to the organization of the ancient community that once occupied this area. These data also provide a foundation for identifying and characterizing residential settlements, their social composition, and a basis for comparison with other coeval settlements throughout the south-central region. Understanding what residential settlements are, in terms of the material evidence regarding the activities of social groups in their most elemental contexts, is critical for developing an archaeological perspective of community and for pushing research in the region forward.

In the absence of physical dwellings, archaeologists often rely on a suite of characteristics to identify permanent residential settlements. These generally include:

- Quantity and diversity in the artifact assemblage indicating a wide range of functional activities.
- Discrete activity areas.
- Longevity or temporal durability.
- Evidence of food processing and consumption.
- Evidence of tool production and use.

Artifacts recovered during the TASP consist of ceramics, lithics, and shells (modified and unmodified) which can be used to provide a functional and temporal context for the newly documented sites. Due to the abundance of pottery and shell in the collection, this chapter primarily focuses on these artifact classes. The survey also recovered substantial quantities of bone, particularly from column samples; however, analysis and interpretation of this material is not presented here, as it is the subject of a forthcoming study (DuChemin 2009, 2010).

Pottery Overview

The goals of the ceramics study are to document and characterize the vessel assemblages from each site to infer activities that occurred at them and to identify diagnostic design or production elements to facilitate their temporal association. Pottery identification relies on the work of Irving Rouse who defined the styles for the region which are still in use today--even if highly contested (see Gutiérrez and Rodríguez 2009; Rodríguez López 2007 for recent critiques). To contextualize the ceramic analyses presented here, I briefly review the pottery styles from the region.

Saladoid Pottery[1]

Hacienda Grande style pottery is high quality, relatively thin (<6 mm), well fired, and of fine paste with few aplastic inclusions. Surfaces are smooth, although somewhat uneven. Unpainted surfaces are light tan, orange (or salmon colored), or grey in color. Design elements mainly consist of bichromatic painting--particularly white-on-red (Curet 1997:498). Incisions are common, especially zone-incised crosshatched designs which are sometimes filled with white paint.

[1] This section does not include a detailed discussion of La Hueca pottery as none of this style was recovered during the survey.

Bowls, incense burners, bottles, jars, and plates are common vessel forms. Bottles and jars are typically circular or ovoid with annular bases. Vessels in the shape of inverted bells are common, but in slightly less frequency than in the Cuevas style. Outward flaring rim shapes, indicative of unrestricted vessel forms, predominate over vertical and restricted forms.

Cuevas style pottery is more rounded than the Hacienda Grande style which contributes to its “graceful appearance” (Rouse 1952:336-338). There is an overall decrease in the use of polychrome painting and incision for decoration. The practice of white-on-red painting does continue; however, the frequency of occurrence diminishes through the duration of the style. Decorative elements are largely restricted to red paint over the entire body of the vessel or as a single band along flattened, outflaring portions of the rim. Rouse and Rainey also noted the use of red paint to cover the interior base of shallow open bowls (Rainey 1940:44; Rouse 1952:442).

Non-painted vessel surfaces are often self-slipped, with a light brown to ivory color, giving them a brownish or “chocolate tinge” (Rouse 1952:336). Cuevas, like the Hacienda Grande style, is well fired with fine paste and thin--usually measuring around 6 mm thick. However, paste becomes slightly coarser and vessel walls thicker in later occurrences of the style. Diagnostic structural elements consist of D-shaped handles and tabular lugs. D-shaped handles extend from the shoulder to the top of the rim (Rainey 1940:51). Tabular lugs occur on opposing sides of oval and round vessels, slightly elevated above the edge of the rim, and are often “semi lunate” in shape (Rainey 1940:52). Tabular lugs can also be flat with simple edge points on rims.

Common among Cuevas vessel forms is the “inverted” bell shape characterized by an outflaring rim. This form, while occurring in the earlier Hacienda Grande style, is at its highest frequency in Cuevas pottery assemblages. Plates and oval serving dishes are also frequent forms (SEARCH 2011a). Rims are often internally thickened and tend to be round rather than angular.

Researchers generally acknowledge that the inception Cuevas style pottery was concurrent with Hacienda Grande style around AD 400. However, Cuevas pottery has been documented with Elenan and Ostionan Ostionoid assemblages indicating a perpetuation of the style to about AD 1000 in eastern Puerto Rico (Oliver 1995; SEARCH 2011b).

Ostionan Ostionoid Pottery

Commonly occurring in western Puerto Rico before AD 600, Early (Pure) Ostiones style pottery is well made and relatively thin (6-7 mm). Monochrome red painting/slip over the entire vessel is diagnostic. The red colored Pure Ostiones slips are often lighter than the bright reds associated with Saladoid painted surfaces giving them a characteristic pinkish or light purplish hue. These “red wares”, while diagnostic for the style, actually make up a small percentage of the overall Ostiones pottery assemblage which are more often smoothed or semi-burnished and dark brown in color (SEARCH 2008; Goodwin and Walker 1975:64; Rainey 1940:15).

Raised loop handles above the rim and rectangular lugs are common. Rims tend to have thickened lips beveled inwards, similar to Cuevas assemblages, which later develops to flat or rounded lips (Rouse 1952:343). The unrestricted bell-shaped bowls, common in the Cuevas style, are absent and restricted incurvate forms increase in frequency (SEARCH 2008).

Generally occurring after AD 600, late or “Modified” Ostiones style consists of geometric line and dot incision and horizontal bands (Rouse 1952:343). Complex appliquéd and modeled designs, particularly zoomorphic adornos, are also frequent. The incorporation of adornos, modeling and incision in Modified Ostiones pottery is considered a result of contacts with Hispaniola and emergent from pre-Arawakan pottery traditions (Rodríguez Ramos *et al.* 2008).

Rainey identified fourteen vessel forms (seven common and seven rare) for Ostiones pottery (Rainey 1940:16-20). More recently, Espenshade proposed ten early Ostiones vessel forms which vary in shape and sizes. Vessels range from 6 cm diameter round bowls to 50 cm round cooking pots. Diagnostic vessel forms are navicular and hemispherical and globular shaped bowls. Restricted vessel forms are common.

Elenan Ostionoid Pottery

Monserrate style appears throughout eastern Puerto Rico around AD 700. It is the least understood and difficult to identify of all the styles. Because it is poorly defined, differences in reporting tend to emphasize traits associated with Cuevas or Santa Elena styles resulting in somewhat conflicting descriptions and documentation of the style (compare SEARCH 2009:10; Curet *et al.* 2004; Garrow *et al.* 1995:31-32). While lacking some of the decorative and morphological attributes present in Cuevas assemblages, Monserrate pottery has tabular lugs, strap handles, and red painted and slipped ceramics. While sharing many similarities with Cuevas pottery, Monserrate style has some distinctive characteristics, albeit irregularly represented throughout eastern Puerto Rico.

Monserrate style pottery is thicker, coarser and rougher than Hacienda Grande and Cuevas style pottery. Monserrate vessels lack definitive shoulders or *carina*s, and tend to have out rounded shoulders, although more vertical shapes increase in frequency. Rounded and internally thickened rims become common and secondary morphological features consist of loop handles.

Design elements consist of limited occurrences of "splotchy" red painting applied to buff backgrounds and areas of black smudging to create negative "resist" design patterns. Red painting is common on vessel interiors, particularly in trays and open bowls. Incision is not a decorative design element. A dichotomy between utilitarian and finer wares has been distinguished with painted vessels, better fired and manufactured, possessing slightly thinner walls and polished surface treatments that are not present in the coarser plain utilitarian wares (Garrow *et al.* 1995:47). Brushing and scraping is a common surface treatment later in the sequence.

Santa Elena style pottery, commonly occurring in eastern Puerto Rico after AD 900, are thick with average wall thickness around 8 mm. Paste is coarse, often containing an abundance of large (> 1.0 mm) aplastic inclusions. Vessel color ranges from pale to medium brown, orange, or reddish brown in color. Painting, evident in Cuevas and Monserrate assemblage, is rarely used. Surfaces are seldom slipped or burnished. Simple incision, modeling, and appliqué are frequent (Rouse 1952:344-347). Diagnostic design elements consist of crude vertical incisions on the exterior of the vessel running from the rim to just above the shoulder. Other design elements consist of incised interior horizontal lines just below the rim on unrestricted bowls and appliqué strips running vertically from rim to shoulder.

Vessels tend to be large, open, hemispherical bowls with roughly shaped rounded walls, restricted orifices, and round or flat bases. Vessel profiles are generally smooth, albeit crudely formed, and not angular. In Santa Elena pottery, the coils used to construct vessels are relatively thick, contributing to terminal coil breaks along rims (Rodríguez Lopez 1989).

Chican Ostionoid Pottery

Capá style pottery is common to western Puerto Rico. It is more friable and elaborately decorated than Esperanza style pottery which occurs in eastern Puerto Rico (Rouse 1992:111). Capá pottery is often sand tempered with vessel walls averaging around 7 mm in thickness. Painting *is not* used and vessels tend to be brown to very dark brown. Burnishing is a common surface treatment giving vessels a lustrous sheen. Decorative elements mainly consist of broad line incisions forming geometric patterns, punctations, zoomorphic lugs (but no true handles), and appliqué and modeling. Incisions are deep and extensive usually restricted to the shoulder areas of the vessel (Rouse 1952:450). Vessel forms are predominately incurving or carinated (*cazuela*) bowls. Rims from this period are tapered and upturned at the lip.

Esperanza style pottery, common to eastern Puerto Rico after AD 1200, is generally light brown to medium reddish brown in color. Esperanza vessels are rarely slipped and surface treatment mainly consists of smoothing. Like Santa Elena vessels, Esperanza vessel walls are thick ranging between 8 and10 mm. Paste is medium coarse to coarse with aplastic inclusions ranging from approximately .5 to 2 mm. Handles are absent from the style and globular vessel forms are common.

Diagnostic design motifs for this style consist of double or triple sets of incised straight, curvilinear or oblique parallel lines. Wide, downward curvilinear lines are reminiscent of the double rainbow mythological theme (Stevens Arroyo 2006). Incised lines are broad, deep and widely spaced. Incision is restricted to the upper portion of the vessel between the rim and shoulder. Another common design element is singular horizontal line under the rim.

Boca Chica is the finest of the Chican Ostionoid styles, with hard and well-finished surfaces, complicated vessel forms, and intricate design motifs (Garrow *et al.* 1995; Rouse 1952:348). Burnishing is a common finishing technique. Rouse (1952:347) described this ware as having a “soft sheen.” These ceramics are generally brown with thick walls (averaging 8 mm) and tapered rims. Boca Chica design elements include elaborate incision, punctation, and modeling. Rouse (1952:349) describes the common motifs as “circles, each with a dot in the center and flanked with semicircular lines; horizontal oblique, and vertical parallel lines; ovoid figures, each encircling a line or a series of dots; and a maze-like arrangement of curved lines.” Lines that end in dots are a defining characteristic of Boca Chica. Modeled plastic design elements include zoomorphic and anthropomorphic head lugs similar to those encountered in late Ostionan Ostionoid assemblages (Modified Ostiones), albeit in more complicated forms.

Pottery Analyses

The TASP pottery collection is a complex sample representing several sites, multiple styles, and numerous vessel forms with different material characteristics. With so much variability, the question becomes how to examine them in a meaningful way? In previous research, Curet (1992a) analyzed a collection from multiple sites recovered from the valley of Maunabo using multi-dimensional scaling (MDS) techniques. With this technique, he was successfully able to attribute the various site assemblages to particular styles. While the study was successful in establishing socio-temporal associations based on clustering of diagnostic attributes, it had the unintended consequence of overlooking some of functional dimensions of vessels and the implications of various forms for interpreting social activities at the level of the residential settlement.

To address this issue, I evaluate the pottery collection through a comparative examination of techno-functional elements from each site to tease out, to the extent possible, activities related to pottery production and use. While regional variability exists in the manufacture of various styles, potters generally followed certain rules in the production of pots in specific space-time contexts. These rules included the construction of particular forms, design elements, clay recipes, and surface finishing techniques. Research conducted by Garrow & Associates at the sites of PO-21 (Espenshade *et al.* 1987), PO-38 (Weaver *et al.* 1992), and PO-39 (Garrow *et al.*1995), Robinson's work at El Bronce (1985:F1-F48), and more recent work in Arecibo by Southeastern Archaeological Research (2008) serve as points of methodological reference for the present analysis.

In contrast to a sherd-based analysis, I focus on the collection of data related to the manufacture, form, and ultimately function of vessels. To accomplish this, sherds were combined to form lots representing individual vessels. Vessel based-analysis compresses the data in such a way as to alleviate some of the issues associated with analytical disparities in quantification based on sherd count or weight as primary variables of representation. This method is useful for extrapolating the number of vessels within the assemblage, or Minimum Number of Vessels (MNV), and provides a better framework for understanding the function of pots within the use contexts of living peoples (Braun 1980, 1983; Deal 1983, 1998; Hally 1984, 1986; Rice 1987). Quantification of the assemblage in this way lends itself to evaluating other dimensions of residential settlements. For instance, Espenshade (2000) in Puerto Rico and Varien and Mills (1997) in the American Southwest successfully used MNV to model artifact accumulation rates to refine estimates of site population and duration of occupation. I utilize the sample of pottery recovered from PO-42 and PO-43 in a similar manner in Chapter 8 of this work.

The pottery collection consists of 1,688 sherds from 11 sites (10.4 kg). The majority of sites yielded modest amounts of pottery (barring PO-42 and PO-43) and sherds are generally limited in size with 88% of the collection falling between 2 and 6 cm in diameter. Initial examination identified cross-mends within each shovel test. During this process, sherds less than 1 cm in diameter were counted, weighed, and removed from the sample, as these are generally too small to yield reliable data related to vessel form or style. Concluding the identification of mendable sherds (with cross-mended fragments counting as one), 1,332 sherds remained and were subject to further study. During initial sorting, I quantified sherd types to get a sense of the composition of the overall assemblage and that from each site (Table 6-1).

I then sorted sherds from within each shovel test unit into vessel lots to estimate the MNV for each site. Lots were formed by grouping sherds that potentially belong to the same vessel through establishing cross-mends and/or similarities in surface treatment and paste. As shovel testing occurred at distances over 12.5 m, I assumed that sherds of the same vessel were not distributed across shovel tests.

Table 6-1. Sherd type frequencies of vessel portions by site (isolates excluded).

	Site PO-											
Sherd Type	42	43	45	46	47	48	49	50	51	52	53	Total
Bases	9	9	0	0	1	0	0	3	0	0	1	23
Buren	7	8	0	0	1	1	0	0	1	13	1	32
Handles	9	6	0	0	0	1	0	0	2	0	0	18
Body Sherds	443	390	7	4	24	59	4	34	47	39	23	1070
Rim	65	68	1	0	6	5	1	8	9	6	4	172
Shoulder	5	9	0	0	1	0	0	1	0	0	1	16
Total	538	490	8	4	33	66	5	46	59	58	30	1332

Nine hundred and forty unique vessel lots (excluding isolated finds) were created from the assemblage (Table 6-2). Each lot was analyzed separately for several variables including paste type, wall thickness, temper size and abundance, surface and interior treatments, surface color, rim and lip characteristics (if present), vessel orientation (where available), vessel type, and style (if possible). The raw data for the analysis is in Appendix D.

Table 6-2. Minimum number of vessels (MNV) for each site (isolates excluded).

Site	Total Number of Sherds per Site	MNV
PO-42	538	344
PO-43	490	366
PO-45	8	6
PO-46	4	4
PO-47	33	31
PO-48	66	53
PO-49	5	2
PO-50	46	31
PO-51	59	26
PO-52	58	51
PO-53	30	26
Total	1332	940

First impressions of the pottery assemblage indicated the predominance of non-Saladoid styles for all sites based on several factors including the coarseness of surface finish and paste, wall thickness, and the general lack of paint or slip. In general, the collections from all sites share the following characteristics:

- Smoothed and semi-burnished sherds prevail within the assemblage accounting for 80% of the total collection.
- Evidence of red slip or painting is limited. The majority of the pottery is plain and undecorated. Red slip and paint are strongly associated with Hacienda Grande, Cuevas, and Ostiones styles.
- Incised sherds are rare in the assemblage. Incision is a common decorative technique in Santa Elena and Modified Ostiones pottery styles as well as those associated with the Chican Ostionoid subseries.
- Anthropomorphic lugs or adornos are non-existent, and are common among Late Ostionan and Chican Ostionoid styles.
- Paste is predominately medium to medium-coarse. Coarser pastes are typically associated with the post-Saladoid pottery styles (Curet 1997).
- Based on vessel size, form, and evidence for post-firing heat attrition, most of the pots appear to have been used for cooking and serving.
- Handles are largely absent from the assemblage. Handles are common in Saladoid and Ostionan Ostionoid pottery styles.

Paste Types

The identification of paste types is useful for understanding the exploitation of different clay resources for manufacturing vessels. Paste types in this research conform to those identified in petrographic studies of pottery from Río Tanama and Roosevelt Roads by Ann Cordell (SEARCH 2008, 2011). Cordell (SEARCH 2008:261-271) identified eight types to characterize pottery from the island. These include fine, medium, and coarse felsic, quartz, volcanic, mafic[2], limestone, partially vitrified, and mixed felsic pastes.

[2] Mafic pastes were absent from the collection, although mafic constituents comprised a small proportion of specimens with felsic and volcanic pastes.

Felsic paste contains granitic rock fragments, quartz, and feldspar grains. The various felsic pastes types noted by Cordell were compressed into a single felsic category as temper size was documented separately. Quartz paste is primarily composed of quartz grains with lesser quantities of felsic and volcanic constituents. Volcanic paste has volcanic rock fragments often with small quantities of mafic inclusions. Felsic, volcanic, and quartz constituents are naturally occurring in the local clays of the south-central coast foothills where underlying igneous volcanic rocks predominate (Gierbolini 1978).

Limestone paste consists of naturally occurring calcareous fragments with lesser amounts of felsic and/or volcanic constituents. Clays with calcareous constituents are found on the coastal plains and in karstic regions of the island where sedimentary rocks composed of concreted marine shell form. Vitrified pastes are characterized by a "frothy, partially vitrified (glass-like) matrix" (SEARCH 2008:271) where vitrification likely represents repeated high temperature firing events (SEARCH 2008). Other categories were created to document a limited number of sherds with grog and/or shell additives. Based on the local geology (Pico 1974), and soil composition of the foothills (Gierbolini 1978), it was expected that vessels would consist primarily of felsic and volcanic clays with a limited number of specimens possessing quartz and limestone pastes.

Paste types were identified for each lot through an examination sherd profiles under 10x magnification (Table 6-3). Vessel lots with felsic (n=490) and volcanic (n=343) pastes compose 89% of the total sample with quartz paste (n=49) composing 5%. The balance of the assemblage comprised a limited number of limestone pastes and pastes with shell or grog additives.

Table 6-3. Temper type frequencies for vessel lots by site.

	Site PO-											
Paste Type	42	43	45	46	47	48	49	50	51	52	53	Total
Volcanic (n=343)	98	164	0	0	15	29	0	7	12	12	6	343
Quartz (n=49)	28	15	0	1	1	1	0	2	0	0	1	49
Limestone (n=6)	4	1	0	0	0	0	0	1	0	0	0	6
Felsic (n=490)	208	145	5	3	14	22	2	20	14	39	18	490
Vitrified (n=3)	0	3	0	0	0	0	0	0	0	0	0	3
Limestone/Grog (n=27)	0	26	1	0	0	0	0	0	0	0	0	27
Felsic/Grog (n=14)	3	9	0	0	0	1	0	1	0	0	0	14
Volcanic/Shell n=2)	0	1	0	0	0	0	0	0	0	0	1	2
Quartz/Shell (n=1)	0	0	0	0	1	0	0	0	0	0	0	1
Felsic/Shell (n=5)	3	2	0	0	0	0	0	0	0	0	0	5
Total	344	366	6	4	31	53	2	31	26	51	26	940

Vessels from PO-42 consist of 60% (n=208) felsic, 28% (n=98) volcanic, and a small number of specimens with quartz paste (n=28). Pottery from PO-43 was more evenly distributed with 42% (n=145) of the assemblage composed of felsic and 44% (n=164) of volcanic pastes. PO-43 also contained a small number (n=26) of sherds with calcareous limestone inclusions mixed with grog.

Paste types documented for the balance of the sites are similar to PO-42 and PO-43 with felsic and volcanic constituents dominating the collection. Paste types at PO-47, PO-48, and PO-51 are somewhat evenly distributed between volcanic and felsic pastes whereas lots from PO-49, PO-50, PO-52, and PO-53 are mainly felsic pastes. The rest of assemblage consists of a limited number of specimens with quartz, limestone, and felsic pastes mixed with shell or grog. Vessel lots with pastes other than volcanic, quartz, or felsic types are rare in the collection and do not appear to represent dominant paste recipes for producing pottery in this locality. In all, the preponderance of felsic and volcanic pastes meets expectations for the use of local clay resources.

The presence of few lots with limestone paste indicates some level of interaction with extra-local settlements and/or infrequent use of non-local clay resources. The sourcing of clays to examine exchange, interaction, and population movement in the region has yet to be explored. However, the prevalence of felsic and volcanic paste types noted in the TASP collection strongly suggests that potters focused on the acquisition and use of immediately available clay resources for pottery manufacture.

Temper Size

Temper size also provides clues to the pottery assemblages. While temper size may represent functional differences in vessel performance and use (Rice 1987:226), the variability in temper size in Puerto Rico is often an indicator of style. As noted in previous studies, Saladoid and early Ostionan Ostionoid wares tend to consist of finer pastes with few aplastic inclusions, while later styles tend to have more and coarser inclusions. This is obvious in Santa Elena and Esperanza pottery that commonly contain medium-coarse and coarse aplastic inclusions. Other incidences of coarse tempered pottery are noted for *burens* which typically have aplastic inclusions over 1 mm (*e.g.,* Espenshade 1987; Garrow.*et al.* 1995, SEARCH 2011a, 2011b).

Vessel lots were classified into four categories based on the size of the most abundant aplastic inclusions in the paste (Table 6-4). Size categories consist of fine (<.25 mm), medium (.26-.5 mm), medium coarse (.6-1.0 mm), and coarse (1.0-2.0 mm) grains (Table 6-4). Initial examination of temper frequencies suggested a preference for pastes with medium to medium coarse aplastic inclusions. Medium sized temper (.25 - .5 mm) predominates with 53% (n=485) of the total sample falling into this category. Following this, are samples with medium-coarse (.5 - 1.0 mm) pastes comprising 31% (n=293) of the total assemblage.

Table 6-4. Temper size frequencies for vessel lots by site.

Site	None	Fine (0-.25mm)	Medium (.26-.5 mm)	Medium Coarse (.6-1.0mm)	Coarse (> 1mm)	Total
PO-42	0	30	182	126	6	344
PO-43	4	96	177	83	6	366
PO-45	0	0	5	1	0	6
PO-46	0	0	3	1	0	4
PO-47	0	5	17	8	1	31
PO-48	0	0	43	10	0	53
PO-49	0	0	0	2	0	2
PO-50	0	1	11	16	3	31
PO-51	0	2	11	13	0	26
PO-52	0	1	23	24	3	51
PO-53	0	1	13	9	3	26
Total	4	136	485	293	22	940

Fine tempered (≤.025 mm) pottery was documented from seven sites (PO-42, PO-43, PO-47, PO-50, PO-51, PO-52, and PO-53) but in small quantities (n=136, 14%). The remaining 2% of the assemblage consists of coarse (n=22) and non-tempered vessels (n=4). The coarse tempered (1.0 – 2.0 mm) vessels are primarily associated with *buren* fragments. Non-tempered (*i.e.,* fine grained sand) vessels are present in four specimens from PO-43 and appear to be associated with Cuevas or Pure Ostiones style—supported by wall thickness and evidence for painting/slipping on some of the lots. Fine tempered (0-.25 mm) specimens from PO-42, PO-43, PO-47, PO-50, PO-51, PO-52, and PO-53 suggests a minor Cuevas or Pure Ostiones component at these sites—albeit limited. Based on temper size lot frequencies, pottery from all sites appears to primarily consist of post-Saladoid styles.

Wall Thickness

Wall thickness often relates to vessel size and its intended function. For instance, larger vessels usually require thicker walls for stability and structural support. As a consequence, thick vessels require more energy to heat but retain heat longer (Rice

1987). In contrast, thin walled vessels transmit heat to the vessel contents quickly. Most utilitarian vessels of a given pottery style tend to conform to a range of specified sizes and therefore thickness can also correspond to traditions in pottery manufacture (SEARCH 2008; SEARCH 2011a, 2011b). In fact, Rouse documented distinctive associations in sherd thickness and pottery styles particularly between Saladoid, Elenan, Ostionan and Chican Ostionoid assemblages (1952).

To examine wall thickness, measurements for lots were compressed into 15 size categories ranging from ≤5 mm to ≥18.1 mm. Thickness was calculated by taking the mean measurement of all body and rim sherds[3] within each vessel lot. Sites possessing less than 25 lots were omitted from examination because they were, based on sample size, deemed unable to yield meaningful intra- and inter-site trends. Eight sites were examined for sherd thickness including PO-42, PO-43, PO-47, PO-48, PO-50, PO-51, PO-52, and PO-53 (Figure 6-1).

In the case of PO-42, 45% (n=153) of the site sample is within the 6 to 8 mm range with 27% (n=91) between 6.1 and 7 mm. PO-43 is similar with 44% (n=159) of the site sample between 6.1 and 8 mm and 26% (n=94) between 6.1 and 7 mm. Vessel thickness of the PO-47 sample is also high in this range with 55% of the site sample between 6.1 and 8 mm of which 29% is between 7.1 and 8 mm. The overall pattern for thickness (as well as temper size) for these three sites indicate strong similarities in the pottery assemblages. Several other sites exhibit peaks in these size ranges including PO-48 (40%), PO-51 (50%), PO-52 (31%), and PO-53 (27%). Peaks in the relative percentages within this range are most common for Ostionan and Capá styles.

[3] Measurements on rims taken approximately on the body portion of the sherd 3 cm below the rim.

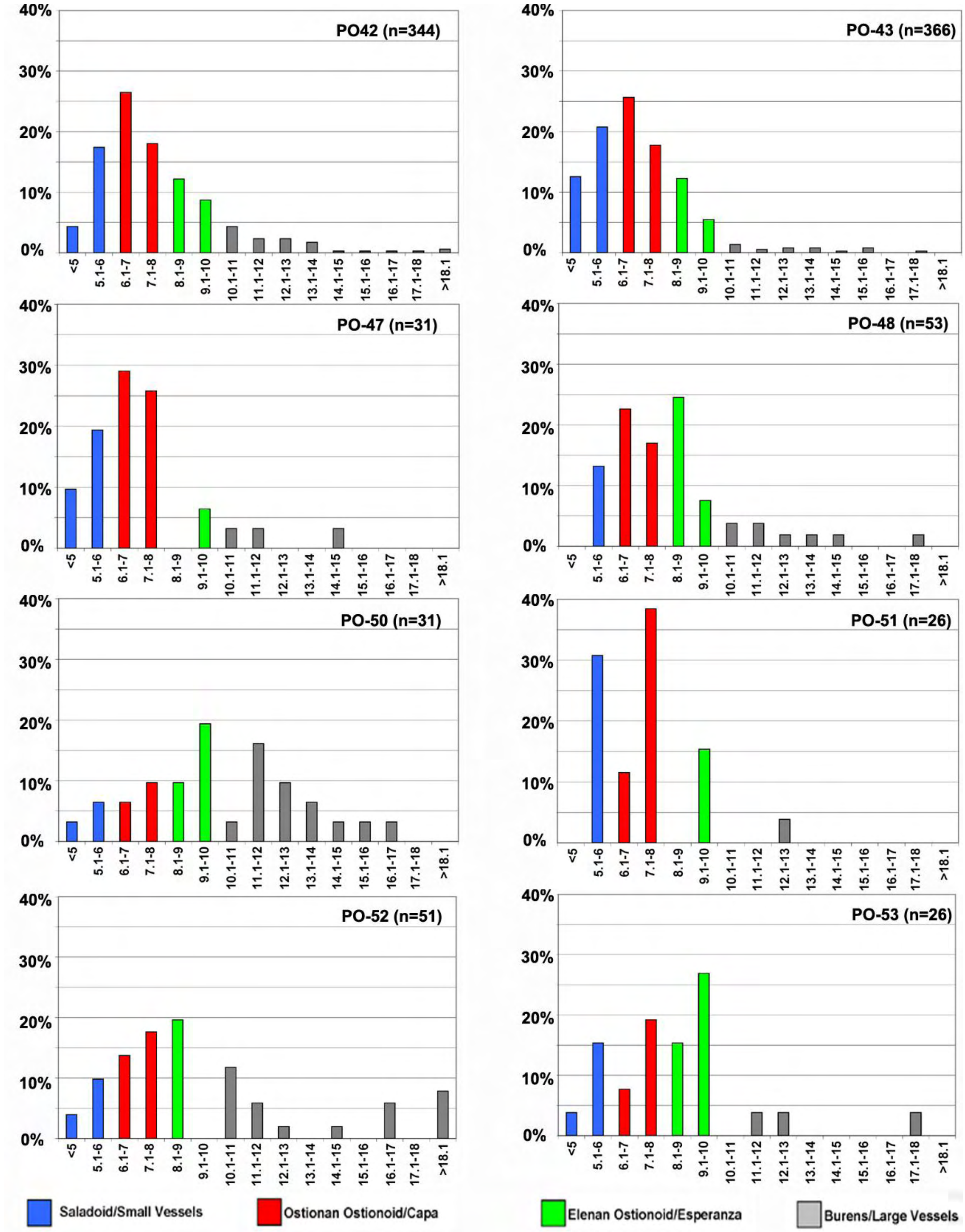

Figure 6-1. Vessel lot thickness for eight sites

In the case of PO-48, PO-50, PO-52, and PO-53 the highest frequencies of sherds are in the 8-10 mm range which is generally associated with Santa Elena and Esperanza styles. The sample from PO-48 shows a bimodal distribution with 23% of the lots ranging between 6 and 7 mm and 25% between 8 and 9mm suggesting a mixed Ostionan Ostionoid/Capá and Santa Elena/Esperanza style assemblage.

Several sites (PO-42, PO-43, PO-48, PO-50, PO-52, and PO-53) have lots greater than 15 mm and are likely associated with large vessels and *buren* fragments. The total sample also has a number of specimens falling in the lower end of this spectrum which indicates the presence of small vessels and/or Saladoid style pottery. However, the due to the overall high indices of vessel lots with thickness ranges between 7 and 10 mm generally indicate post-Saladoid assemblages. The presence of many sites with high frequencies of vessels in multiple size ranges also may be indicative of stylistic change through time and/or potential coeval mixing of styles.

Rim Morphology and Vessel Form

One-hundred and eighty five lots with rims were recovered from 11 sites (Table 6-5). Lots possessing at least 5% of the rim were profiled and orifice diameter measured. Seventy-five percent of the rim fragments were, not surprisingly, recovered from sites PO-42 (n=68) and PO-43 (n=71). Examination of the rim sherds from all sites revealed forms described by Rouse (1952:337). Rim forms are characterized by types that have parallel (n=115, 62%) interior and exterior walls to the lip. Parallel rims are common in post-Saladoid assemblages, particularly late Ostionoid styles. The second most frequent type in the sample are thinned rims (n=28, 15%) in which the interior and exterior walls taper to the lip—characteristic for late Ostionan and Chican Ostionoid pottery (Rouse 1952). Rims with thickened interior and exteriors are also present in the total collection but in smaller proportions (n=11, 6%) and appear to be Santa Elena style. These observations support those made in the previous discussions of temper size and wall thickness that indicate the assemblages are primarily post-Saladoid.

Table 6-5. Rim form frequencies by site.

	Site PO-											
Rim Definition	42	43	45	46	47	48	49	50	51	52	53	Total
Flat-In Platformed	0	0	0	0	0	0	0	0	0	0	1	1
Indeterminate	3	4	0	0	2	1	0	0	0	0	1	11
Parallel	41	54	0	1	0	2	0	6	7	2	2	115
Thickened Ext. Angular	1	0	0	0	1	0	0	0	0	0	0	2
Thickened Ext. Round	2	2	0	0	0	0	0	0	0	0	0	4
Thickened In Angular	2	0	0	0	0	0	0	0	0	0	0	2
Thickened In Round	7	1	0	0	0	1	0	0	1	1	0	11
Thickened In/Ext	1	4	1	0	0	1	2	1	0	1	0	11
Thinned	11	6	0	0	3	1	0	1	1	3	2	28
Total	68	71	1	1	6	6	2	8	9	7	6	185

Vessel forms and types were determined from rim orientation, orifice diameter, and extant portions of lots with non-rim body sherds that indicated vessel form (*e.g.,* carinated shoulders, rounded shoulders). Particular vessel types were then postulated based on commonly occurring types documented from the region (Figure 6-2). While not representing the full range of vessel types for all periods, these generalized types offer a useful heuristic for inferring vessel form and function.

Vessels consist of globular and composite types for restricted forms and hemispherical, shallow, outflaring, and two open bowl types (convex out and vertical) for unrestricted forms. A small number of other specialized vessel types are also represented including jars, *buren*/griddles, plates, and oval dishes. Variability in size noted within types indicates potential differences in function—as observed in recent studies (Espenshade 2000; SEARCH 2008, 2011b). In general it is assumed that both medium to larger sized pots were likely used for cooking or serving while smaller ones may have been used for storage of powders, seeds, herbs (Rowe 2011) or for personal food consumption.

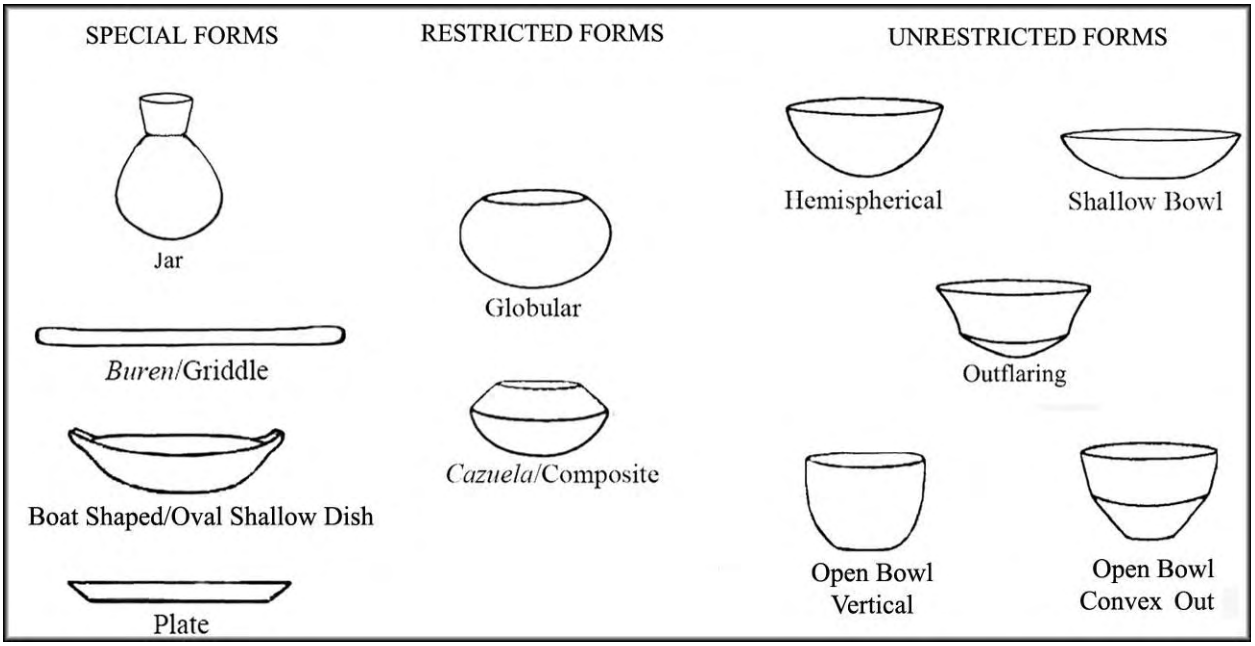

Figure 6-2. Commonly occurring vessel forms.

One hundred and sixty-one vessel lots from 11 sites were attributed to a particular vessel form and type (Table 6-6). Variability in documented vessel types suggests diversity in activities conducted at each site. Obviously, this diversity relates, to some degree to the size of the site samples. For instance, PO-42 and PO-43 have the greatest diversity in vessel types represented (11 for each) indicating a wide range of functional activities. PO-51 possesses six different types with five documented at PO-50 and PO-47. PO-48 and PO-53 each possess four different types of vessels and each with *buren* specimens. PO 53 contains three different vessel types and PO-45 and PO-46 each have one vessel type. Despite the relatively large sample of pottery fragments collected from PO-52, only three vessel types were identified. Of these 13, *burens* were documented. A discussion of the various vessel types and their function is provided in the following sections.

Table 6-6. Frequency of vessel types by site.

Vessel	42	43	45	46	47	48	49	50	51	52	53	Total
Restricted Forms												
Composite	6	5	0	0	0	1	0	0	0	0	0	12
Globular	4	5	0	0	1	0	0	1	1	0	1	13
UID Restricted	6	5	0	0	1	0	0	0	0	3	0	15
Unrestricted Forms												
Hemispherical	8	12	0	0	1	0	0	0	2	0	2	25
Open Bowl Convex Out	5	5	0	0	0	1	0	0	0	0	1	12
Outflaring	2	0	0	0	1	0	0	1	0	0	0	4
Shallow Bowl	1	1	1	0	0	0	0	2	1	0	0	6
Open Vertical	6	7	0	1	0	0	1	1	1	0	0	16
Specialized Forms												
Buren	8	8	0	0	1	1	0	0	1	13	1	33
Jar	2	6	0	0	0	0	0	0	0	0	0	8
Plate	8	2	0	0	0	1	0	1	2	1	0	15
Navicular/Oval Dish	0	2	0	0	0	0	0	0	0	0	0	2
Total	56	58	1	1	5	4	1	6	8	17	5	161

Restricted vessels (n=40) narrow between shoulder and rim with the maximum body diameter exceeding the orifice diameter. Restricted vessels consist of two types: globular and carinated or composite/*cazuela* bowls. Globular bowls are spherical and gradually in-curving from the shoulder to the rim. In contrast, composite bowls are acutely angled inward with carinated or keeled shoulders. Both types have interior walls orientated less than 90 degrees above the shoulder, causing a restriction of the vessel orifice. Rim sherds, where orientation could be determined but no orifice and/or characteristics of the shoulder could be identified, were classified as indeterminate restricted vessels.

Restricted vessels are good for storage and heat retention. These vessels also limit access to the contents, permit a higher degree of control during transport (Hally 1986), and reduces spillage during cooking (Espenshade 2000). Restricted bowls tend to be more frequent in non-Saladoid styles (Rouse 1952; also see SEARCH 2008, 2011a, 2011b for case studies).

Restricted forms are registered at eight of the 11 sites and from the 40 vessels, 13 are globular, 12 composite, and 15 indeterminate (Figure 6-3). PO-42 and PO-43 constitute 77% of the total sample of restricted forms with globular and composite types in somewhat equal proportions between the two sites. Three restricted vessels also were recovered from PO-52, two from PO-47, and single specimens from PO-48, PO-50, PO-51, and PO-53.

Out of the 40 restricted vessels, the sizes for 27, from six sites, could be determined (Figure 6-4). Using orifice diameter as a proxy for vessel size a variety of functional types becomes apparent. Vessel sizes range from 6 cm to 34 cm. PO-42 and PO-43 display the greatest range, with 6 cm to 24 cm for PO-43 and 10 cm to 34 cm for PO-42. Vessels from all other sites cluster between the 10 cm and 14 cm range (mode of 12 cm). Medium and larger sized vessels would have been good for cooking pepper-pot style soups, for which heat retention and controlled access of the contents would be useful.

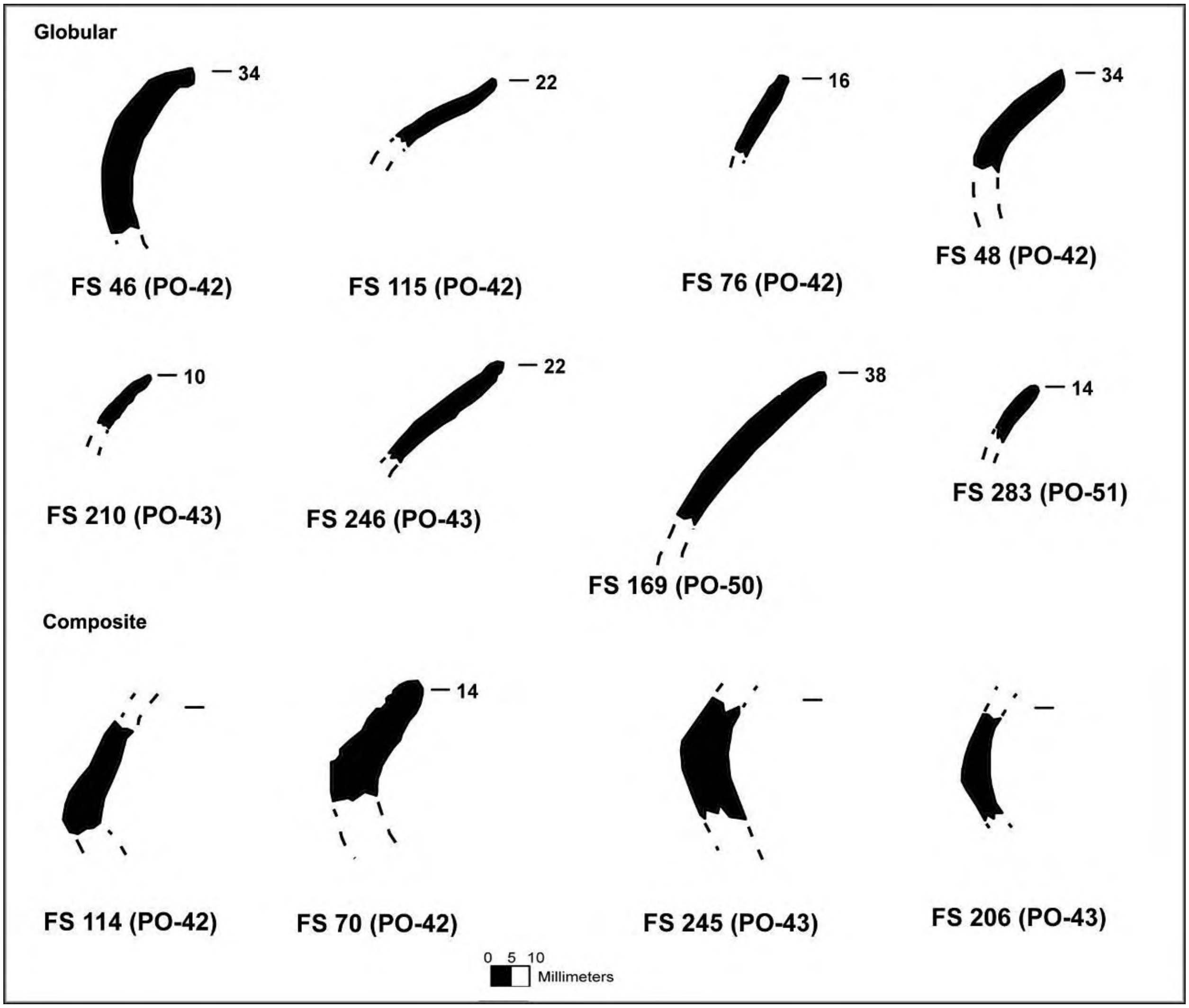

Figure 6-3. Examples of restricted vessel types.

Large vessels (≥ 16 cm) were documented from PO-42 and PO-43 with the largest coming from PO-42 measuring 34 cm in diameter. Large vessels would be able to accommodate large fish, birds, and iguanas that were noted as part of the indigenous diet by contact-period chroniclers (Martyr D'Anghera 1964). These large vessel sizes may also indicate the preparation of communal meals. Smaller vessels (≤ 10 cm) are almost exclusive to PO-43. These vessels may indicate small cups or bowls for personal food consumption or storage.

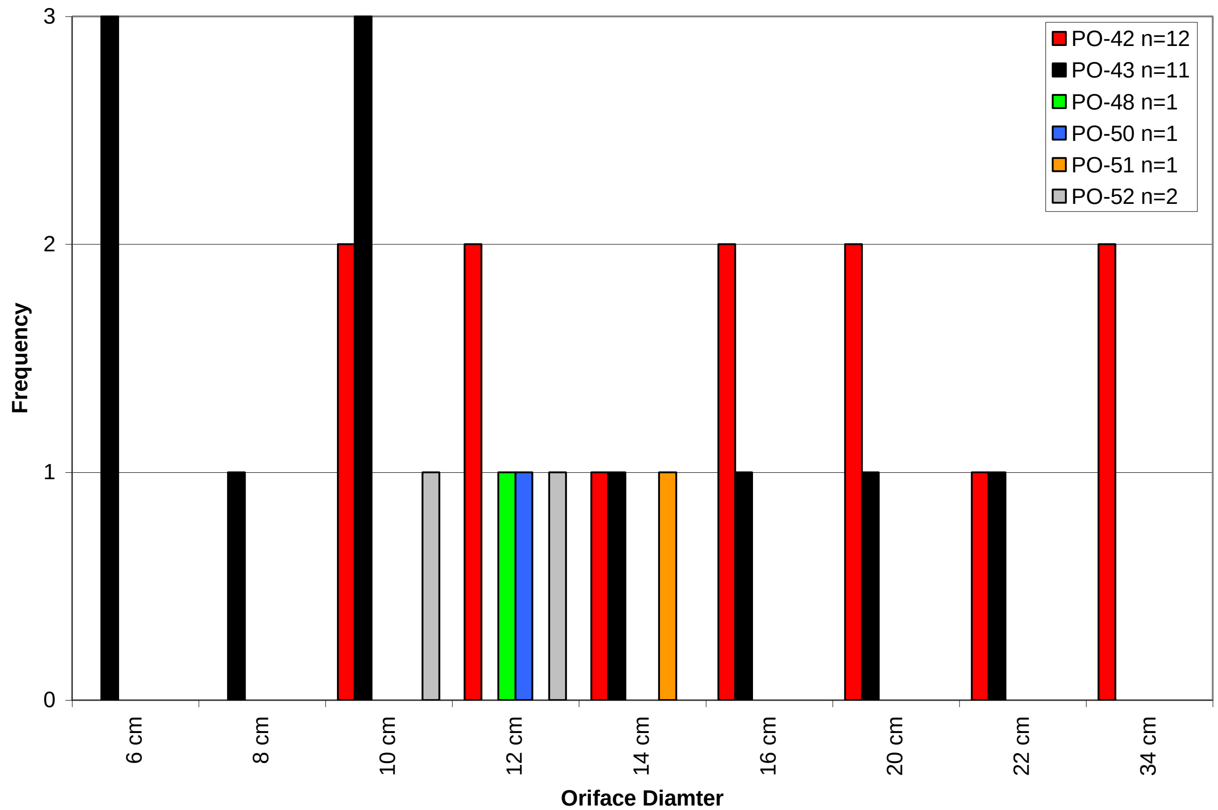

Figure 6-4. Documented vessel sizes for restricted forms.

Unrestricted vessels (n=63) are oriented straight out, convex vertical, convex out, and outflaring (Figure 6-5). Interior walls angle from 90 to 130 degrees. Unrestricted vessels offer access to contents and are good for serving (Rice 1987: Table 7.2); however, they retain heat poorly and do not allow for as much control of the contents as unrestricted forms. Unrestricted forms dominate the TASP pottery collection with 63 specimens identified from 10 sites. Thirty-four percent of these were recovered from PO-42 and 39% from PO-43 (Table 6-6).

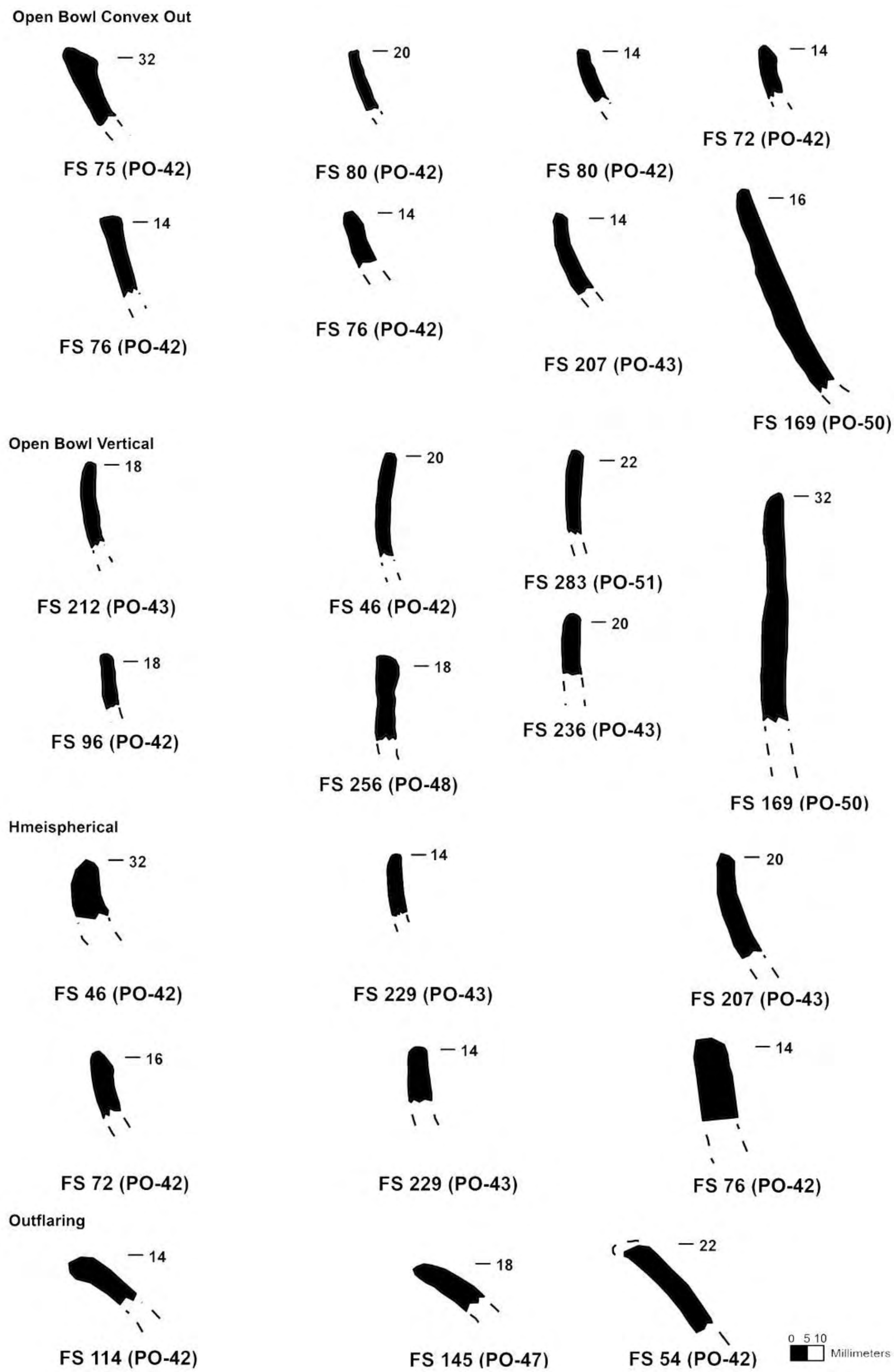

Figure 6-5. Examples of unrestricted vessel types.

The primary unrestricted type is hemispherical bowls (n=25). Like globular vessels, hemispherical types are spherical in shape; however, the orifice is along the central axis of the sphere as opposed to the top. Hemispherical types generally produce rim profiles that are convex vertical with the interior wall curving gradually to vertical from the base to the orifice. Unlike vertical vessel types, only a small portion of the rim is vertical where the vessel orifice terminates at the central axis of the sphere. Hemispherical vessel forms are common in Ostionan Ostionoid pottery assemblages and occurring in smaller frequencies in the Santa Elena and Esperanza pottery styles (Rouse 1952).

Open bowls with vertical walls constitute the second most frequent vessel type with 16 specimens identified from 5 sites. These types have rim orientations of approximately 90˚ with no discernible curvature evident. PO-42 and PO-43 possess 6 and 7 vessels respectively of this type accounting for 81% of those recovered. Single specimens of this type were also collected from PO-46, PO-49, PO-50, and PO-51.

Convex out bowls have a rim form that curves outward with straight parallel interior and exterior walls near the lip. These vessels are generally characteristic of large open bowls. Twelve specimens were identified from four sites including PO-42, PO-43, PO-48, and PO-53. Outflaring bowls constitute a small portion of the assemblage with only four recovered from three sites PO-42, PO-47, and PO-50. Rim forms of this type open gradually from the central axis or keel forming a small outflaring platform at the orifice. Outflaring vessels are generally associated with Saladoid style pottery.

Of the 63 unrestricted vessels identified in the collection, sizes for 36 (excluding shallow bowls) are presented in Figure 6-6. Unrestricted forms range in size from 8 cm to 38 cm with the majority of vessel lots clustering to medium size bowls between 14 cm and 18 cm, a pattern similar to that observed for the restricted forms. As with the restricted forms, PO-42 exhibits the widest range in distribution from 10 cm to 32 cm. Similar to the pattern of restricted vessels exhibited at PO-43 are the presence of smaller vessels which may indicate pots for personal use.

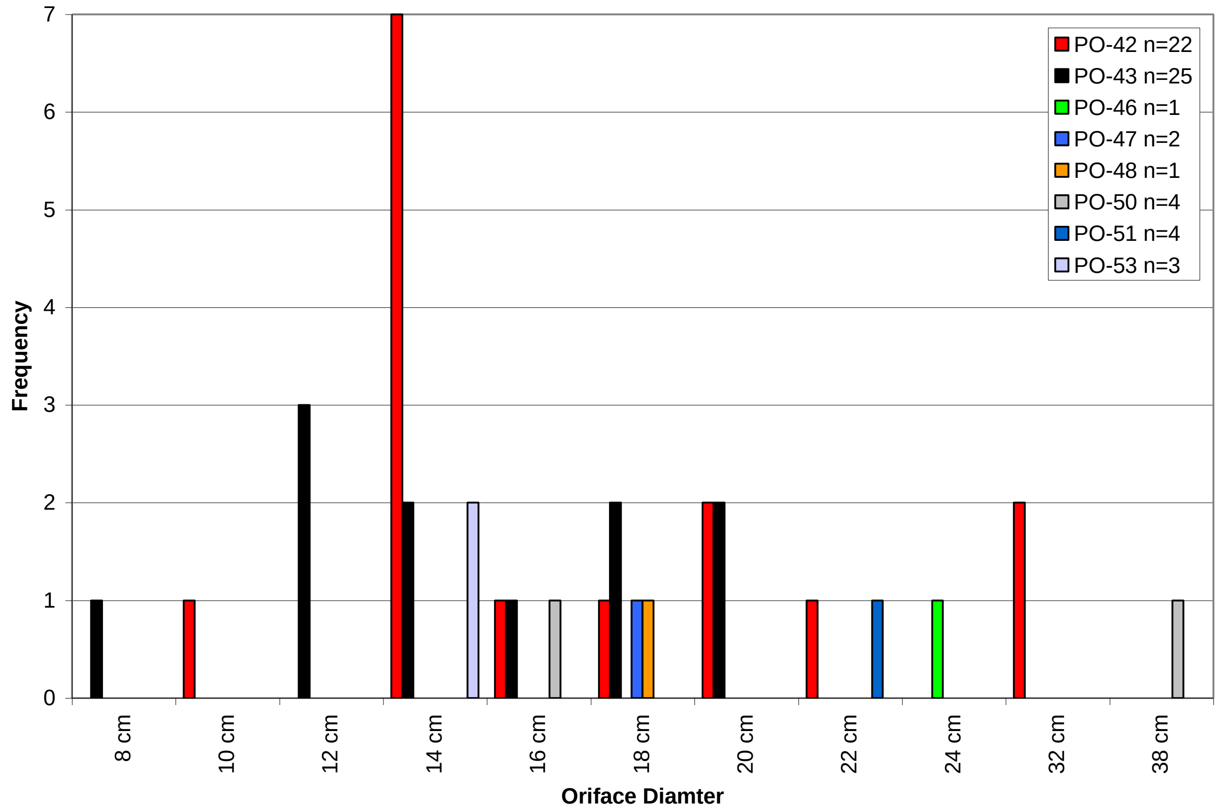

Figure 6-6. Documented vessel sizes for restricted rim forms (not including shallow bowls).

Unique among the unrestricted vessel types are shallow open bowls (Figure 6-7). These vessels differ from the others previously discussed, because of their shallow nature they have limited volume capacity and would not be particularly useful for cooking. Six shallow open bowls are present from 5 sites with single specimens coming from PO-42, PO-43, PO-46, PO-47, PO-48, PO-51 and PO-53 and two from PO-50. These vessels range from medium to large from 14 cm to 32 cm. with the largest collected from PO-43. No smaller specimens under 14 cm are present in the collection. Smaller bowls may have been used for personal consumption, while larger shallow bowls may have been used for presenting communally served meals.

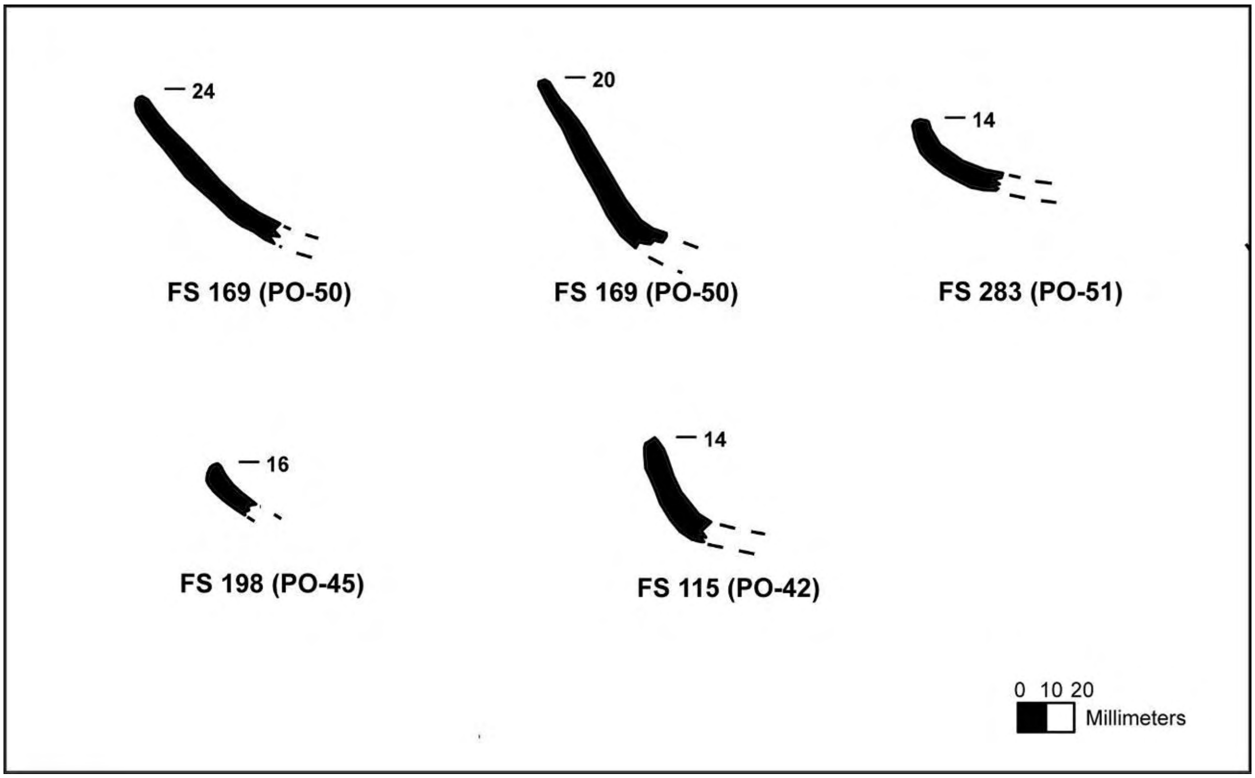

Figure 6-7. Examples of shallow bowls.

Specialized vessel forms (n=58) were identified in the assemblages and do not fall within the general restricted or unrestricted categories. These types include plates, jars, oval dishes and *burens*/griddles.

Fifteen plates were recovered from six sites. This vessel type has a rim orientation that is straight out with straight interior walls at an angle between 130 and 180˚ (Figure 6-8). Half of the plates were recovered from PO-42 (n=8) with two plates recovered from both PO-43 and PO-52. Single specimens were also registered at PO-48, PO-50, and PO-52 respectively. Plate diameters range from 14 cm to 22 cm—too small to be *burens* despite the thickness of several specimens. Plates would have been used to serve non-liquid items such as meats, fish, or casva bread. Recent research suggests the plates may have also been utilized as *cohoba* trays (SEARCH 2011a; Oliver 1990).

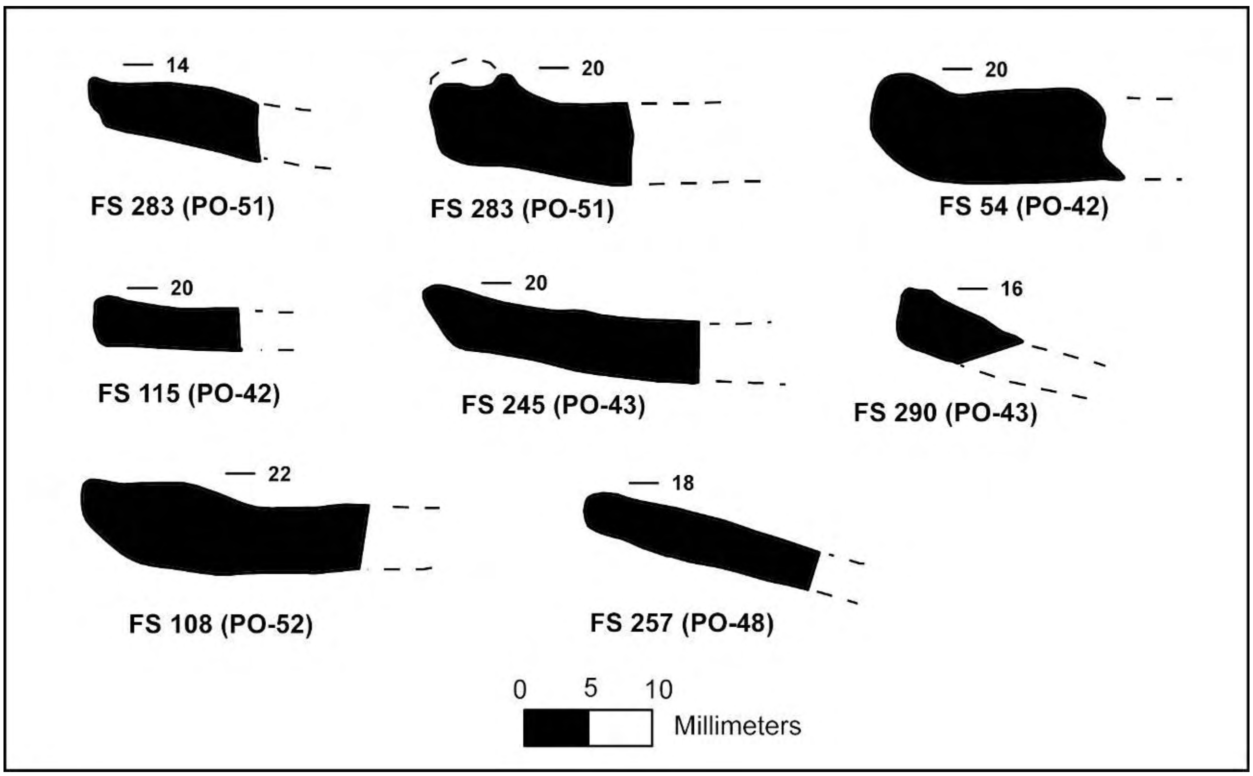

Figure 6-8. Examples of plates.

Narrow orifice vessels ($\leq$ 10 cm) were registered from two sites (PO-42 and PO-43) and posses straight vertical rim orientations. While no portion of the vessel below the neck was present, the small orifice diameter and orientation of these rims suggest they are jars. Jars are good for storage which limit access to the interior and facilitate containment of the vessels contents. Jars are also good for transporting materials where potential spillage is an issue. It is assumed that jars were not utilized for cooking. Jars are largely absent in Santa Elena style, but are common in Chican Ostionoid assemblages (Rodríguez López 1989; Rouse 1952).

Two oval dishes were found at PO-43. This type of vessel, found in other sites in Puerto Rico and is primarily associated with late Cuevas and Ostionan Ostionoid assemblages (Goodwin and Walker 1975). These vessel types in Ostiones assemblages typically possess strap handles above the rim at either end of the vessel similar in form to a boat. Cuevas forms often have tabular handles that are semi-lunate in shape. The tabs have identifiable rim points. Two fragments, from separate vessels were collected from PO-43. These sherds have no evidence of surface attrition from heat and are consistent with other vessels of this type documented from other sites on the island (*e.g.* SEARCH 2008). These vessels are assumed to have been used for serving.

Despite limited mention of vessel types in ethnohistoric documents, griddles or *burens* are frequently discussed (Las Casas 1951 40-41; Oviedo y Valdes 1959:232). Burens are generally flat and circular in shape (averaging about 50 cm in diameter) with rough exterior surfaces (bottoms) and smoothed interiors (tops). They are typically thick, often exceeding 14 mm, with coarse paste containing large aplastic inclusions (>

1 mm). Thirty-three *buren*/griddles were identified in the assemblage (Figure 6-9). Their function is conventionally associated with cooking cassava bread however; recent research has demonstrated that they also were used to cook or prepare an array of foodstuffs including maize, sweet potato and fish (Pagán Jimenez 2009; Rodríguez Suarez and Pagán Jiménez; Vanderveen 2009).

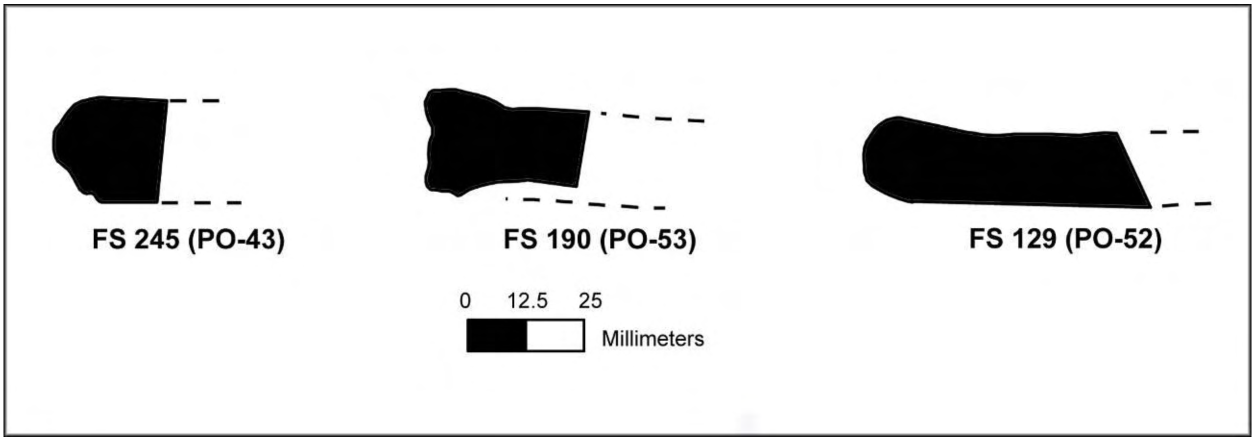

Figure 6-9. Examples of *burens*.

Buren fragments identified from seven sites and represent less than 1% of the total assemblage by count (but 16% of the total assemblage by weight). Approximately 50% of these *buren* lots (by count) were recovered from PO-42 (n=8) and PO-43 (n=8) with 78% by weight (1.2 kg) and 39% by count (n=13) from PO-52. The *buren* collection is fragmented and intact rims are limited. In most cases, the *buren* specimens were too fragmented to ascertain their diameter. Thickness of the *buren* sherds in the collection range from 11 mm to a very thick specimen recovered from PO-43 measuring 32 mm (mean 17.5 mm, Std. 4.6). No decorated *buren* fragments, often documented in Ostiones sites (Robinson 1985; Rouse 1952:343; Rainey 1940 19, 24), were identified.

The identification of *burens* is important because they denote, perhaps more than any other vessel type, activities associated with domestic habitation. Owing to their size, weight and friable nature *they are not easily transportable*. Their general association with processing manioc and other food stuffs indicates non-expedient food preparation indicative of relatively sedentary domestic occupation activities.

Surface Finish and Diagnostic Elements

Surface finish refers to the method by which a vessel is smoothed and evened during and after shaping (Rice 1987:136-138). Paint is typically considered an additive decorative element but is also considered here. Seven categories of surface treatment were recorded for each vessel lot. These included evidence for smoothing, smoothing/floating (or self-slipped surfaces), smudging, burnishing, slipping, painting and lots lacking identifiable surface treatment (SEARCH 2008:273) (Table 6-7).

Table 6-7. Surface finishing frequencies for sherds by site (based on vessel exteriors).

	Site PO-											
Surface Treatment	42	43	45	46	47	48	49	50	51	52	53	Total
Smoothed	169	168	2	2	10	34	2	24	10	32	17	470
Floated/Self-Slipped	49	77	1	1	2	5	0	0	5	4	1	145
Smudged	0	7	0	0	1	0	0	0	1	0	0	9
Burnished	45	19	3	0	7	5	0	3	3	3	3	91
Slipped	32	44	0	0	7	3	0	0	4	1	1	92
Eroded/Battered	38	44	0	1	4	6	0	4	3	11	4	115
Painted	11	7	0	0	0	0	0	0	0	0	0	18
Total	344	366	6	4	31	53	2	31	26	51	26	940

Like many sites in the region, the majority of sherds recovered during the survey are plain undecorated wares. Examination of surface finish reveals 50% of the total assemblage is characterized by smoothing (n=470). Formal surface finishes in the collection are limited. Approximately 15% of the total assemblage has floated or self-slipped surfaces with the majority specimens from PO-42 and PO-43. A small number of self-slipped specimens also were recovered from PO-51. Burnished sherds account for approximately 10% of the assemblage. Smoothing, floating and burnishing leaves the surfaces fine-grained and smooth regardless of the coarseness of the paste, reducing permeability and leakage—serving both aesthetic and functional purposes (Schiffer and Skibo 1987).

Red paint and red/pink slips are diagnostic surface treatments primarily associated with Saladoid, Monserrate, and Ostiones styles. Forty-five lots were identified possessing red/pink slips in the assemblage. Red-slipped lots were identified from PO-42 (n=18), PO-43 (n=6), and PO-51 (n=1) with pink slipped specimens recovered from PO-42 (n=5), PO-43 (n=11), PO-47 (n=1), PO-48 (n=1), PO-51 (n=1), and PO-53 (n=1). Nineteen painted sherds were identified with 11 specimens from PO-42 and eight from PO-43. These specimens, while limited in number, suggest a minor Cuevas or early Ostionan Ostionoid component from these sites. As Cuevas pottery is now accepted to occur up to AD 1000 in other parts of the island, it is likely that these sherds may post date AD 600. No painted sherds were identified from the other sites.

Incised sherds were rare in the collection and only 19 specimens from seven sites were documented. While incision occurs in Hacienda Grande, and to a limited extent Cuevas vessels, no zone incised crosshatched specimens are present in the assemblage. The majority of incised specimens are severely fragmented and do not offer much insight to their stylistic association. However, three incised specimens are worthy of note (Figure 6-10). These consist of two specimens, from the same shovel test, at PO-42 (FS 70) and appear to be Capá style. Another specimen was recovered from PO-52 and is suggestive of Capá or Boca Chica style pottery (FS 52) (Elvis Babilonia personal communication, 2011).

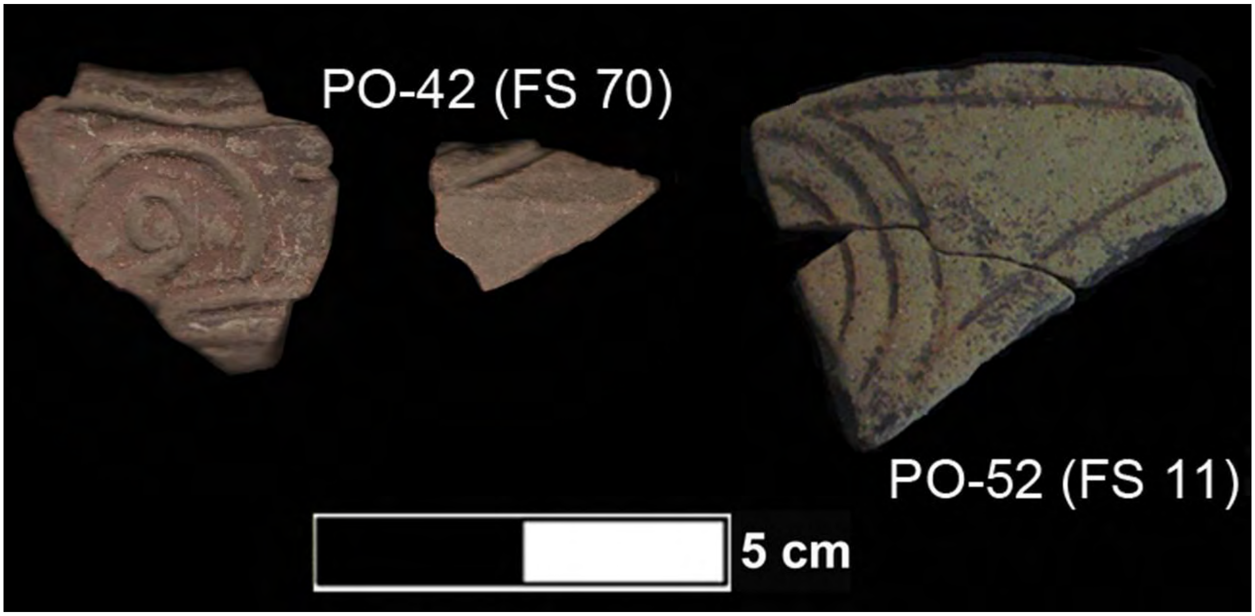

Figure 6-10. Diagnostic incised Capá incised pottery from PO-42 and PO-52.

Chronology

To evaluate the chronological placement of each site, vessel lots were assigned to a particular style. In some cases, this assignment was easy based on visible diagnostic elements. However, as most of the pottery lacked obvious diagnostic design elements it was difficult to ascribe many lots to a particular style. These being the case, lots lacking diagnostic attributes were cross-tabulated based on rim form (where available) temper size, thickness, surface treatment, and surface color. These were compressed into general stylistic categories representing Cuevas/Pure Ostiones, Elenan and Ostionan Ostionoid (including Monserrate, Santa Elena and Modified Ostiones), and Chican Ostionoid (including Capá, Boca Chica, and Esperanza). The results were seriated based on relative proportional frequencies by site (Figure 6-11). Current problems with pottery chronologies, and the fragmented nature of the sample, hindered a refined delineation of the temporal association of the pottery from each site; however, general patterns are apparent.

Sites	Cuevas/Pure Ostiones	Elenan/ Ostionan	Chican
PO-46 (n=4)	0	75	25
PO-47 (n=31)	0	97	3
PO-45 (n=6)	0	100	0
PO-49 (n=2)	0	100	0
PO-53 (n=26)	1	95	4
PO-48 (n=53)	1	97	2
PO-52 (n=51)	2	86	12
PO-50 (n=31)	3	94	3
PO-51 (n=26)	3	97	0
PO-42 (n=344)	9	88	3
PO-43 (n=366)	11	88	1

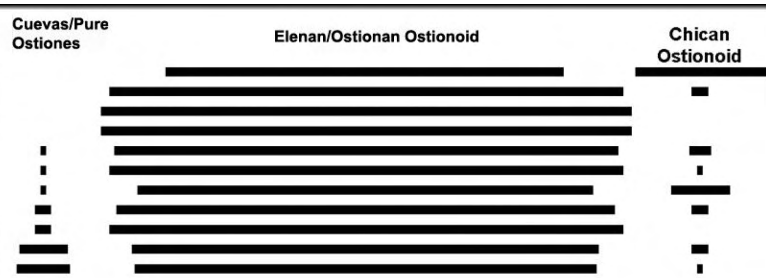

Figure 6-11. Ceramic seriation by vessel lot style frequency. Bars represent percentage of total number (n) of vessel lots from each site.

Relative percentages show PO-42, PO-43, PO-51, PO-52, PO-48, and PO-53 possess limited evidence of Cuevas/Pure Ostiones pottery and, in general, the majority of specimens from all sites indicate Late Ostiones and/or Elenan wares (Period IIIb). Further, several sites including PO-42, PO-43, PO-46, PO-47, PO-48, PO-50, PO-52, and PO-53 exhibit evidence for Chican Ostionoid pottery with the highest proportional frequencies registered at PO-46, PO-47, PO-52, and PO-53.

Four shell specimens were selected from two sites, PO-42 and PO-43, for radiocarbon analysis. Shell specimens were collected from the bottom of hand excavated column samples from discrete midden deposits at each site. Determining occupation dates for these sites was important for developing local settlement chronology because these sites provided the best evidence for residential occupation in close proximity to Tibes.

The Center for Applied Isotope Studies at the University of Georgia made the determinations utilizing Accelerator Mass Spectrometer (AMS). The dates were calibrated using OXCal 6.0.1 software (Stuiver and Reimer 1993). The two samples recovered from PO-42 yielded radiocarbon dates of cal. 2 σ AD 940 – AD 1290 (FS 116) and AD 1290 – AD 1600 (FS 112). The two samples from PO-43 yielded cal. 2 σ dates of AD 960 – AD 1300 (FS 289) and AD 1080- AD 1420 (FS 292) (Table 6-8).[4]

Table 6-8. Radiocarbon determinations from PO-42 and PO-43.

Site	Associated Pottery	Period	Conventional Radiocarbon Age	Calibrated Date Range 2σ (95%)		FS	Material Dated
PO-42	Santa Elena/ Modified Ostiones	III	1240±25	940	1290	(FS116)	Shell
PO-42	Santa Elena/ Esperanza/Capá	IIIB-IV	950±25	1290	1600	(FS112)	Shell
PO-43	Pure/Modified Ostiones	III	1310±25	960	1300	(FS289)	Shell
PO-43	Modified Ostiones/ Capá	IIIB-IV	1160±25	1080	1420	(FS292)	Shell

Date ranges coincide with what would be typically expected for the Late Ostionan Ostionoid and Chican Ostionoid wares collected from both sites. Pottery recovered from PO-42 in FS 112 is associated with late Ostionoid pottery. Three lots from this context also may be associated with Santa Elena, Esperanza, or Capá style and two definitive Capá style lots were recovered in the adjacent shovel test (FS 70; Figure 6-9). Additional pottery from the same site consists of evidence for Modified Ostiones and

[4] The ΔR values for the marine reservoir calculations were applied based on recent values from Tibes (Pestle and Curet 2011).

Santa Elena style lots mixed in single contexts (FS 116). Pottery from PO-43 appears to be primarily Modified Ostiones (FS 289) and Chican Ostionoid style pottery (FS 292). Some mixing of the Modified Ostiones wares with potential Cuevas/Pure Ostiones pottery is also present.

Based on the dates and associated pottery, it appears that both sites were potentially occupied at least between AD 960 to AD 1420, and as such they would both have been potentially occupied during the construction of the plazas/*batey*s at Tibes *and* PO-29. Further, based on the pottery seriation, the slightly elevated percentage of Cuevas/Pure Ostiones pottery in PO-43 over PO-42, and the slightly higher frequency of Chican Ostionoid pottery from PO-42, suggests that PO-43 may have been settled slightly earlier than PO-42 and that PO-42 persisted slightly longer than PO-43. What is also important is that both may have been coeval. While limited, these dates provide a basis from which to begin to contextualize residential settlement within the local landscape associated with Tibes.

Summary of the Pottery Assemblage

Potters of the foothills immediately surrounding Tibes created vessels using locally acquired clay resources. Limited quantities of alternative paste types indicate interactions or movement of clays/pottery from outside of the immediate locality. Based on the technofunctional and stylistic characteristics of the pottery, all sites appear to possess post-Saladoid pottery styles. Based on the analysis presented here, in conjunction with the radiocarbon dates presented in Chapter 2, it appears that the primary occupation of the newly documented TASP sites range from Period III through Period IV with primary occupations likely between AD 900 and AD 1300.

Evaluation of the vessel forms indicates that a range of activities were conducted at each of the sites. Vessel functions from several sites indicate a variety of domestic activities associated with food preparation and consumption, as evinced through the diversity of vessel forms; especially the presence of plates, and *burens*. The greatest diversity in vessel forms come from the sites of PO-42, PO-43, PO-50, and PO-53 in the Portugués drainage, PO-47 in the Cañas drainage, PO-51 near the Bayagan River, and PO-48 in the Chiquito drainage. All present clear evidence of food processing, serving, and consumption.

The presence of griddles or *burens* at seven of the sites, particularly PO-52, also suggests domestic activities. The presence of *burens* is a good indication of residential settlement, because they are too cumbersome to transport and are susceptible to breakage. Admittedly, *burens* could have been produced for expedient purposes; however, when taken in the contexts of the total artifact assemblage from any given site they provide an additional line of evidence for domestic occupation. The functional interpretation of sites is revisited at the conclusion of this chapter.

Lithic Analysis

Stone tools and the byproducts of stone tool production represent a small fraction of the TASP artifact assemblage (n=227, 7.8 kg). Lithics were sorted by material type and analyzed for use-wear, thermal alteration, and amount of cortical material present. Lithics were then divided into flaked stone and formal tool categories; further characterized by descriptive attributes related to the reduction sequence in the process of making tools.

The lithic assemblage is relatively limited and no specimens of beads, celts, stone collars, or other lapidary items were recovered. The majority of the lithics are commonly occurring local stone types, thereby precluding any interpretations of regional interaction and/or exchange of raw materials. Further, while lithics are useful for determining certain activities and the movement of people and materials across the landscape, they are relatively poor chronological indicators in Puerto Rico. According to Walker lithics in Puerto Rico maintain “stylistic and functional uniformity with little variation through middle and late pottery times” (Walker 1985:G26).

This persistence of stone tool production, and the limited variability in the tool diversity noted in the TASP assemblage, may be attributable to the fact that there was little need for a highly developed stone tool tradition. This idea is based on the availability of other materials that could be expediently employed as tools, particularly in areas where shell was readily accessible. However, this hypothesis has yet to be formally tested and is beyond the scope of this research.

Raw Material Types

The lithic assemblage displays evidence for the exploitation of local materials (Table 6-9). The availability of these materials from the Río Portugués and surrounding region has been documented in recent research associated with Tibes (Rice-Snow 2010; Walker 2010) and PO-29 (Espenshade 2009; n.d.) as well as previous work conducted at El Bronce (Walker 1985) and sites in the Cerrillos River Valley (Espenshade 1987; Garrow *et al.* 1995; Weaver *et al.* 1992). This observation is not surprising as the Portugués river bed contains a wide array of raw materials which include plutonic, volcanic, and sedimentary stones (Rice-Snow *et al.* 2010; also noted in Walker 2010). The selection of raw materials generally conforms to observation made in recent lithic assemblages at Tibes that indicate the use of green and grey tuffs for flaking, porphyry and breccias for pounding and sandstone for grinding (Walker 2010:156).

Table 6-9. Summary of lithic raw material types by site (isolates excluded).

		Site PO-										
Material	Data	42	43	45	47	48	49	50	52	53	54	Total
Basalt	ct	1	2	0	0	0	0	0	0	0	0	3
	wt (g)	1	6	0	0	0	0	0	0	0	0	8
Flint	ct	1	0	0	0	0	0	0	0	0	0	1
	wt (g)	5	0	0	0	0	0	0	0	0	0	5
Grnstone	ct	8	4	0	0	2	0	0	7	0	0	21
	wt (g)	175	17	0	0	10	0	0	589	0	0	791
Grey Flint	ct	1	0	0	0	0	0	0	0	0	0	1
	wt (g)	2	0	0	0	0	0	0	0	0	0	2
M.volcanic	ct	41	80	1	2	32	4	1	19	15	1	196
	wt (g)	1708	459	58	12	509	199	255	3224	120	8	6550
Quartz	ct	0	0	0	0	0	0	1	0	1	0	2
	wt (g)	0	0	0	0	0	0	1.9	0	72	0	74
Total Count		52	86	1	2	34	4	2	26	16	1	224
Total Weight (g)		1892	482	59	12	519	199	256	3813	192	8	7431

Debitage and Stone Tools

Lithic debitage accounts for 201 out of 227 specimens. Lithics from all sites is dominated by evidence of bipolar reduction techniques, subsequent refinement or tool maintenance by the presence of thinning flakes, and shatter, indicates various stages of tool production.

Lithic debitage was documented from nine sites with the highest quantities (by count) recovered from PO-42 (n=46), PO-43 (n=84), PO-48 (n=32), PO-52 (n=20) and PO-53 (n=12) and smaller quantities from PO-45 (n=1), PO-47 (n=2), PO-49 (n=3) and PO-50 (n=1) (Table 6-10). The greater quantity of debitage recovered from PO-42, PO-43, and PO-48 in conjunction with the pottery recovered from these sites indicates a diverse array of activities and strong evidence for domestic occupation.

Table 6-10. Summary of lithic debitage (isolates excluded).

		Site PO-									
Debitage	Data	42	43	45	47	P48	49	50	52	53	Total
Bipolar Flake	ct	6	21	1	1	2	0	0	5	1	37
	wt (g)	121	58	58	10	9	0	0	361	2	618
Shatter	ct	11	34	0	0	8	3	1	5	10	72
	wt (g)	27	70	0	0	9	13	2	10	82	212
Thinning Flake	ct	29	29	0	1	22	0	0	10	1	93
	wt(g)	394	131	0	1.8	173	0	0	571	12	1290
Total Count		46	84	1	2	32	3	1	20	12	201
Total Weight (g)		541	277	58	12	191	13	2	942	96	2113

Seven formal tool types totaling 24 specimens from 9 sites were recovered during the survey (Table 6-11). Seven tools were collected from PO-42 and PO-52 and three abraders from PO-53. These specimens consist of three small grey metavolcanic pebbles with distinctive faceting on multiple edges. Three blade flakes were recovered during the survey with one specimen each from PO-42, PO-48 and PO-52. All specimens appear to be metavolcanic in origin with common step terminations. These flakes are relatively linear with parallel sides and are twice as long as they are wide (Garrow *et al.* 1995:200). The edges of these flakes generally show evidence of use and some retouch. These flakes would have been used for scraping or cutting.

Seven cores were collected from PO-42, PO-43, and PO-52. All appear to be random cores with no identifiable pattern to flake removal. All of the cores are of metavolcanic origin consisting of grey tuffs. These cores could have been used for the production of usable flakes or could have been employed as choppers. However, no evidence of edge wear on the cores was noted during the analysis. One edge grinder was recovered from PO-42. This tool is an elongated cobble of grey tuff with diagnostic edge wear consisting of smoothing with battered terminal surfaces. This wear pattern has been observed in previous investigations as potentially associated with the processing of vegetal items (Rodríguez Ramos 2006). This specimen was recovered from the north wall of the *batey* at PO-42.

Table 6-11. Lithic Tools recovered from sites (isolates excluded).

		Site PO-							
Debitage	Data	42	43	48	49	50	52	53	Total
Abrader	ct	0	0	0	0	0	0	3	3
	wt (g)	0	0	0	0	0	0	91	91
Blade Flake	ct	1	0	1	0	0	1	0	3
	wt (g)	66	0	4	0	0	138	0	207
Core	ct	3	1	0	0	0	3	0	7
	wt (g)	641	130	0	0	0	849	0	1620
Edge Grinder	ct	1	0	0	0	0	0	0	1
	wt (g)	635	0	0	0	0	0	0	635
Grnd Stone	ct	1	1	1	1	1	0	1	6
	wt (g)	10	94	324	186	255	0	5	872
Hmmr.rstone	ct	0	0	0	0	0	2	0	2
	wt (g)	0	0	0	0	0	1885	0	1885
Total Count		6	2	2	1	1	6	4	22
Total Weight (g)		1351	224	327	186	255	2871	96	5310

Six ground stone artifacts were recovered, one each from PO-42, PO-43, PO-48, PO-49, PO-50 and PO-53. These artifacts consist of metavolcanic pebbles and cobbles that show smoothed or faceted surfaces. The smaller specimens may have been burnishing stones or abraders with the larger specimens for grinding food, other vegetal materials, or smoothing wood. Two hammer stones were recovered from PO-52. These specimens are relatively large cobbles with distinctively battered surfaces.

Summary of the Lithic Assemblage

The lithic assemblage denotes practices associated with stone tool production and use at several sites. Based on raw materials the collection shows procurement primarily from local riverine sources. Production techniques emphasize bipolar core reduction for the creation of tools. The relatively high incidence of thinning flakes, particularly from PO-42, PO-43 and PO-48 also support a range of tool making activities. The edge-grinder recovered from PO-42 and other ground stone tools present at PO-42, PO-43, PO-48, PO-49, PO-50, and PO-53 indicate the possible processing of vegetal material for food.

Shell Analysis

Marine shell is an important indicator of past human activities because of its use as a food source, for tools, and the implied landscape associations based on the connection between the habitat of particular species and the locations where they are recovered. Eight sites yielded marine shell including PO-42, PO-43, PO-45, PO-46, PO-50, PO-51, PO-52, and PO-53 (Table 6-12). PO-46 and PO-50 yielded too few specimens and were omitted from further analysis. No shell was recovered from PO-47, PO-48, or PO-49[5]. Seven sites yielded sufficient quantities of shell to discuss food consumption, tool use/production, and landscape associations.

Table 6-12. Summary of shell and coral by site (includes large fraction from column samples, isolates excluded).

Site	Shell and Coral ct	Shell and Coral wt (g)
PO-42	5701	9041.5
PO-43	8181	11469.6
PO-45	99	78.5
PO-46	3	4.1
PO-50	11	25.9
PO-51	62	276.9
PO-52	506	2331
PO-53	212	361.5
Total	14775	23589.05

[5] Although one parrot fish (*Scaridae*) premaxilla was recovered from PO-48, the northern most site in the Río Chiquito drainage.

All shell specimens collected from shovel tests were analyzed. Materials recovered from column samples are not presented; they are currently the subject of a detailed faunal analysis to be presented in future work (DuChemin n.d.). The identification of specific taxa was through examination of comparative source materials (Warmke and Abbot 1961) including collections from the Florida Museum of Natural History. Analysis documented raw counts (*i.e.*, number of individual specimens [NISP]) and weights for each taxon from each shovel test. The calculation of Minimum Number of Individuals (MNI) was through the identification of non-repeatable elements within each taxon for each shovel test with the results tabulated for each site (Appendix E). Shell tools identified in the analysis were subject to additional study.

The sample of analyzed shell totaled 5,673 specimens (NISP), representing 1,600 individuals (MNI) weighing 11.9 kg. The sample comprises a variety of gastropods and bivalves with the latter composing the majority of the sample by both MNI and weight (Table 6-13). Gatropods form 34% of the total sample population by weight and 15% by MNI.

Sites PO-42, PO-43, PO-51, PO-52, and PO-53 account for 92% of the total shell sample by MNI. The majority of shell from these sites consists of bivalves dominated by Carib pointed venus (*Anomalocardia brasiliana)* and Zebra Ark (*Arca zebra*) specimens. The Carib pointed venus are common in shallow water habitats buried in intertidal mudflats. Zebra arks are common in rocky or reef habitats, and attach themselves to rock or coral. Other commonly occurring bivalves in the shell sample include clams from the Lucinidae Lucine family (particularly *Codakia* and *Lucina*) and Veneridae hard-shell clams including *Chione*. Oyster fragments, particularly *Isognoman* and

Crassostrea also were also recovered but in smaller quantities. The high proportion of bivalves suggests that marine shells were collected through exploitation of coastal flats and shallow water habitats. Bivalves, and particularly the smaller species, like Carib pointed venus, were likely cooked and eaten as part of pepper pot type soups because processing them individually would have been too time and labor intensive.

Table 6-13. Summary of shell and coral recovered from seven sites.

Site	Data	Gastropods	Bivalves	Coral	UID Molluscs	Totals
PO-42	Sum of MNI	119	744	0	0	863
	Sum of NISP	350	2850	60	16	3276
	Sum of wt (g)	1482.5	3321.2	514.2	12.8	5330.7
PO-43	Sum of MNI	66	333	0	0	399
	Sum of NISP	180	1252	82	10	1524
	Sum of wt (g)	696.5	2525.3	421.2	2.3	3645.3
PO-45	Sum of MNI	0	17	0	0	17
	Sum of NISP	8	89	0	0	97
	Sum of wt (g)	16.9	53.6	0	0	70.5
PO-50	Sum of MNI	0	0	0	0	0
	Sum of NISP	11	0	0	0	11
	Sum of wt (g)	25.9	0	0	0	25.9
PO-51	Sum of MNI	7	16	0	0	23
	Sum of NISP	11	52	0	0	63
	Sum of wt (g)	186.6	99	0	0	285.6
PO-52	Sum of MNI	34	164	0	0	198
	Sum of NISP	87	404	5	3	499
	Sum of wt (g)	1513.6	648.5	65.5	1.2	2228.8
PO-53	Sum of MNI	16	65	0	0	81
	Sum of NISP	21	175	2	5	203
	Sum of wt (g)	111.3	226.5	17.1	1.2	356.1
Total Sum of MNI		242	1339	0	0	1581
Total Sum of NISP		668	4822	149	34	5673
Total Sum of wt (g)		4033.3	6874	1018	17.5	11942.8

Common gastropod species recovered were the variegate turretsnail (*Turritella variagata*) and conch (*Strombus* spp.). Conchs prefer shallow water habitats and grassy or sandy bottoms whereas the turretsnails prefer shallow mud-bottomed bays. Another gastropod, the nerite (*Nerita* sp.), was also collected from midden deposits. Nerites are found attached to rocks in the intertidal zone. The presence of large gastropods at several sites indicates the acquisition of material for tools. Supporting this are studies demonstrating that larger gastropods are usually processed near or at the place where they are gathered as the shell to meat ratio and size of the shells inhibits transport over long distances (Bird *et al.* 2008; Keegan 1986). As noted by SEARCH, "Conch in sites that are not right on the shoreline usually represents discarded tools or debitage from the manufacture of tools" (SEARCH 2008:105).

Shell and Coral Tools

Ninety-one tools from six sites were identified including PO-42, PO-43, PO-51, PO-52, and PO-53, and one shell tool each from the isolated finds at PO-2 and PO-44. Shell and coral tools were identified through use-wear patterns exhibited by non-natural breakages and surface striations. Tools were sorted into types based on currently accepted categories developed by O'Day and Keegan (2001). Six types were identified in the sample consisting of abraders, celts, hammers, picks, scrapers, and tips (Table 6-14).

Table 6-14. Summary of recovered shell tools from all sites.

Tool Type	PO-2	PO-42	PO-43	PO-44	PO-51	PO-52	PO-53	Total
Abrader	0	1	3	0	0	0	0	4
Celts	0	0	0	0	1	2	0	3
Hammers	1	5	2	0	1	1	1	11
Picks	0	0	0	0	1	1	0	2
Planners	0	2	2	0	0	1	1	6
Scrapers	0	20	13	0	0	2	2	37
Tips	0	17	5	1	0	4	1	28
Total	1	45	25	1	3	11	5	91

The predominant tool type is bivalve shell scrapers (n=37) that were recovered from four sites (PO-42, PO-43, PO-52, and PO-53). Scrapers exhibit wear primarily on the exterior (top) of the shell (Figure 6-12) and are particularly as well as along growth lines where they are often worn smooth and tend to break. Scrapers comprise large tiger lucine (*Codakia orbicularis*) and faust tellin (*Tellina fausta)* specimens. These tools would have been useful for scrapping and possibly shearing, and cutting. The tools may have been used to “scrape out gourds as water collection vessels, or for shaping or finishing pottery” (SEARCH 2009:105) or for peeling vegetal material, such as manioc, as described in the chronicles.

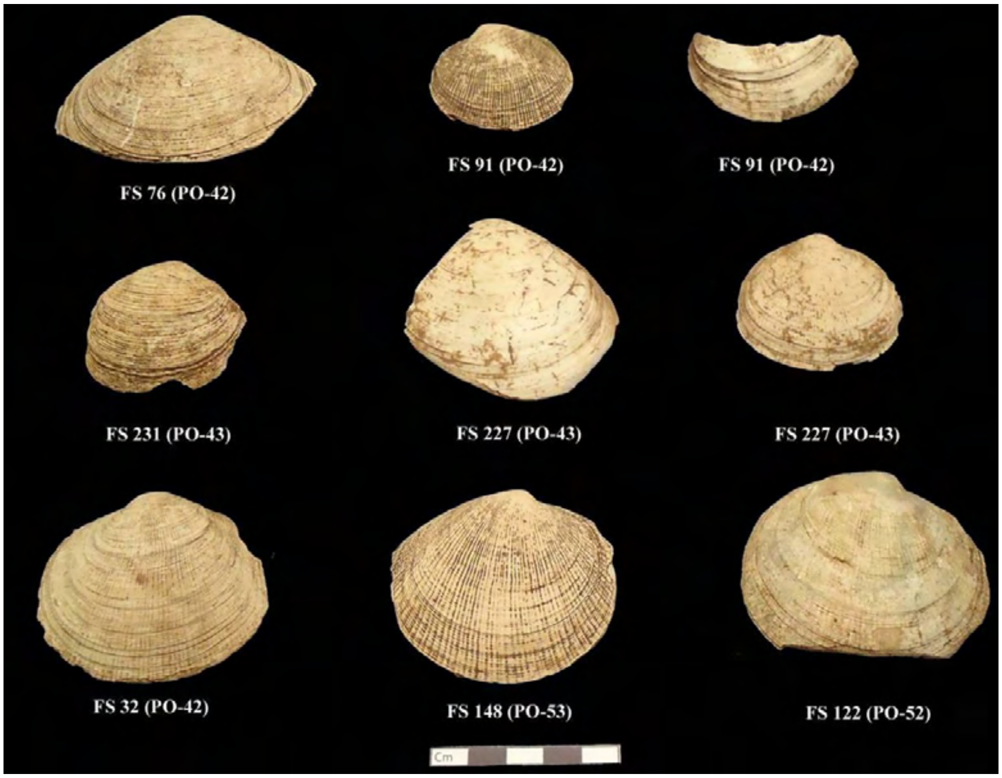

Figure 6-12. Representative sample of shell scrapers.

Tools made from conch (*Strombus* sp.) include hammers, picks, planers, and tips (O'Day and Keegan 2001). This brings us to the second most abundant tool type recovered—what are referred to by O'Day and Keegan as "tips and knippers" (O'Day and Keegan 2003:286-286). Thirty-one tips were recovered from four sites including PO-42, PO-43, PO-52 and PO-53 (Figure 6-13).

Figure 6-13. Representative sample of worked shell tips.

Tips are defined as small picks where the spire has been intentionally removed. These tools may have been used for detailed tasks involving chiseling, graving or gouging. Use-wear patterns are evinced by beveling and flaking on the remaining inferior end. All appear to be small Queen Conch (*Strombus gigas*) and West Indian Fighting Conch (*Strombus pugilis)* specimens.

Eleven hammer fragments were also recovered during the survey (Figure 6-14). Hammers are characterized by mature Strombus sp. shells with the lip and portion of the outer whorl removed. Use-wear is consistent with hammering or battering of shell which is often evinced by blunt rounded edge at the termination of the inferior collumella.

Figure 6-14. Representative sample of shell hammers.

Three celts were recovered from two sites: PO-52 and PO-51 and six planners from PO-42, PO-43, PO-52, and PO-53. These tools would have been good for working wood. Shell picks are also present in the form of worked column fragments from Queen conch (*Strombus gigas*) and West Indian fighting conch (*Strombus pugilis*) specimens (n=2). These tools are made from the inner whorls of the collumella and display beveled wear patterns on the inferior end-tip of the specimens.

Finally, four coral specimens, recovered from PO-42, PO-43 and PO-51 and PO-52, show evidence of abrading. However, it should be noted that despite direct evidence for tool use on all documented coral fragments, the presence of represents some type of use. This observation is a based on the notion that, unlike shell that is a subsistence resource, coral does not serve subsistence needs and people would likely have been reluctant to carry it from the coast unless they intended to somehow use it. The natural rough surfaces make good abraders, shapers, rasps, or polishers (Lammers 2007: 108), which have been shown experimentally to sometimes be more effective than tools made of stone (Kelly 2003).

Summary of the Shell and Coral Assemblage

Substantial quantities of shell recovered from shovel tests and partially exposed *concheros* indicate that while the immediate environments associated with the foothills surrounding Tibes were utilized by the people living in them for basic subsistence needs (deFrance *et al.* 2010; Pestle 2010) much more of the region's environment was routinely utilized. Eight sites contained shell suggesting the exploitation of marine resources that came from the coast located about 8 km to the south.

The quantity and diversity of marine shell, both bivalves and gastropods, recovered from these sites also indicate the use of different coastal zones for the collection of these mollusks. The abundance of bivalves indicates intertidal flats as a preferred resource (as noted for Tibes in deFrance *et al.* 2010). Due to the small size of the bivalves they were likely used in “pepper pot” type soups (Keegan and SEARCH 2008). However, in relative terms the amount of shell recovered and that observed does not indicate strong reliance on marine resources as primary subsistence source as one would expect larger shell heaps in this situation (see Mardquardt 2010).

Due to the distance from the coast, the transport of substantial quantities of small bivalves for consumption would have entailed considerable labor expenditure. Based on research conducted by Cotterell and Kaminga (1990:194), a human can travel a maximum of 11 km encumbered with 60 kg (on one leg of the trip) over level terrain. Halving this value as a proxy for uneven terrain, suggests that 6.5 km is the maximum range for a round trip. Even with lesser loads, the distance over uneven terrain, places settlements in the foothills at, or just over, this value. This provides support that a subsistence diet based solely on shell fish would have been economically inefficient on a daily basis. Nonetheless the amount of shell recovered indicates consistent, albeit perhaps infrequent, consumption. This supposition appears to coincide with recent findings by Pestle (2010) who indicates that diet of the people interred at Tibes was largely composed of terrestrial fauna. Hence, shellfish at sites further distant from the coast may have been more of a delicacy for people of the foothills rather than a primary staple (*e.g.,* Curet and Pestle 2010).

The shell recovered from these sites not only indicates subsistence activities but also other practices associated with tool production and use. The abundance of shell may have influenced the lithic tool technology of the region whereby the expedient manufacture of shell tools decreased the necessity for elaborate lithic tool manufacture. In this scenario, one would expect the proliferation and elaboration of lithic tools in areas where shell is less available.[6]

Sites PO-42, PO-43, and PO-52 yielded the higher quantities and diversity of tools suggesting a wide range of functional activities which, when taken into account with other aspects of material culture previously discussed here, strongly indicates long term domestic habitation. Finally, the shell remains recovered from the archaeological sites here allude to interactions that may have existed between people and their broader social and physical environment in antiquity. The shell assemblage reveals that people in the foothills around Tibes were potentially engaged in fishing and shoreline/shallow water gathering practices. However, it is also possible that these items were gathered and brought upriver by people living closer to the coast. In either scenario, the presence of marine shell demonstrates that inhabitants of the foothills were connected, if not through infrequent interaction, with coastal settlements.

Summary of Artifacts and Site Interpretations

Through examination of the artifacts recovered during the survey, it is possible to characterize variability in the local settlement pattern and develop a temporal context for the documented sites. The artifacts discussed in this chapter represent a small sample from each site which undoubtedly contains more material to be revealed through future excavation. Because of this, the functional assessment of the sites is conservative and as a result I feel this increases the validity of the interpretations presented here, particularly in making the case for domestic occupation for several of them.

[6] One example of this is seen at PO-38 in the Cerrillos River valley where an abundance and diversity of lithic tools is noted but no shell (Weaver *et al.* 1998).

Variability in site types relate to their size, presence of ceremonial features, potential duration of occupation, and the types of artifacts recovered from them. Settlements with evidence of domestic occupation are central to understanding the local community as they from the nexus of lived practices and interactions which structure daily social life. Further, the presence of stone enclosures or *bateys* documented at PO-42 and PO-43 also indicate potential ritual activities. Domestic occupations can be inferred from the implied range of functional activities performed at particular sites based on the relative quantity and diversity of material present.

Assuming that the several settlements presented in this study were at least overlapping for a short period, the image created here of the community is one characterized by a neighborhood comprising small residential settlements and specialized activity areas. Examination of the material recovered from each site shows five (PO-42, PO-43, PO-51, PO-52 and PO-53) with strong evidence for domestic occupation (Table 6-15). Each of these sites contains evidence for activities associated with pottery making and use, food processing and consumption, and lithic and shell tool production and use.

The presence of substantial quantities of marine fauna and shells at several sites indicates long term activities associated with resource procurement and consumption. In contrast, four of the documented sites (PO-45, PO-46 and PO-48, PO-50) have limited evidence for the exploitation and use of marine resources and/or lack middens or other features indicative of permanent domestic occupation.

Table 6-15. Site summary. (Date ranges approximated based seriated pottery styles compared with radiocarbon dates from Chapter 2. X indicates presence).

Site PO	Cuevas/ Pure Ostiones	Modified Ostiones	Santa Elena	Chican Ostionoid	Lithics	Ground Stone	Shell	Shell Tools	Bone	Buren	Site Type	Date Range AD
42	X	X	X	X	X	X	X	X	X	X	Habitation w/ *batey*	900-1500
43	X	X	X	X	X	X	X	X	X	X	Habitation w/ possible *batey*	800-1300
45		X		X	X	X	X	X			Possible Habitation	600-1200
46		X		X			X	X			Limited Activity	900-1500
47		X		X	X					X	Possible Habitation	700-1300
48	X	X		X	X	X			X	X	Habitation	600-1500
49			X								Limited Activity	600-1200
50	X	X	X	X	X	X	X				Possible Habitation	900-1500
51	X	X	X				X	X	X		Habitation	600-1200
52	X		X	X	X	X	X	X		X	Habitation	700-1500
53	X	X		X	X	X	X	X	X	X	Habitation	900-1500

Examination of artifacts offer important data to contextualize settlement and community organization within the local landscape associated with Tibes as well as within the broader region in general. Pottery recovered from all sites indicates post-Saladoid occupation with strong evidence for primary settlement of the area during Period III and into Period IV (ca. 600-1500). Tibes, possessing both a Cuevas and Hacienda Grande component, is mainly similar to the newly documented settlements in its later pottery components (Alvarado Zayas 1981).

Hence, it appears that *intensive* settlement of the Portugués and adjacent drainages did not begin until at *least* AD 600. The lack of Saladoid pottery styles and the prevalence of late Ostionan, Elenan, and Chican Ostionoid styles strongly indicate that Saladoid settlers were *primarily* focused outwards towards the coast. Explanations for this could be that Saladoid settlers were reluctant to initially establish settlements in the foothills and mountainous interiors because of limitations on the ability to recreate large settlements in these interior areas, and/or it would have secluded them from access to the broader regional network, and/or the presence of pre-Arawak settlements in the these areas precluded their colonization. Obviously none of these factors are mutually exclusive.

Examination of the shell recovered from sites indicates extensive use of the broader landscape and connections to groups situated outside the foothills segment of the Portugués and adjacent river drainages. The presence of the shells at several sites could have been the result of three non-mutually exclusive factors: 1) procurement from the source, 2) they were brought in by non-local residents, or 3) traded somewhere between the coast and the site. All three of these cases involve potential interaction with other groups outside of the local community, even if it only entailed brief encounters while procuring the shellfish directly from the source.

In the case of sites displaying evidence for permanent habitation, our focus necessarily shifts to the smaller end of the interpretive spectrum. These smaller domestic sites are likely limited in their social composition to perhaps fewer than 10 households (*e.g.* Espenshade 2000; Espenshade *et al.* 1987). Oliver has previously noted small settlements as the primary organizational pattern for the Chican Ostionoid landscape in the mountainous interior of the island (Oliver 2007; Oliver *et al.* 1999). However, the transformation from previous Saladoid models of settlement to these later formations has not been sufficiently addressed.

In this chapter I have begun to characterize settlement of local landscape in foothill in the area surrounding Tibes. Evidence presented here indicates the proliferation of small residential settlements in the foothills after AD 600. These settlements appear to have formed neighborhoods, focused on the acquisition of local resources for their subsistence and production of lithic tools and pottery. Yet many questions remain regarding the organization of local groups and the formation of the political landscape. How did these neighborhoods form? Is the settlement pattern presented here unique to the Tibes locality? What are the implications of these patterns on the organization of local communities and what does this tell us about the inception of formative political groups in the region? In the following chapter I will address these questions through a detailed examination of the settlement landscape of the south-central region. In doing so, it will be possible to revisit the Tibes locality later in this work to discuss the implications of the observed patterns on the organization local communities and how these compare with other localities throughout the region.

CHAPTER 7
THE REGIONAL SETTLEMENT LANDSCAPE: PATTERNS AND PROCESS

In the previous chapter I presented archaeological data from the local landscape immediately associated with Tibes that depicts a burgeoning community comprised of small residential settlements and their associated activity areas occupied after AD 600. Yet, how are the settlements and spatial patterns of social life observed in this locality indicative of processes of settlement and community formation of the broader south-central region between AD 600 and AD 1200? What are some of the underlying processes responsible for these developments and what are the implications of these patterns on the organization of the social and political landscape during that time? To address these questions, this chapter presents a diachronic examination of settlement patterns for the south-central region to develop a history of the social landscape and to show how local populations were organized and articulated through time.

To begin, the first section of this chapter presents an examination of settlement distributions through time in relation to the region's major physiographic zones. In doing so, I identify general temporal trends, laying the groundwork for subsequent analyses and discussion.

Next I model near-village territories to identify settlement clusters or *locales* (*sensu* Giddens 1984:375) where face-to-face social interactions were concentrated based on occupational continuity, social propinquity, and the friction of distance (Soja 1989:14). In this section, I focus on the implications of settlement clustering and changes in near-village territories to discuss how they may have influenced people's relations with the landscape and with one another. This section also presents a discussion of the settlement expansion that occurred around AD 600 and evidence indicating aspects of continuity and change in the occupation of particular localities.

In the third section of this chapter, I explore the regional settlement network to offer insight into the structure and historical formation of the social landscape. This discussion highlights identifiable trends in social distancing and how settlement structure may have influenced social interactions in the region. Here I highlight spatial patterns indicating that while regional social networks were expanding, they were concomitantly becoming increasingly insulated and localized.

In the final portion of this chapter I examine the spatial distribution of pottery styles from the south-central region to evaluate the evidence for and implications of increased social diversity that developed between AD 600 and AD 1200. I conclude this chapter with a summary of the major transformations in settlement and how these changes redefined people's relations with one another and their landscapes. Ultimately I show how population growth and processes of settlement influenced the development of social communities and reconfiguration in the organizational structure of post-Saladoid social groups.

Regional Dataset

As an analytical tool for examining regional settlement patterns, Geographical Information Systems technology (GIS) provides a means to generate visual heuristics, descriptive statistics, and conduct analysis of spatial features.[1] The baseline data used in this chapter consist of topographic data and archaeological sites. The topographic data is a 1:20,000 Digital Elevation Model (DEM) acquired from the U.S. Geological

[1] See Aldenderfer 1996 and Wheatly and Gillings 2004 for overview of GIS applications in archaeology.

Survey (USGS 2001). A DEM is a raster (or grid) based elevation map in which each cell represents a 30 x 30 m area. Through the GIS the DEM can be used to create additional datasets such as slope and cost-friction surfaces. The cost-friction surface is used to model cost-catchments and cost-paths that serve as proxies for near-village territories and the potential paths linking settlements. Specifically, these datasets quantify distances between settlements based on costs of travelling through the landscape and for examining the potential relationships between settlements through time.

At the heart of the regional settlement analysis is the archaeological site database. Site data was initially acquired in a GIS format (ESRI point shapefile) from the PRSHPO (Officina Estatal de Conservacíon Historíca) in July of 2003. The tabular data associated with the shapefile consists of information denoting site size, cultural material present (*e.g.,* pottery, shell, and bone), architectural features (plazas/*bateys*), socio-temporal affiliation and date of recordation. I subsequently modified this database based on a review of published and unpublished sources including cultural resource management reports, journal articles, books, and academic papers. Modifications to the database included updating site sizes, styles of pottery present, standardization of cultural/temporal affiliation (by Periods), number and size of ceremonial features and potential site function. Previously documented sites, present in the literature review but not included in the original dataset, also were added. These additions included the sites documented during TASP survey presented in the previous chapters. Site specific information from the GIS database used in this study is in Appendix F.

Assumptions and Issues of Interpretation

Prior to delving into the analyses, it is necessary to point out some of the issues associated with the use of the site data. The first relates to the nature of the sample of sites which, over the past century, were identified through a variety of methods ranging from accidental discovery to systematic survey. Many early field investigations in the region were not formally published[2] and little or no information is available for several known sites in the region. Second, there are analytical problems stemming from variability in the registered information for sites due to site recordation strategies based on when and under what circumstances they were documented. Third, many sites have been destroyed by historical agricultural practices and the expansion of urban development. Hence, the sample of sites is not complete.

Finally, temporal association of sites in the absence of radiometric data is an obstacle hindering the interpretation of settlement patterns in the region. Temporal assessment of most sites is limited to relative dating of pottery, often to the series or sub-series level. To the advantage of this study, the south-central region (and particularly Ponce) possesses a number of well dated sites that facilitates the chronological placement of pottery assemblages from the region (as presented in Chapter 2).

As the traditional socio-temporal framework is under development, I warily use the Period classification devised by Irving Rouse (1992:107) to delineate time. I do not to suggest that the use of Rouse's periods solves the problems of temporality, and I realize that the broad segmentation of time for interpreting settlement processes can

[2] For instance the site of Minas, in Juana Diaz excavated by de Hostos and the work of Spinden in Salinas were never published (as noted in Rouse 1952).

result in the overgeneralization of idealized patterns. However, the focus of this work is not to recreate the social landscape at an exact moment in time--Binford (1981) has effectively criticized the methodological problems of this approach. *Instead, the focus here is on identifying systematized patterns of social relations that underlie broad structural trends through time*. These central tendencies are less affected by short-term chronological deficiencies in the data and are more appropriate for discerning meaningful patterns in "structural histories" (Braudel 1980). Hence, despite the problems associated with the data, site distributions conform to a logical and meaningful construct based on relationships between people and the physical spaces they occupy which do not preclude their use for evaluating and interpreting settlement patterns.

Settlement Types and Nomenclature: When is a Village?

To characterize settlement variability I use concepts derived from geographies of rural agricultural systems as a basis for organization and discussion. In contrast to methods of classification that emphasize hierarchical relationships, I focus on the materiality of social practices and types of functional activities indicative of domestic habitation and communal ritual activities. This categorization is influenced by site size, and owing to this variation, one gains a sense of site function through occupational density and intensity of use. Settlement categories are informed by the results of the TASP survey and archaeological literature from the island. This leads us to the five categories:

- SITES WITH CEREMONIAL ARCHITECTURE (PLAZAS/*BATEY*S) BUT NO EVIDENCE DOMESTIC HABITATION. These sites possess plaza*/bateys* features but no evidence for domestic occupation. Examples tentatively include PO-41 and PO-39.
- HABITATION (RESIDENTIAL SETTLEMENTS/VILLAGE) WITH CEREMONIAL ARCHITECTURE: These sites are from 1 to ~5 ha and defined by evidence of long-term occupation (based on ceramic assemblages, and/or radiocarbon dates), household features,

and/or substantial midden deposits indicative of loci of domestic life. These sites also possess at least one plaza/*batey*. Examples include El Bronce (PO-11), Tibes, and PO-42 documented during TASP investigations (see Chapter 5).

- HABITATION (RESIDENTIAL SETTLEMENT/VILLAGE) WITH NO EVIDENCE OF CEREMONIAL ARCHITECTURE. Defined as the previous except lacking plaza/*batey* features.

- HAMLETS OR SMALL RESIDENTIAL SETTLEMENTS. These sites are $\leq$ 1 ha and lack ceremonial architecture. Differing from other habitation sites, hamlets tend to be small and not as intensively occupied as villages. Sites classified as hamlets were either noted as such in previous reports or based on the spatial extent of the site. Broadly conceived, this category also encompasses farmsteads.

- LIMITED ACTIVITY AREAS. These sites do not possess artifact quantity/diversity indicative of domestic occupation (*e.g.,* midden mounds or dense artifact scatters) and lack plaza/*batey* features. These sites are typically $\leq$ .5 ha and include caves, petroglyph only sites, and those registered in previous studies as "camp sites".

One hundred and twenty-seven sites were placed into one of the five categories, and attributed to particular periods based on relative (*i.e.,* pottery) and/or radiometric data. The chronological placement of sites is first based on the range represented by available radiocarbon dates and then by particular pottery styles where the former is absent.

Settlement Variability: General Trends through Time

This portion of the study presents settlement distributions in relation to the region's physiographic zones and major watersheds. The goal of this discussion is to characterize regional settlement variability through time and to form a foundation from which explore these patterns in more detail. While preliminary analysis and interpretation of these general patterns have been presented in previous work (*e.g.,* Curet 2005; Lundberg 1985; Torres 2001, 2005, 2010), a brief review and update based on recent research is warranted. Table 7-1 provides a list of the sites including their map identification numbers (MAPID) for referencing the maps in discussion throughout this chapter.

Table 7-1. Site map index.

Site #	MAPID	Site Name	Site #	MAPID	Site Name
PRAI004	1	Vega del Suburruco	PRPN005	37	El Oregano
PRAI005	2	Los Burgos	PRPO002	38	Tibes II
PRCY001	3	Jajome	PRPO003	39	Tibes III
PRCY002	4	Las Planas	PRPO008	40	Cañas
PRCO001	5	Las Flores	PRPO029	42	PO-29
PRCO002	6	Villón/Cuyón	PRYA002	43	Duey/Diego Hernandez
PRCO003	7	Buenos Aires	PRYA008	46	
PRCO004	8	Canters	PRYA011	47	YA11
PRCO005	9	Baños de Coamo	PRYA012	48	La Fraternidad
PRGN013	10		PRPO005	49	Tuque
PRGN014	11		PRPO015	50	Holiday Inn
PRGY001	12	Tecla	PRYA004	51	Barinas II
PRGY004	14	Antes Cotui	PRYA009	52	
PRGY005	15	Cueva Vallejo	PRYA010	53	
PRGY006	16	Los Sitios	PRPO001	54	Tibes
PRGY013	20	GU13	PRPO012	55	Maraguez
PRGY014	21	GU14	PRPO013	56	Hernandez Colon
PRGY015	22	GU15	PRPO014	57	Tizol
PRGY016	23	GU16	PRPO016	58	Tito Castro
PRGY017	24	GU17	PRPO031	59	Lagos Geley
PRGY018	25	GU18	PRPO038	62	El Parking-CT2
PRJD001	27	Santi	PRPO039	63	La Iglesia de Maraguez (CT-4)
PRJD004	28	Guayabal	PRPO009	64	Tiburnes
PRJD005	29	Cueva Lucero	PRPO010	65	Caracoles
PRJD007	30	Río Cañas	PRSN015	66	P-1 (K-8-02)
PRJD002	31	Autopista	PRSN016	67	P-2 (F-4-01)
PRJD003	32	Venegas/JD-3	PRSN017	68	P-3 (M-18-01)
PRJD006	33	Collores	PRSN018	69	P-4 (M-14-01)

Table 7-1. Continued.

Site #	MAPID	Site Name	Site #	MAPID	Site Name
PRPN001	34	Caracoles/PE-1	PRSN021	70	P7 (E-5-01)
PRPN003	35	La Jagua	PRSN022	71	P8 (E-6-01)
PRPN004	36	Olefinas	PRSN023	72	P9 (E-7-01)
PRSN024	73	P10 (F-3-01)	PRGA002	117	El Palo
PRSN025	74	P11 (G-4-01)	PRGY010	120	Cemetario de Guayanilla
PRSN026	75	P12 (G-4-02)	PRGY011	121	GU-11
PRSN027	76	P13 (G-4-03)	PRGY012	122	GU12
PRSN028	77	P14 (G-15-01)	PRPO021	129	PO-21
PRSN029	78	P15 (H-1-01)	PRPO027	131	PO-27
PRSN030	79	P16 (H-7-01)	PRSI004	132	La Florida/Los Indios
PRSN031	80	P17 (J-5-02)	PRPO011	135	El Bronce
PRSN032	81	P18 (L-13-01)	PRPO023	136	PO-23
PRSN033	82	P19 (N-5-01)	PRPO037	137	CT-1
PRSN034	83	P20 (P-12-01)	PRSN004	138	La Plena I
PRSN035	84	P21 (P-13-02)	PRSN007	139	El Coco
PRSN036	85	P22 (R-13-01)	PRSN010	140	Carmen
PRSI008	86	Peñuelas	PRSN013	141	La Arbolead A
PRSN003	87	Turrado	PRSN014	142	La Arbolead B
PRSN005	88	LaPlena II	PRSN012	143	Las Marias
PRSN037	89	SA-37	PRSN002	144	Esperanza
PRSN038	90	SA-038	PRPO051	145	Río Bayagan
PRSN039	91	Las Yeyesas	PRPO050	146	Pico's Ranchero
PRSN011	92	El Llano	PRPO043	147	Los Gongolones
PRSN020	93	P6 (B-8-01)	PRPO042	148	La Mineral
PRSI001	94	Jauca I	PRPO052	149	Finca Feliciana
PRSI002	95	Jauca II	PRPO049	150	Reyes Ranchero
PRSI003	96	Jauca III/Texidor	PRPO048	151	Escuela Río Chiquito
PRSN006	98	Aguirre	PRPO046	152	Cañas II

Table 7-1. Continued.

Site #	MAPID	Site Name	Site #	MAPID	Site Name
PRSN008	99	Abeynos	PRPO045	153	La Vaquería
PRSI006	106	Las Ollas	PRPO053	156	PR-10 Midden
PRSI007	107	El Cayito	PRYA003	157	Mattei Y-3
PRVL004	108	VL 4	Bronce III	158	El Bronce III
PRGA008	110	XP-3/4	Bronce II	159	El Bronce II
PRGA009	111	XP-5	El Monte	160	El Monte
PRPO041	163	El Colmado Perez			
PRPO047	164	Cañas I			
PRYA001	167	La Florida			

The number of sites in the region with evidence of occupation prior to AD 600 (Period II) is limited to 19, of which 16 are residential habitations (Figure 7-1). No hamlets and only a few limited activity sites are documented. In general, settlements follow the major river drainages with the highest frequencies at the interface of the coastal plains and foothills. The distributional pattern shows 53% (n=10) of the total number of sites are on the coastal plains with 42% (n=8) in the foothills. One site (CY-02), in the northeastern portion of the study area, is in the uplands. Only two other sites, Las Flores (CO-1) and PO-38, are located at substantial distances inland.

The Period II settlement pattern supports previous research suggesting that prior to AD 600 people had a primary coastal orientation but positioned themselves to take advantage of multiple ecological zones as part of opportunistic adaptive strategies to local resources (Newsom and Wing 2004; Siegel 1993). Proximity to both coastal and inland settings would have maximized the ability to efficiently exploit subsistence resources from both zones and allow for travel overland along the coastal plain as well as by sea. In addition to the sites previously mentioned, several well documented settlements form this period include Tecla (GY-01), Hernández Colon (PO-13), Tibes (PO-1) and Collores (JD-06) all of which are at the interface of the coastal plains and foothills physiographic zones. The relatively high proportion of settlements in the western watershed, in conjunction with evidence for early settlement at Tecla, suggests that this area was perhaps and early locality of Saladoid colonization.

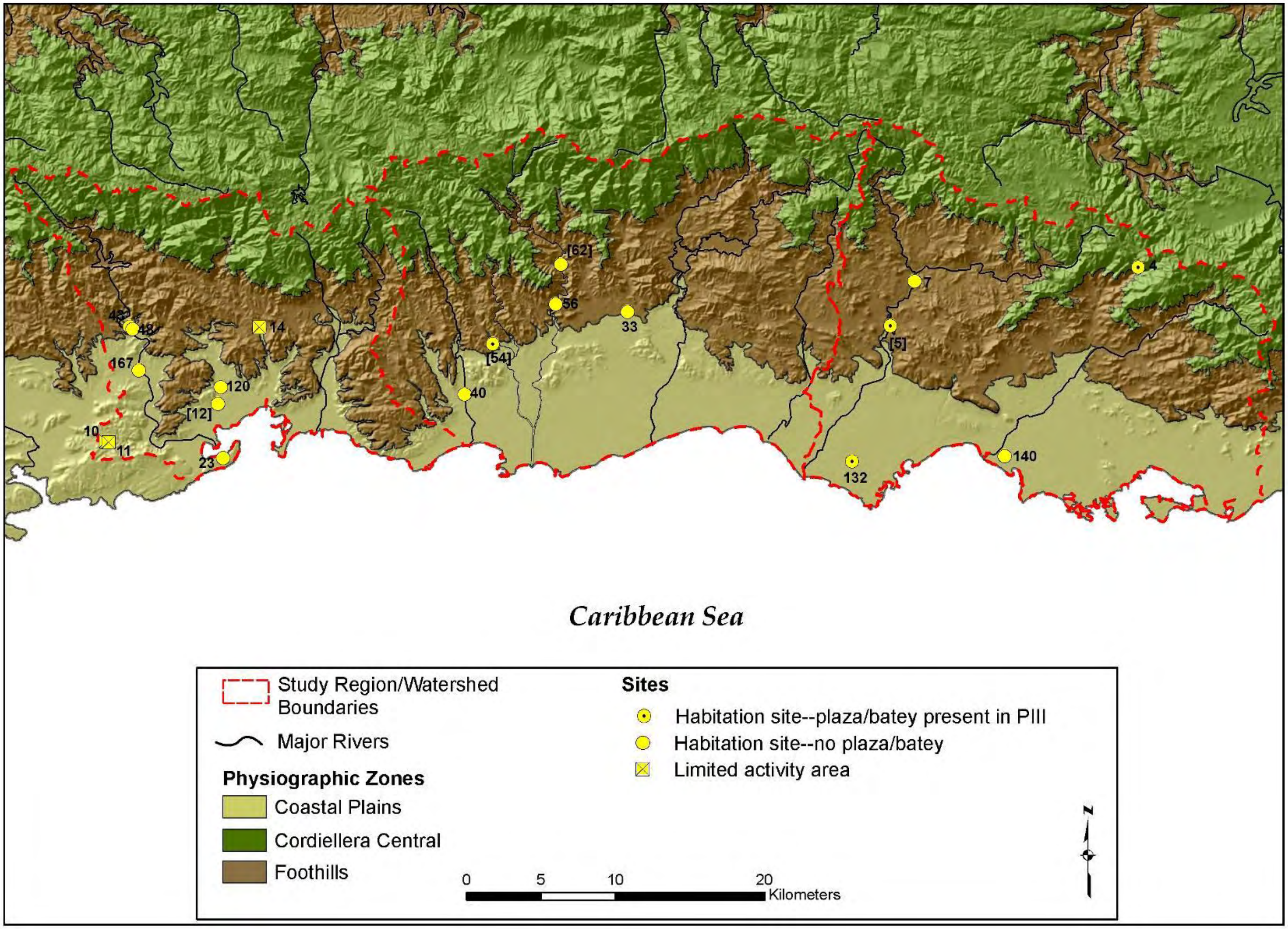

Figure 7-1. Period II site distributions in relation to physiographic regions. Bracketed sites [ ] have radiocarbon dates.

Between AD 600 and AD 1200 (Period III) there was an explosion of new sites evident in an increase of approximately 400% (n=98) (Figure 7-2). Of the 98 documented sites 81% (n=80) are residential habitations. Fifty eight percent (n=47) of the 80 settlements are in the foothills, 38% (n=31) on the coastal plains, and 4% (n= 3) in the uplands. The proliferation of new settlements during this period is thought to represent a dramatic rise in population that began just before AD 600. Increases in population during this time are generally attributed to the successful adaptation of Saladoid colonizers to the newly settled island environments (Siegel 2004). While this is indeed likely the case, rapid settlement expansion belies processes associated with village expansion that may or may not have been a direct result from social tensions catalyzed by increases in population. It may also suggest immigration of groups into the region from other, more distant areas. Obviously, these are not necessarily mutually exclusive scenarios.

With increases in settlement and population came the formation of new social networks. Several consequences resulted from these changes including the potential for increased social mobility, as individuals would have more opportunities to interact with a variety of people from different settlements. The outcome of these interactions would have increased potentialities to form new social links through marriage alliances (Ensor 2003; in press), exchange, or cooperative labor projects among members of interacting settlements. These interactions may have also caused tension through competition over resources and ambiguity in social relationships caused by increasingly complex and dense settlement networks.

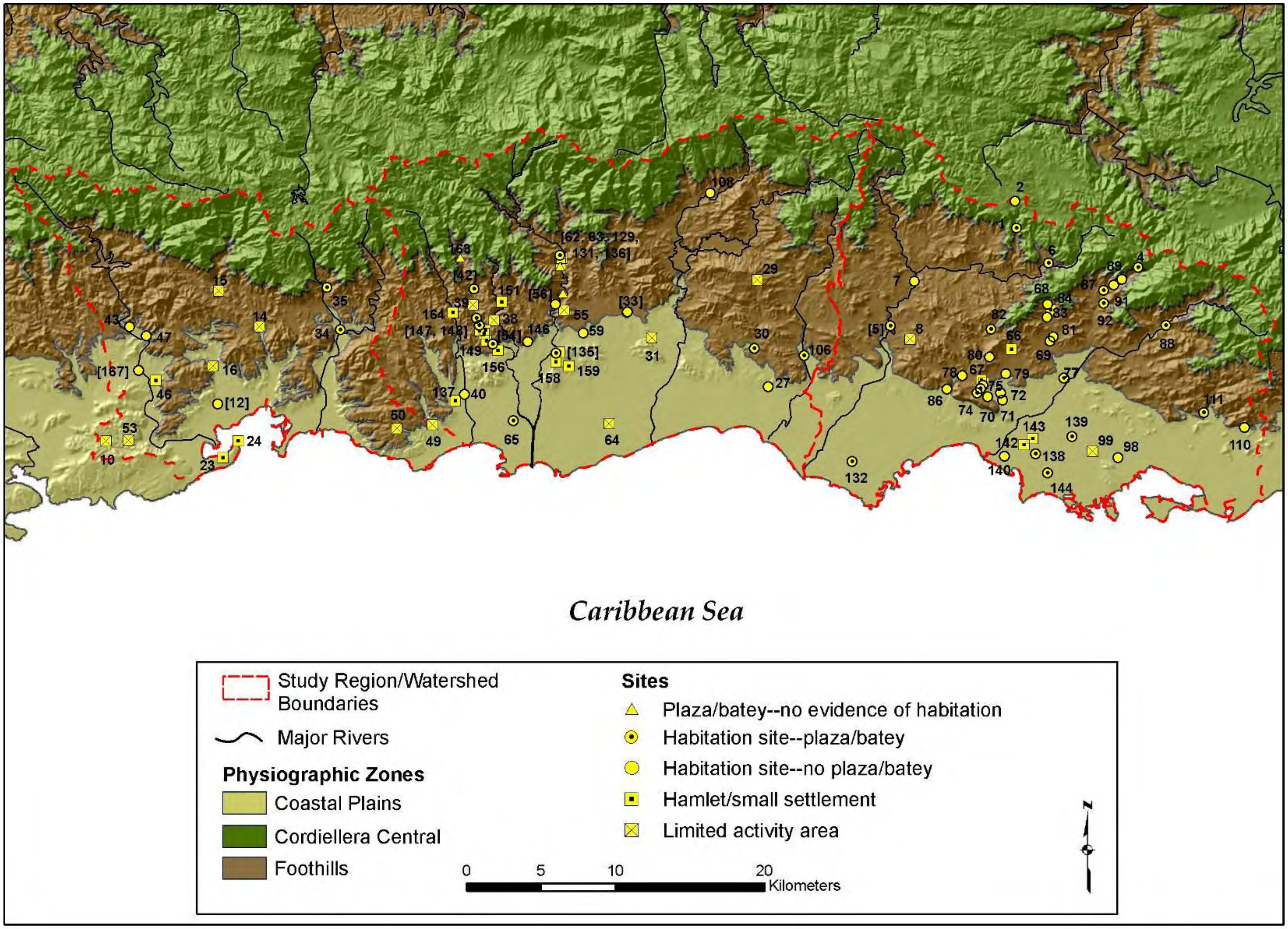

Figure 7-2. PIII site distributions in relation to physiographic regions. Bracketed sites [ ] have radiocarbon dates.

Increases in site frequencies were accompanied by settlement diversity. Changes in settlement size, discussed further in Chapter 8, is documented with smaller settlements in the foothills and some larger settlements on the coastal plains. However, the most conspicuous element of the settlement landscape emerging at this time is the proliferation of stone-lined plazas/*bateys*. Thirty sites, or 38% of the total sample from this period, possess these features. Sites with these features are most frequent in the eastern and central watersheds and 50% of these sites are located in the foothills.

Between AD 1200 and AD 1500 (Period IV) there was yet another shift in regional settlement. However, in this case, the number of sites decreases by 38%, from 98 to 61 (Figure 7-3). Of the 61 registered sites, 79% (n=48) are classified as habitations. Examination of these 48 residential settlements shows that 48% (n=23) are on the coastal plains with 44% (n=21) in the foothills and 8% (n=4) in the uplands. Notably, while many sites occupy inland settings, settlement frequencies on the coastal plains (particularly in the eastern portion of the study region) increase.

The largest settlements during this period, are on the coastal plains with the site of Lago Gely (PO-33) measuring about 9 ha (Thomas and Swanson 1986). However, the large size of this site (and perhaps others on the coastal plains) may be a slight overestimation due to site deflation from historic agricultural practices. The next largest settlements in the region, Caracoles (PO-10) and La Florida/Los Indios (SI-4), both measure just over 4 ha. In fact, the majority of sites from this Period are well under this size and the preponderance of so many small settlements during this time contradicts long held perceptions that the Taíno were primarily settled in large villages or “towns” (Loven 2010 [1935]).

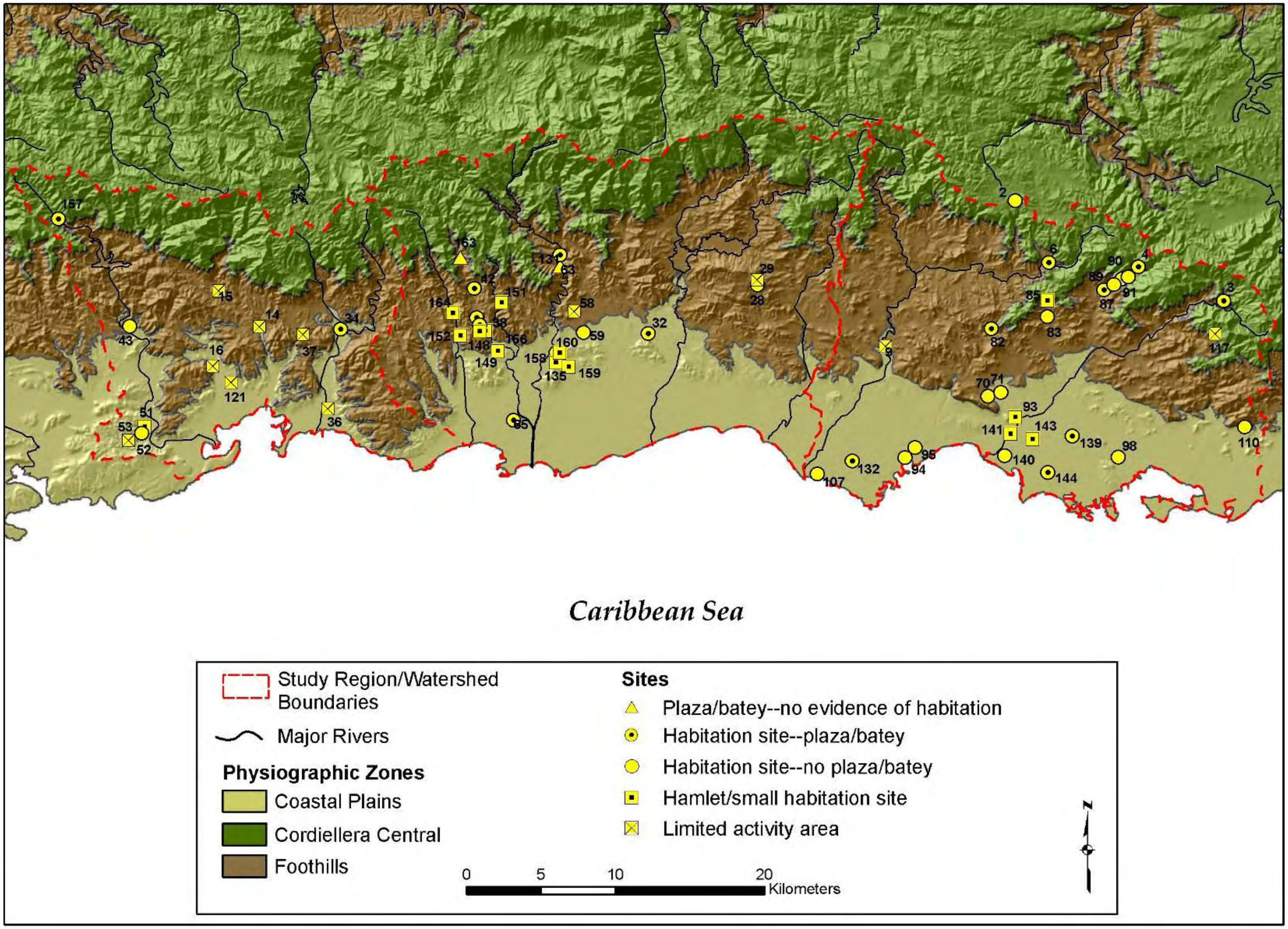

Figure 7-3. PIV site distributions in relation to physiographic regions.

It is also during Period IV that the frequency of sites with plazas/*bateys* is thought to reach its apex throughout the island, signaling the formalization of regional territorial political units (Siegel 1996, 1999). However, this does not appear to be the case for the south-central region. In fact, sites with plaza/*batey* features in the region are at their highest frequency in the *preceding* period with 30 documented for Period III versus only 19 in Period IV.

In contrast to the south-central region, research from other parts of the island indicate an increase in site frequencies during Period IV, particularly in the mountainous interior (Curet 2005; Oliver 2007; Oliver *et al.* 1999) as well as along the eastern coast (SEARCH 2011b) *with a prevailing pattern of small dispersed hamlet-sized settlements*. The decrease in sites in the south-central region, and increase in other areas, may have been the result of several factors including hurricane activity (Rodriguez 1985), climate variability, and/or processes related to the cyclical nature of incipient polities in which social groups fission and fusion in different stages of the political cycle (Anderson 1996a, 1996b; Blitz 1999).

Of particular note during this time is the eventual disuse or abandonment of Tibes shortly before AD 1300 (Curet and Stringer 2010; Curet and Torres 2010) and the apparent concomitant rise of PO-29 in the Portugués River drainage (Espenshade *et al.* 20011; Torres 2010). The settlement changes documented for the late pre-contact period in the region remain poorly understood, and with the abandonment of Tibes and other major village sites in the south-central region, this change is an important avenue of future investigation (Torres 2001; Curet 2005).

Summary of regional settlement variability: Diachronic examination of settlement patterns for the south-central region indicates major shifts in the distribution of regional populations through time (Figure 7-4). The settlement landscape during Period II depicts a relatively dispersed pattern of habitation sites that, while having some penetration into the foothills and uplands, are generally concentrated on the coastal plains. Through time the intensification of settlement follows a pattern of inland movement culminating in the emergence of densely settled localities in the foothills and some upland areas by AD 600. After AD 1200 there was some sort of realignment of the regional settlement structure evidenced by a decrease in the overall number of sites and shifts in some residential sites back on the coastal plains—particularly in the eastern portion of the study area.

It is important to note that the form of the regional settlement landscape is predicated, to some degree, by what comes before. For instance the density of residential settlement in particular parts of the landscape evident in Period III was influenced by settlement that developed during Period II. Hence, initial settlement of certain areas would have influenced locations of daughter settlements and processes of expansion based on areas available for settlement at any given point in time (a point to be addressed the proceeding discussion).

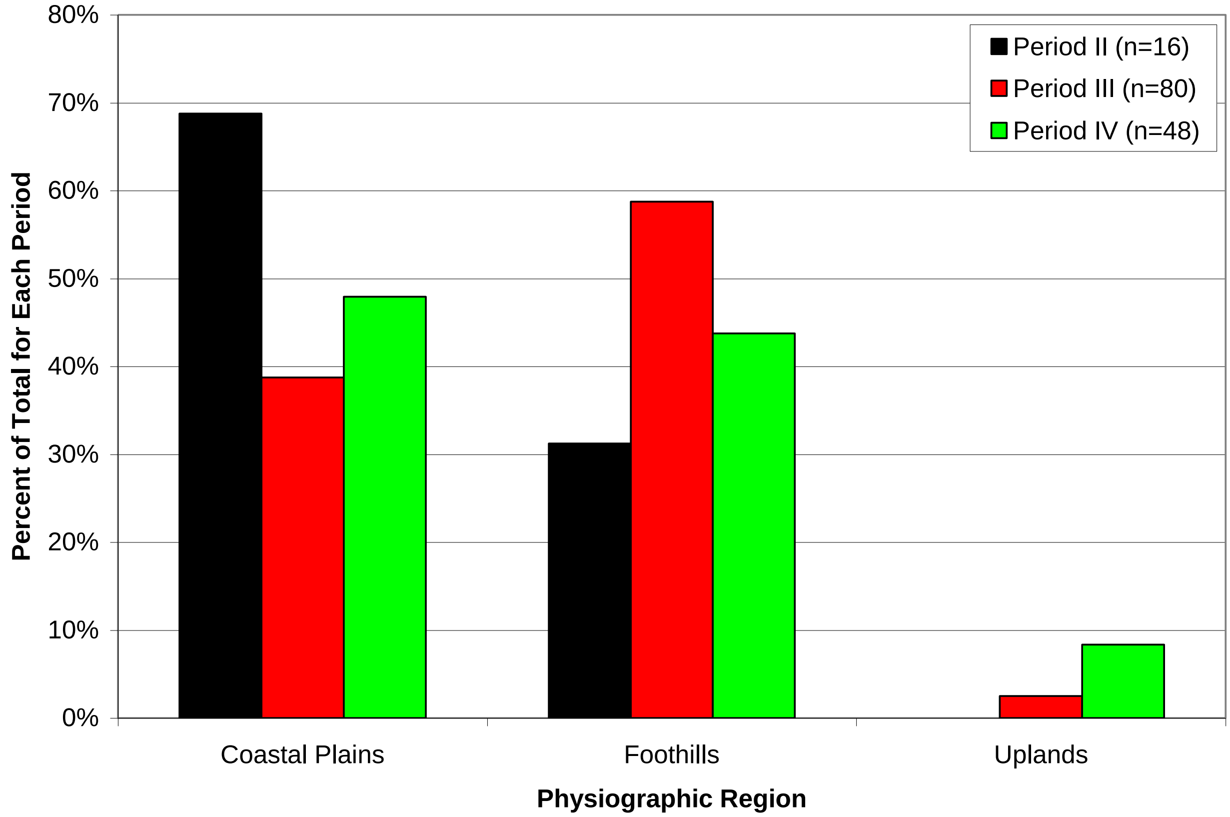

Figure 7-4. Site distributions in relation to physiographic zones through time.

A regional change in the organization of the social landscape is evident in the diversity and in the types of sites that emerged after AD 600 (Figure 7-5). During Period II there appears to be limited diversity in the morphology and function of settlements. The limited number of specialized activity sites during this time indicates that most activities were focused on areas immediately associated with the residential settlement. Settlements during this time are generally large ($\geq$ 3 ha) and there is little evidence indicating otherwise. These sites are relatively dispersed across the landscape and limited in number.

By AD 600 more variability is visible in the types of settlements ranging from small and medium sized habitation sites to sites with multi-court ceremonial features and proliferation of specialized activity areas. This variability is concomitant with a distributional shift in regional populations and intensification of settlement of inland foothills areas. The increase in settlement density and the implied challenges facing the regional population highlight some of the new social conditions that emerged during this time. In the remaining portions of this chapter I present additional evidence to discuss the implications of these settlement changes on the development and organization of local communities throughout the region between AD 600 and AD 1200.

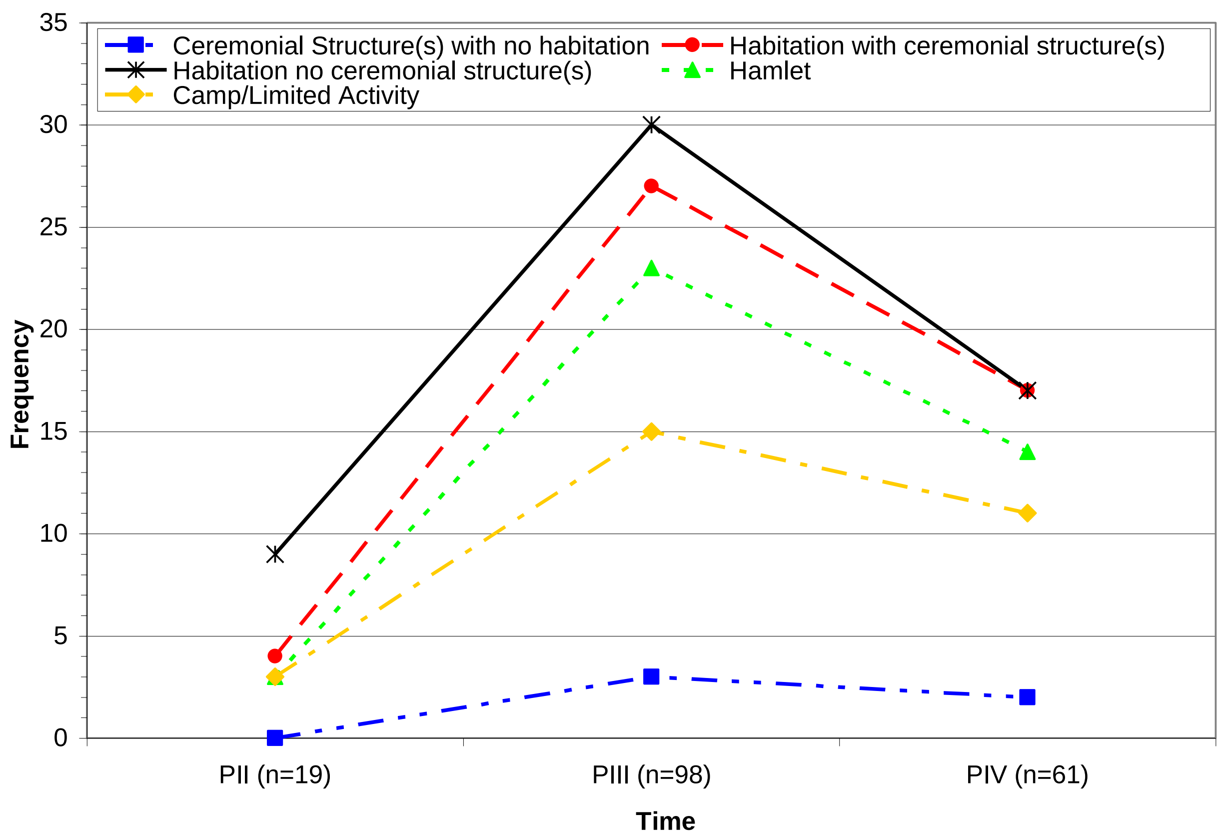

Figure 7-5. Site trends through time. (Note: Period II settlements noted with ceremonial architecture develop them in Period III).

Cost-Catchment Analysis: Community Clusters and Near-Village Territories

Cost models have proven an effective tool in archaeological research for modeling potential social interaction between residential settlements and their articulation in larger social formations (*e.g.*, Varien 1999). At the heart of cost based models of interaction is the idea of social propinquity that suggests people in close proximity to one another spatially will interact more frequently and form social groups (Festinger *et al.* 1950). From this perspective (as outlined in Chapters 2 and 4) the friction of distance directly influences the formation and organization of local social and political networks (*e.g.,* Powell 1960; Tuzin 2001).

Although societies differ in the extent of their spatial awareness and social interdependence, in most cases individuals focus on direct experience. The immediacy of social awareness is typically centered on the residential settlement, its immediately surrounding near-village territory, and neighboring social groups. This local area and those that dwell within it are therefore become the most intimately known (Ingold 1993; Soja 1985; Taun 1997). Hence, in this study I focused on residential settlements (*i.e.,* habitations/hamlets) to discuss the implications of cost modeling because these spaces form the nexus of local social groups and the foundation for first-order, face-to-face, social relationships.

Cost models measure surface distance based on impedance factors, which take into account characteristics of the natural topography. Differing from other models of travel based on two dimensional modeling techniques, cost models measure resistance units across a topographically non-uniform plane to calculate a least accumulative surface from a given point location. In the present study, the DEM was used to generate slope for the region, which in turn is used to develop a friction surface for measuring cost-distances. As the slope increases, cost values increase accordingly.

The generation of the friction surface is based on the following formula applied to the slope grid: (((slopegrid/45)*3.168)+1). In this formula slope is divided by 45 to convert from degrees to vertical proportion per cell width (Carlisle 2007; Van Luesen 1998). This value is then multiplied by an ascent cost factor of 3.168 taken from the conventional backpacker equation (Van Luesen 1998:3), and increased by a value of 1 to represent the effort required to traverse the horizontal distance of the cell. The resulting raster is an isotropic friction surface that uses slope to determine relative energetic cost of moving across the landscape. From the isotropic surface, I modeled cost-catchments for all residential settlements from Periods II, III, and IV.

Based on the available data, 96 sites are habitations/hamlets. From this sample, 16 are from Period II, with 80 from Period III, and 48 from Period IV. I generated cost-catchments at 2.5 and 5 km distance intervals for settlements for each period. The 2.5 km cost-interval serves as a heuristic to visualize the approximate extent of lands most intensively utilized by a settlement for its most basic social and subsistence activities (Chisholm 1968:131; Stone 1991:347, 1992:166; Varien 1999, 2002:174-175). I use a 5 km cost-interval to represent a more inclusive range of settlement activities that that closely relate to ranges documented for near-village territories in formative agricultural societies (as discussed in Chapter 4).

When adjusted for the energy it takes to traverse variable terrain, the areas of the cost-catchments are in many cases smaller than the areas of circles with 2.5 and 5 km radii. This is because the terrain in particular portions of the landscape, especially in foothills and upland locations is much more difficult to traverse than the coastal plains. This will become increasingly apparent in examination of Periods III and IV. In the following discussion, I show how the physical realities of topography and changes in settlement through time affected interactions between social groups at the local and regional levels.

Period II

Cost catchments for the 16 Period II habitation sites show three distinct clusters of settlement in the western, central, and eastern watersheds (Figure 7-6). Examination of the clusters reveals denser settlement in the west, becoming more dispersed to the east. Examination of the 2.5 km cost-catchments shows habitation sites are loosely linked with only 43% (n=7) sharing catchment boundaries. One settlement pair (GY-01 and GY-10) and one triplet (YA-01, YA-02, and YA-12) are present in the west, with one pair in the center (PO-13 and PO-38), and one pair in the east (CO-01 and CO-03).

The 2.5 km settlement clusters in the west suggest a more nucleated pattern, while in the east settlements are a more dispersed. At the 5 km cost-interval, distinct clusters of settlements are evident which tend to fall within the major watershed boundaries. At this distance 82% of the documented settlements share cost catchment boundaries. Early sites in the region dating to this period, such as Tibes, Hernandez Colon, Tecla, and Cañas would have benefited from the presence of other nearby settlements while maintaining ample distance between them to limit competition for local resources (Keegan n.d.; Moore 2001).

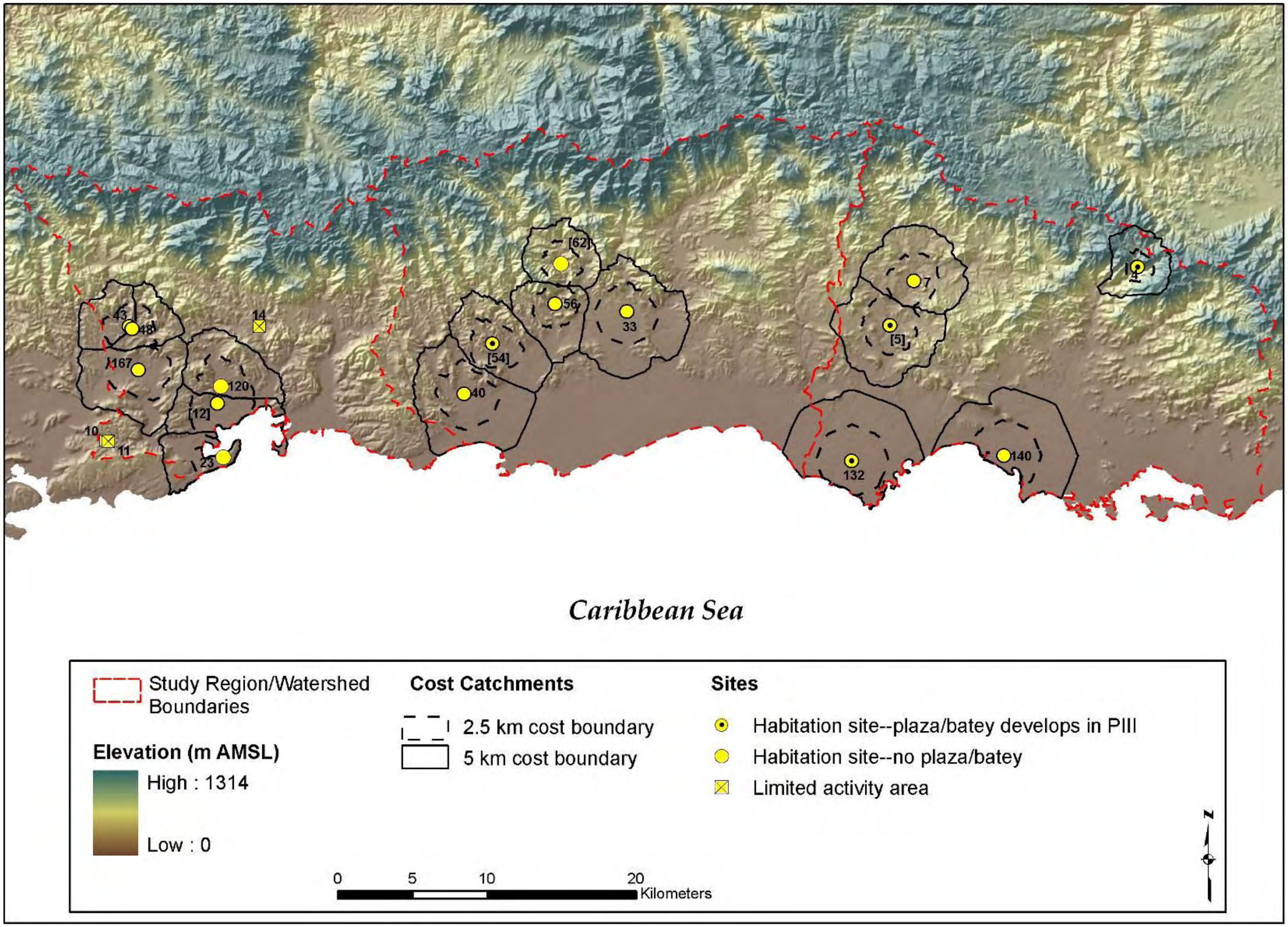

Figure 7-6. Period II settlements and cost-catchments. (* Sites noted with plaza/*batey* features develop them in PIII).

Period III

Period III shows a dramatic increase in the number of residential settlements which contributes to the dense clustering of the post-AD 600 landscape (Figure 7-7). Examination of the 2.5 km cost-catchments shows that 93% of residential settlements (n=74) share a catchment boundary with at least one other settlement. At the 5km cost-interval 99% (n=79) of all settlements share catchment boundaries with at least one other settlement. The three major settlement clusters, noted for the previous period, expand substantially continuing to conform to the region's major watersheds. Two important observations are made from the cost-catchments that likely had major ramifications on community organization and social interaction during this time.

First, decreases in the spacing between coeval settlements would have promoted the extension of social networks outside of primary village contexts. This increase in interaction, while at one level serving to strengthen local social relationships, may have also promoted fractious behavior arising from scalar stress (Johnson 1982). Additional stress may have been placed on residential social groups because of the reduction of immediate near-village territories causing competition for resources in densely settled areas. Second, as social networks became increasingly interconnected and complex, the buffering of settlements, and their spread inland to topographically restricted/secluded areas, *would have resulted in increasing insulation of some settlements from others*. Hence, while the regional settlement system was expanding it was also contracting, with some residential settlements (or small clusters of sites) becoming segregated from other like small clustered settlements in discrete areas. This will be discussed in further later in this chapter. For now, I briefly discuss settlement expansion from Period II to Period III before returning to cost-catchments for Period IV.

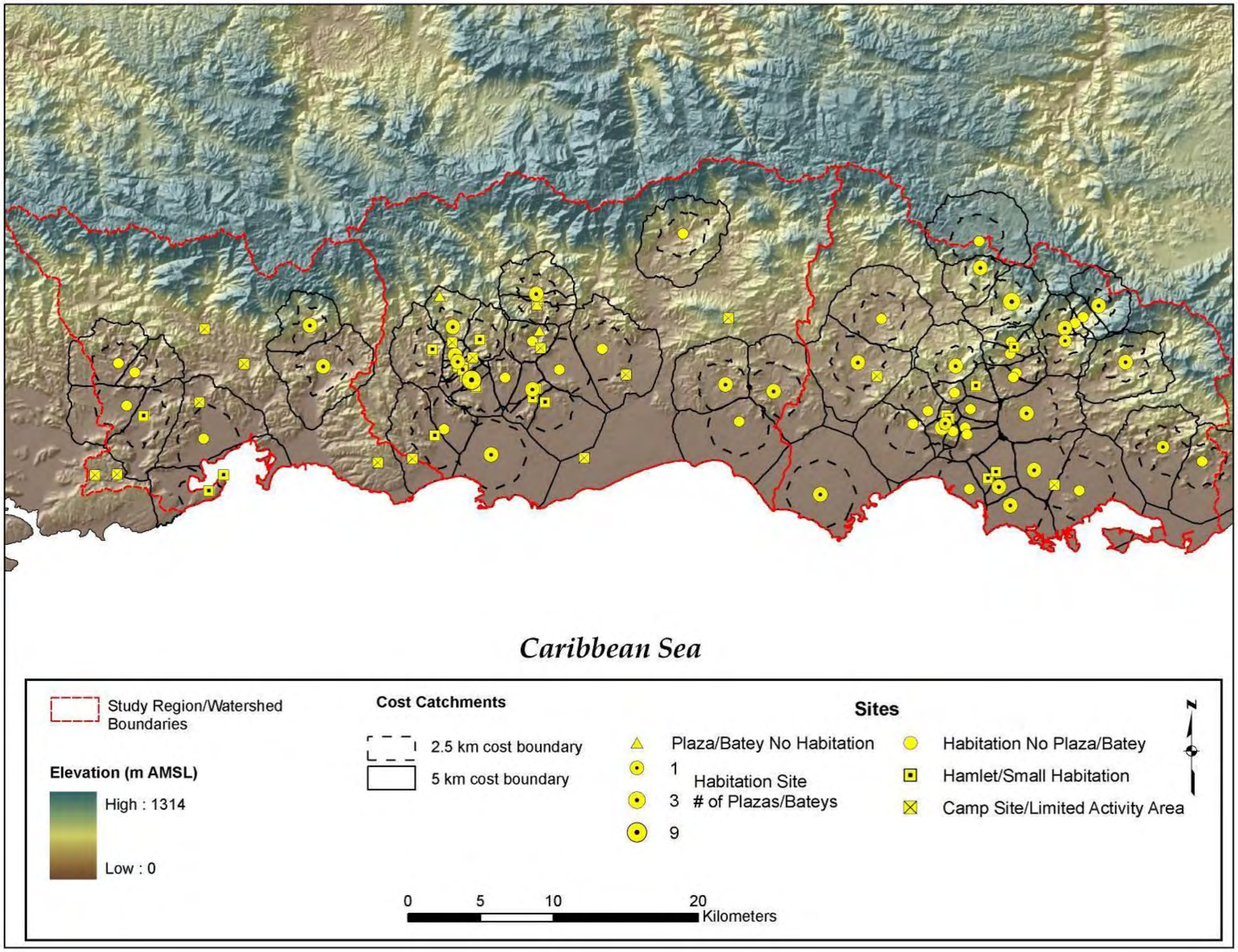

Figure 7-7. Period III settlements and cost-catchments.

Branching Out, Settling In: Settlement Expansion (Period II to Period III)

The proliferation of new settlements during Period III suggests that they may have developed as a part of village fissioning. It is generally accepted by anthropologists that fissioning is strongly tied to settlement size and increases in the population of residential settlements (*e.g.,* Chagnon 1976:14; Whitten 1976:125; Riviére 1984:27). However, anthropologists often differ on the particularities of exactly how and why this happens. Further, and perhaps more important to this study, are the outcomes (perhaps unintended) of this process for the recreation of social communities. Here I briefly discuss processes of settlement expansion, with an emphasis on fissioning, and its implications on the social landscape sometime between Period II and Period III. I revisit this concept and some of the underlying conditions and particular outcomes evident in the archaeological record during this time in Chapter 8.

Two scenarios for the creation of new settlements are present in the data which influence the structure of the regional social landscape and community formation during Period III. First, daughter settlements would settle a short distance from parent sites to maintain social ties. The relative short distance from the parent settlement would have promoted continued interaction and participation in local corporate work group activities as well as access to critical social and natural resources. This intensive use of the local landscape creates occupational persistence and continuity in particular localities and the centralization of particular kin/social groups in the landscape. Second, the development of new settlements outside of this range implies the potential avoidance of earlier residential sites and their near-village territories. In this situation, the expansion of settlements into previously unsettled areas creates new associations between people and the landscape.

Of the total 80 habitation sites associated with Period III, 66 are new settlements with 14 persisting from previous period. These persisting settlements are located in the western (n=4), central (n=5), and eastern (n=5) watersheds (Figure 7-8). Looking at the individual watersheds it is possible to denote differential rates of settlement growth and dispersal. The western watershed accounts for only 7% of regional settlement growth the formation of 5 new settlements. The central and eastern watersheds account for 38% and 55% of regional settlement growth. While some of the variation in the number of settlements may be attributed to relative size of the watersheds, the paucity of new settlements for Period III in the western watershed may be due to topographical constraints. In this region the coastal plain is narrow and the foothills are near the coast.

Forty-five percent (n=30) of new settlements develop within the 5 km of the preexisting Period II settlements and 55% are outside this range. Of the 25 new settlements in the central watershed 72% (n=18) are within the 5 km cost-catchments surrounding the sites from Period II (particularly Tibes) with only 28% (n=7) outside of these areas. This pattern is also evident in the western watershed where 60% (n=3) of the 5 new settlements in that watershed emerge within the Period II 5 km cost-catchments. In both cases, the creation of new settlements so close to those from the previous period suggests the maintenance of close ties with parent settlements and persistence in the occupation of settlement localities. This pattern also suggests a potential trend toward consolidation of local social groups and their associated near village territories.

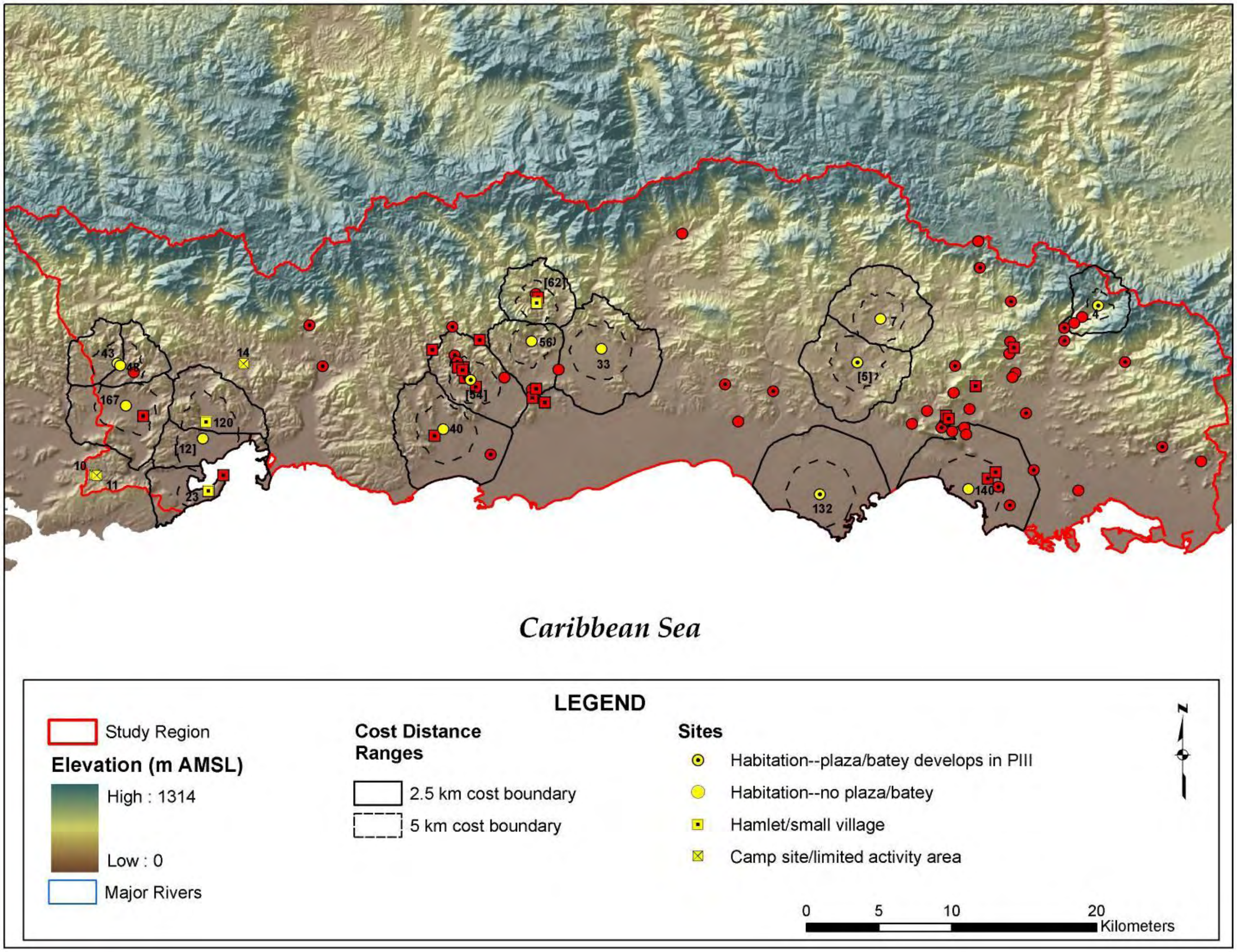

Figure 7-8. Settlement trends from Period II (yellow) to Period III (red).

In contrast, the eastern watershed shows that only 25% (n=9) of the 36 new settlements are within the Period II 5 km catchments and 75% (n=27) are outside these areas. In this instance, the pattern suggests avoidance of earlier settlements and the formation of new settlement territories. The clustering of Period III settlements in these new areas implies the creation of social groups independent of parent settlements. This does not mean that these settlements had no connections with the earlier parents, but that rather these settlement choices would have stimulated more autonomy in the daily lives of social groups. Further, the settlement of new areas would have required new configurations in associations between people and the landscape.

Two outcomes of settlement fissioning are noted that have a direct influence on the organization of social groups. In the first situation, kinship associations are maintained with settlement divisions treated as territorial segments (Widmer 1994). In this case fissioning *does not create new ranks* since no new lineages are created. This scenario suggests that the creation of new villages results in the *replication* of basic social units, and by extension, settlement form. Here social organization is perpetuated and interaction is maintained with parent settlements through exchange and likely corporate labor endeavors such as clearing nearby fields, house building or the construction of communal ritual integrative facilities.

In another scenario, settlement fissioning has a different outcome. When a village fissions the lineage also fissions and new ones are formed. While these new lineages are autonomous, they typically recognize genealogical connection to the parent settlement and its founding ancestor. These splits create a rank order of splits from the parent settlement. Hence, the order of dispersal or fissioning from the parent settlement can become a rank social order materialized on the landscape. In this scenario the material outcome of these patterns can entail *a replication in settlement form similar to the original parent settlement but also may take alternative forms as social groups vie for rank amongst many new settlements*. Although these are just two social outcomes of settlement fissioning, the implications are important when considering the reconfiguration of socio-settlement systems as indicators of continuity and change not only in the organization of social groups but in relations between people and landscapes. This will be further discussed in Chapters 8 and 9 of this work.

Period IV

As noted, during Period IV there is a decline in the number of settlements in the region and many (including Tibes) fall into disuse (Figure 7-9). Settlement frequencies decrease by approximately 40% from 80 to 48 residential settlements within the study area resulting in a relaxing of the compactness in the landscape and near-village territories.

With the decrease in the number of settlements, cost-catchments become less connected and the density of settlement changes in some areas. This is visible in the eastern portion of the study area where settlements shift back towards the coast and in other research where settlement frequencies increase in the mountains (Oliver *et al.*1999). In the western watershed, five settlements are registered with only three linked at the 5 km cost catchment interval. Interestingly, the site with public/ritual architecture (YA-03) is located northwest of these sites and not connected to any other settlement at the 5 km interval. It could be that the site is connected to other spheres of interaction outside of the area captured in this research; however, its specific regional relationships during this time are not clear.

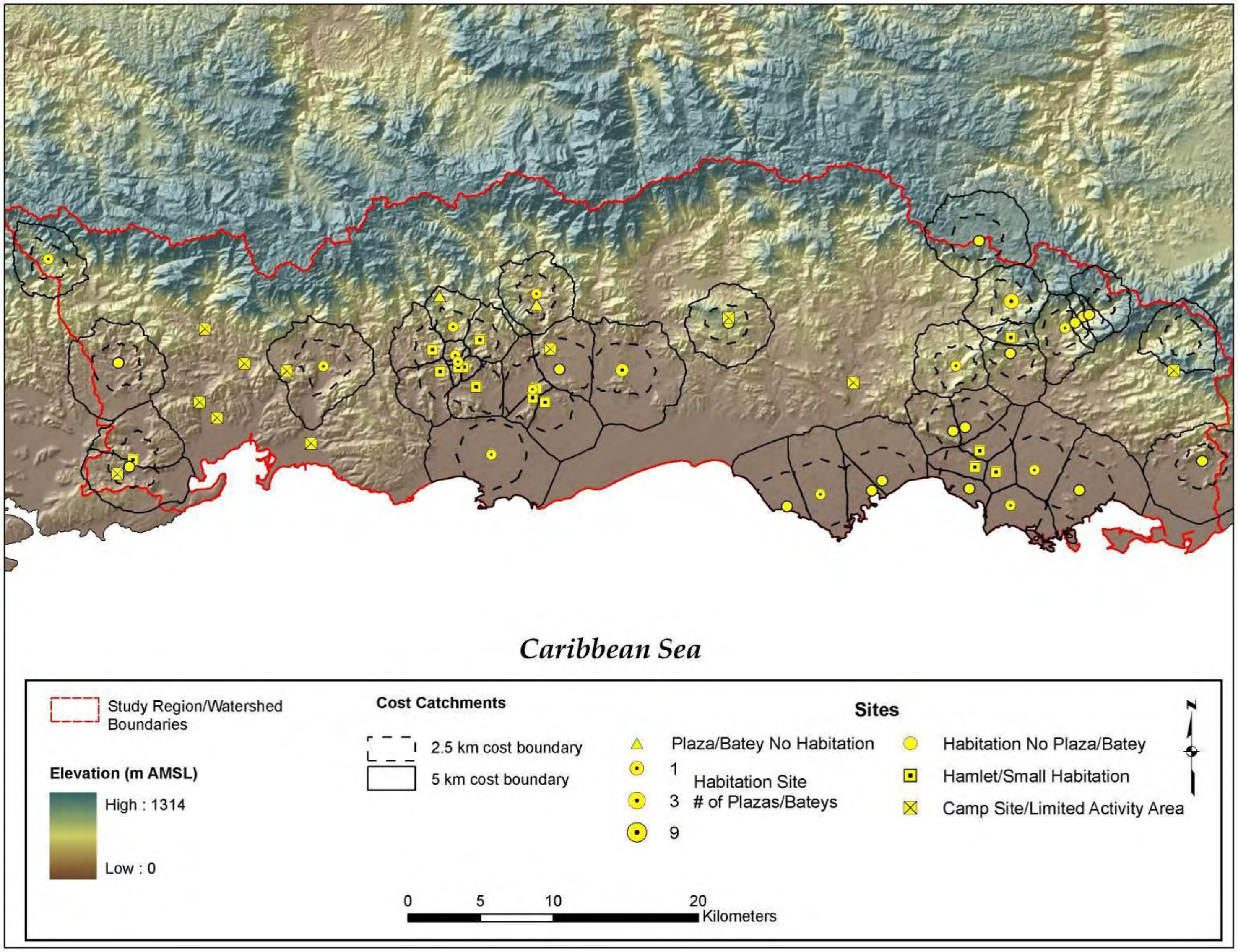

Figure 7-9. PIV settlements bounded by 2.5 and 5 km cost-catchments.

Cost catchment analysis summary: Cost catchment polygons show how topography played a role in the potential movement and settlement of people in the region as well as how residential settlement became more clustered or localized through time. An important observation is that the dramatic increase in settlements from Period II to Period III contributed to a more densely packed landscape—particularly in the central and eastern watersheds. Moreover, the cost-catchments suggest the intensification of social interactions between potential coeval neighboring villages.

Settlement expansion during Period III provides evidence for both continuity and change in relationships within and between settlement clusters as well as the landscape during this time. The development of new settlements in areas immediately adjacent to those inhabited in Period II indicate continuity and the persistence of occupation of particular localities while new settlements outside of Period II near-village territories point to avoidance of earlier settlements and the creation of new social localities.

The clustering observed during Period III resulted in changes in the size and shape of the near-village territories as shown by the 5 km cost catchment polygons (Figure 7-10). During Period II the median catchments were approximately 869 and 2450 ha for the 2.5 and 5 km cost-catchments respectively. In the proceeding period these values drop dramatically with the median catchment sizes at approximately 434 and 844 ha. In Period IV this area is slightly relaxed with median catchment sizes at 529 and 1296 ha.

The changes in the size of near-village territories would have altered the availability of cultivable lands and locations for future settlement. Hence as time progressed, densely settled localities would have become points of contestation not only as a result of increased interactions among proximally related settlements, but also within broader regional contexts as social groups sought to claim legitimacy of and access to the social and natural resources associated with them.

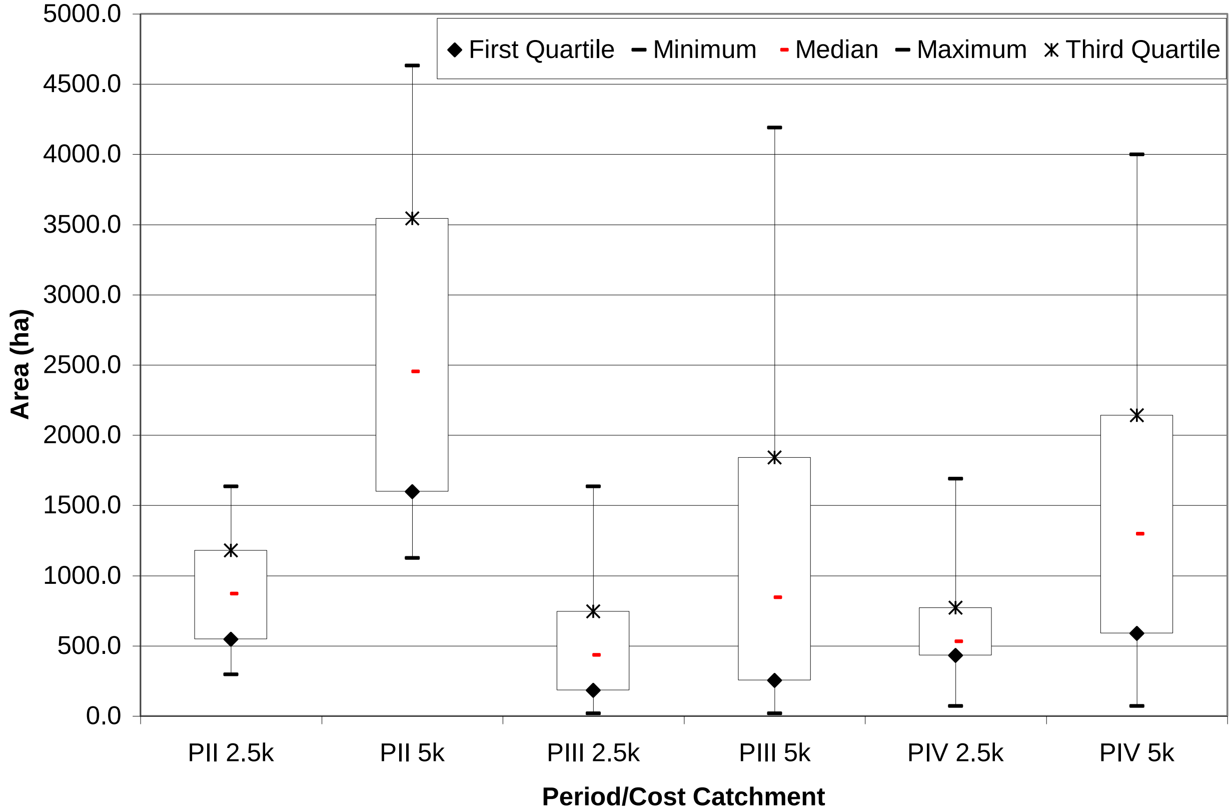

Figure 7-10. Area (ha) of near-village cost-catchments (2.5 km and 5 km) through time. (Period II n= 16, Period III n= 80, Period IV n=48).

Finally, as observed in the connectivity of the boundaries of the near-village territories, settlements during Period III became increasingly linked—particularly at the local level. However, while the clustering of the near-village territories indicates the increases in the potential social connections of settlements within the region, *it also* *suggests that they became increasingly insulated at the local level*. This can be visualized by the number of near-village neighbors of a given site that would have had a buffering effect from further distant settlements. Further, inland settlement of the constricted river valleys of the south-central coast would have contributed to the insulation of local social groups from other more distant groups occupying similar topographically restrictive drainages.

Regional Settlement Structure

In this discussion, I employ aspects of cost-modeling from the previous section to examine the morphological structure of settlement influencing community formation and interactions leading to the Period III social landscape. One method, frequently employed by habitat ecologists for modeling interaction amongst wildlife populations, utilizes least-cost paths as a realistic measure of connectivity (or its inverse, spatial isolation) rather than linking points using standard Euclidean distances (*e.g.,* Chardon *et al.* 2003; Coulon *et al.* 2004). The development of cost paths employs similar spatial computations and the cost friction surface as used for the cost-catchments; however, the creation of the cost paths finds the least cost-distance *linking* settlement nodes together. From this data, distance matrices (and connectivity graphs) can be generated which allow for further manipulation and analysis.

Examining the structure of the regional network offers insight into several important aspects of the social landscape through time. For instance, by establishing the morphological structure of the network it is possible to develop an understanding of how co-residential social groups were positioned within the network and how shifts in settlement affected interactions within and settlement localities through time. The differences in how connected settlements are may be a key indicator of the cohesion or fragmentation of social groups that can be examined diachronically and at different scales of analysis.

To develop the least cost paths and associated distance matrices in this study, the Landscape Genetics toolbox was used in ArcGIS 9.2 (Etherington 2010). This tool box possesses a function to compute matrices of effective geographic distances among points (or nodes), based on a least-cost path algorithm (Adriaensen *et al.* 2003). The sample points, in this case residential settlements for each period, were used in conjunction with the friction surface (used for generating cost-catchments) to represent the cost of movement through the landscape between settlements. Creation of the network develops a polyline shapefile linking each residential settlement resulting in (n*n-1)/2 links (*i.e.,* nodes are not linked to themselves) and matrices of effective (cost) distances.

In developing a least cost path approach for examination of the regional network through time, I focus on the cascading linkages between settlements that were most likely to interact on a consistent basis. Because the calculation of the network mentioned in the previous section takes into account the total linkages between each settlement in the region, the network becomes saturated and meaningful patterns in the morphology of residential social groups become difficult to discern. Further, total linkages create redundancies in the data and consist of overlapping segments that pass through multiple nodes/settlements in the regional network.

To address this shortcoming, I constructed a subset of the total cost paths for each period. The subset was based on the construction of Minimum Spanning Trees (King 1985; Supowit 1983; Yao 1982) (Figures 7-11 and 7-12). The Minimum Spanning Tree

(MST) is a subset of a Relative Neighbor Graph (Toussaint 1980) and displays the minimum least cost to nearest neighbor linkages with no loops or cycles. As such the MST is considered representative of the core structure of any network.

Examination of the network here focuses on social spacing and the implied cohesion and centrality of particular settlements, settlement clusters, and places on the landscape. Given these conditions, two types of networks are here defined. The first is a geographical network of distance, representing a hypothesis of shortest links between settlements. The second is a relational network of co-presence, representing settlements with “limited time-space extension” (Giddens 1984). In the case of the former, these paths should be targets for future archaeological testing for the presence of additional settlement activity as one might expect additional settlements located along them. In the case of the latter, paths represent linkages between coeval settlements and a platform for examining the regional interaction and the distribution of social communities.

Network Structure

Examination of the MST for each period allows for more critical examination of settlement distributions based on the quantification of the distances between settlements. Since the MST represents single links connecting nearest neighbors, it is the core of structure of the network with no redundant linkages. The implications of this spacing and the morphology of the regional network are discussed below for each period.

During Period II, linkages at the 2.5 km cost-distance account for just 25% (n=4) of the settlements with the majority connected at further distances--between 5 and 7.5 km (40% total) (Figures 7-12 and 7-13). Settlements during this time are relatively dispersed with small clusters separated at distances over 11 km resulting in the “step” in the linkages at this level indicating the notable gaps between watersheds. As viewed on the map these longer bridging links are blue lines. With the removal of these links the density of local interactions within settlement clusters becomes more obvious

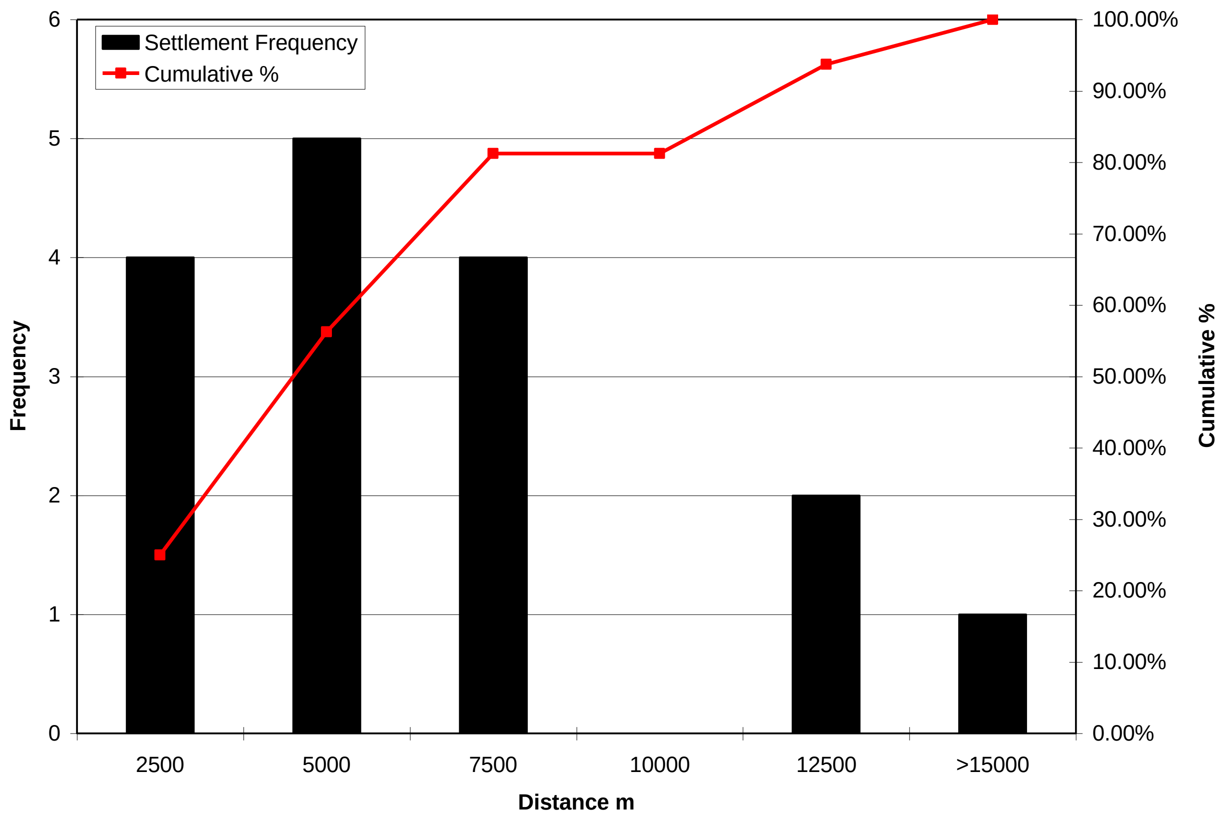

Figure 7-11. Period II settlement spacing based on MST.

The morphology of the regional settlement network, as alluded to in the previous discussions is evident here. The MST shows a central “trunk” running east-west along the interface of the foothills and coastal plains with relatively few branches extending to inland locations. Occupation of the Portugués and the adjacent Cerrillos River drainages shows that initial settlement occurred at the mouth of valleys as they open on the coastal plain. Paths to inland areas can be seen following these drainages. Outside of the river drainages, the settlement system would have been generally "open" with settlements having relatively unimpeded access to others (Clarke and Blake 1994).

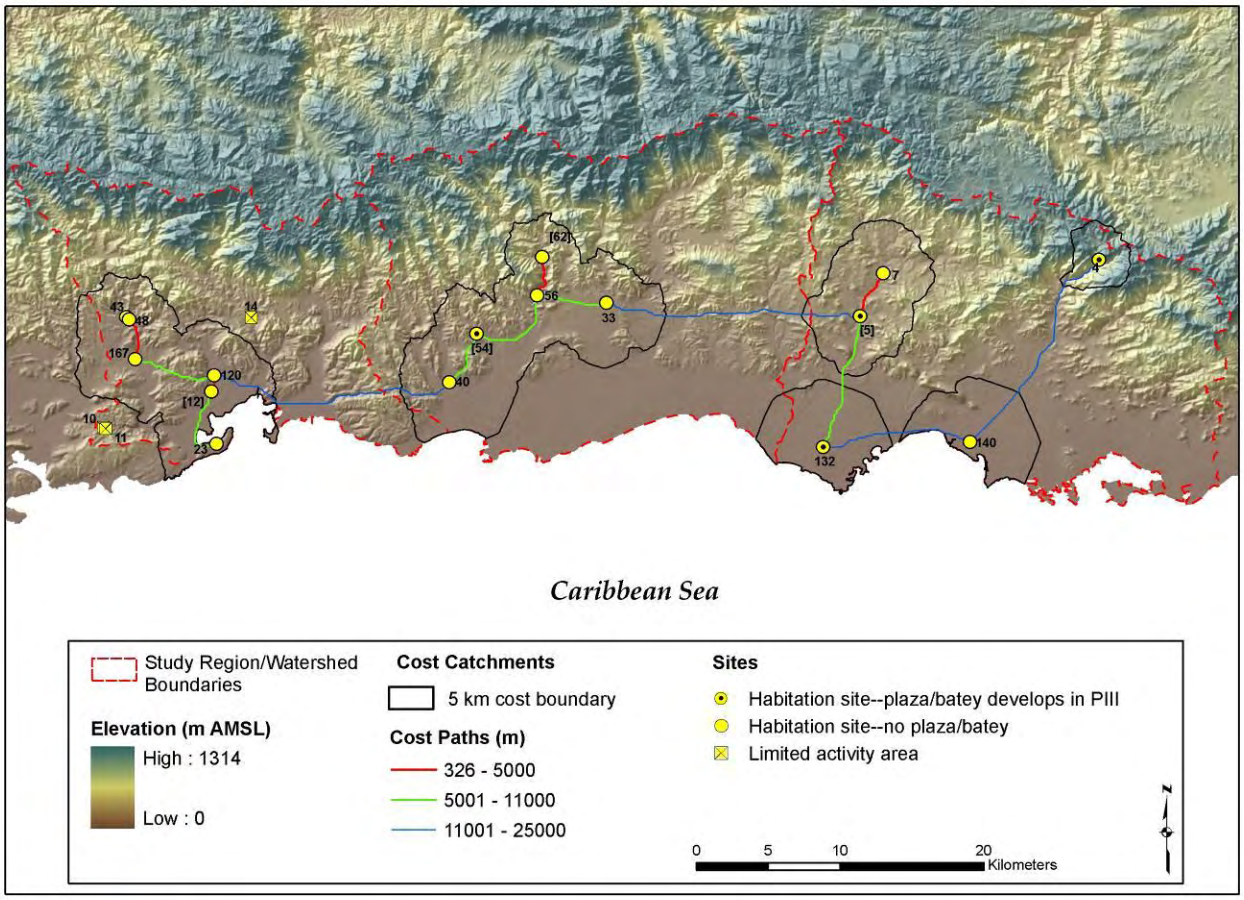

Figure 7-12. PII MST regional network showing distances between residential settlements.

In Period III distances between settlements decrease (Figures 7-13 and 7-14). The MST shows 49% of settlements are linked at the 2.5 km interval and 93% at the 5 km cost interval. The preponderance of settlements at short distances indicates a high degree of interaction among local social groups. Interestingly the relative distance between settlement clusters, of the western, central, and eastern watersheds is maintained with bridging links between the peripheries at distances over 12.5 km. These distances, approximating a one day round trip, would have been even further for settlements at the center of settlement clusters. These distances, as indicated by Spencer (1998), often differentiate localities of social and political action.

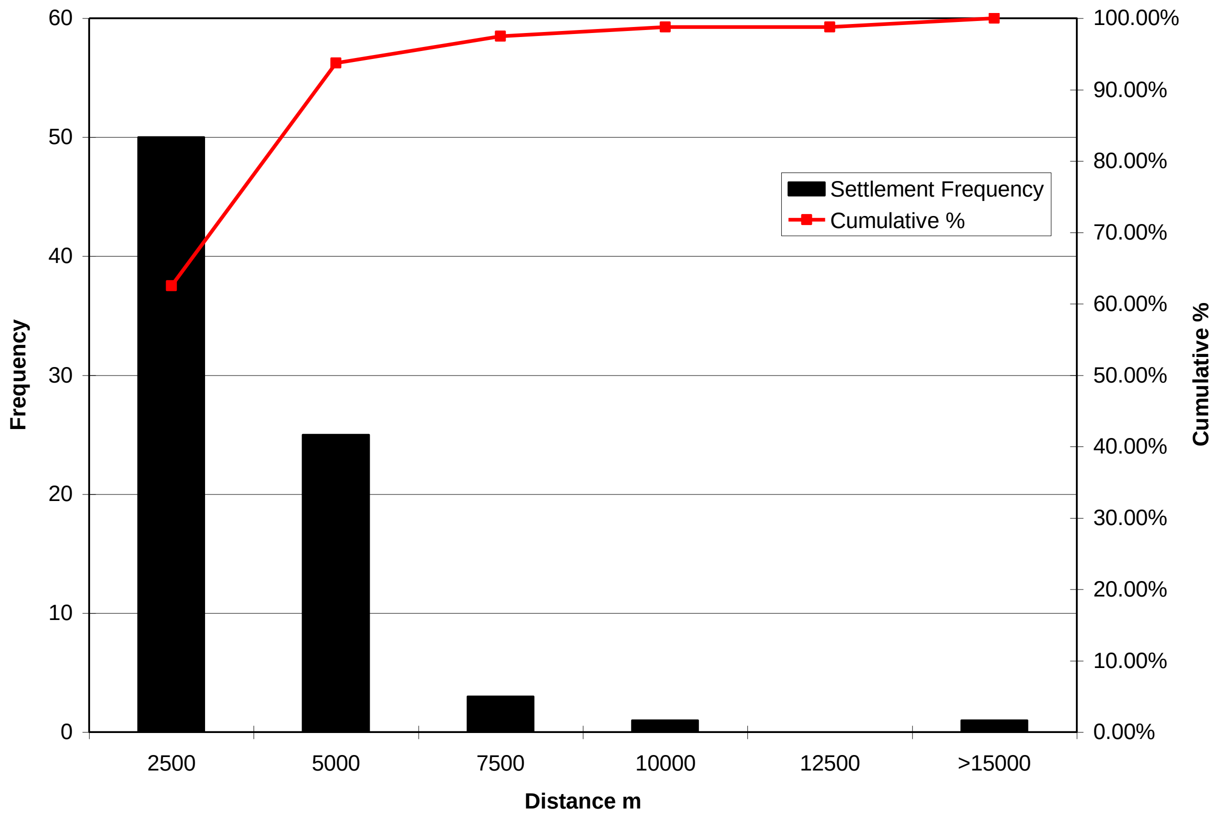

Figure 7-13. Period III settlement spacing based on MST.

In contrast to the network for Period II, other major changes are visible for Period III. While the central trunk of the network from Period II remains, running east-west along the coastal plains, Period III exhibits settlements branching out into the interior river valleys. So, in addition to east-west vectors of interaction the social landscape after AD 600 was complicated by north- south interactions between people of the interior and coast.

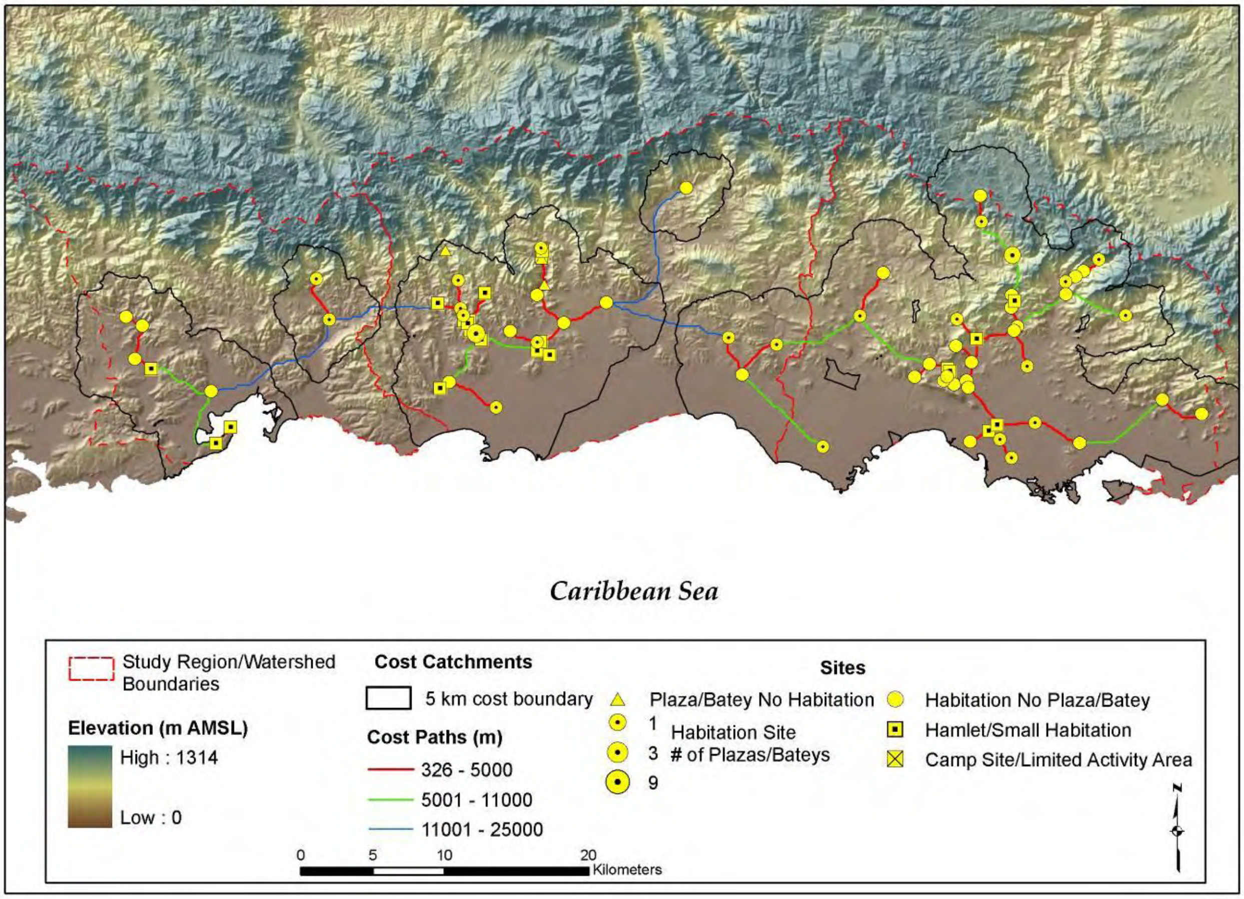

Figure 7-14. PIII MST regional network showing distances between residential settlements.

The structure of the settlement network for Period IV (Figure 7-15 and 7-16) continues to display tight clustering of settlements as noted for Period III based on the high frequency of settlements linked at the 2.5 cost interval. However, these local clusters are separated by further distances indicating an increased spacing between localities. This is clear in the proportional increase in the number of settlements connected by distances over 10 km during this period.

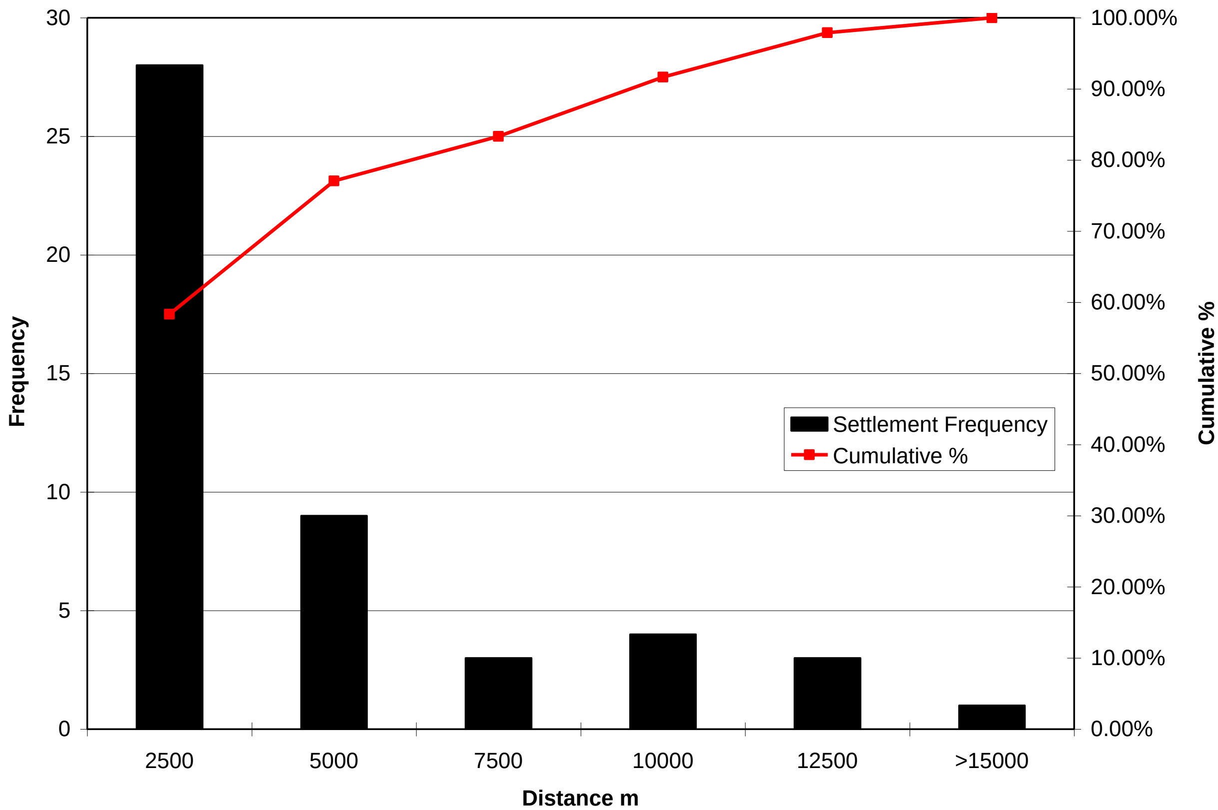

Figure 7-15. Period IV settlement spacing based on MST.

Examination of the MST for Period IV shows that the tightly linked clusters in the east and west change. In the east, clustered settlements are arranged horizontally along the coast. The presence of sites in this area along the coast, in conjunction with many of them possessing Boca Chica pottery from the Dominican Republic, appears to indicate that this area may have been nodes linking the regions by water travel. The linear arrangement of settlements along the coast during this time would also have allowed for easy exploitation of the salt salinas located in the area. Importantly, a shift in settlements denotes that social groups in the eastern portion of the study region became focused on the coast and the affordances in interaction it would have provided.

In the central portion of the study region, while several sites are abandoned, the network still maintains many links at the 2.5 km interval. This is particularly evident in the Portugués river drainage with several settlements persisting form the previous period. Further the central location of Caracoles (PO-10) on the coastal plains and so close to the coast also indicates a focus on coastal interactions. This is also supported by high quantities of Boca Chica pottery at this site during this time.

Looking at the various periods, two types of settlement are clearly identifiable, linear systems and “open” or unrestricted systems (Clarke and Blake 1994). Linear systems of settlement are an important settlement pattern structuring social relationships and are prevalent in areas where rivers are abundant (Flannery 1976; Starke and Young 1981). Somewhat comparable patterns of linear settlements as noted in the foothills, have been noted ethnographically among the Waiyana of Surinam and French Guiana (Butt 1970; Duin 2009). Habitation sites documented on the banks of the Maroni, Yari, and Tapanahony Rivers are small areas comprised of domestic structures on alluvial terraces with adjacent garden plots. Settlement populations in these ethnographic settings are generally small ranging from 15 to 70 people (Butt 970:42).

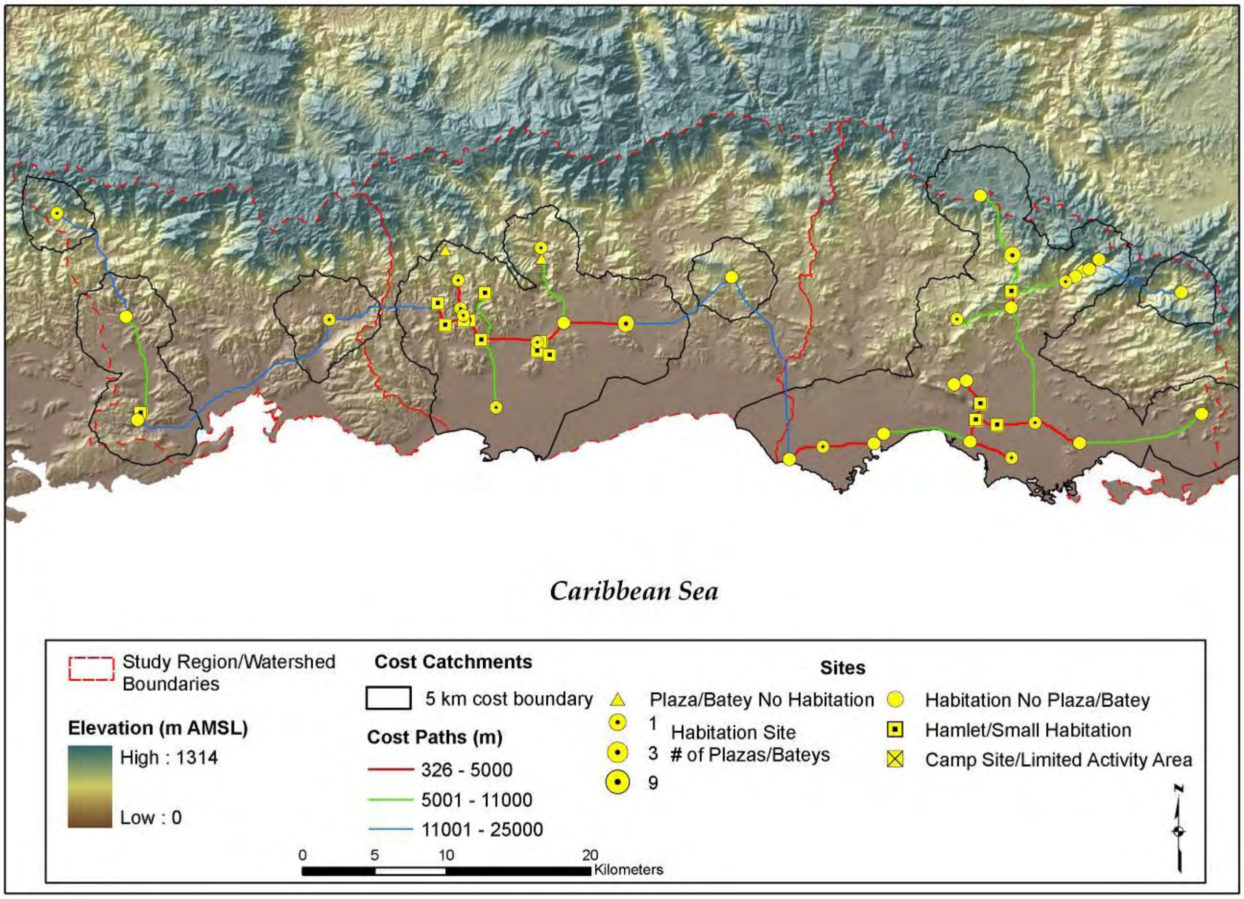

Figure 7-16. PIV MST regional network showing distances between residential settlements.

Settlements at the mouths of the rivers, where drainages open on the coastal plains, would likely have acted as "gate keepers" between those further inland and those on the coast. In this situation it is interesting to note Tibes' position within the landscape which would have contributed to its social and ritual importance during Period III. As a historical process, it is likely that settlements further down the line of these linear networks began to form stronger alliances with social groups further inland and became less dependent on those settlements further south.

Examined as part of a network, certain properties of spatiality in the different settlement configurations become salient. First, those upriver were more insulated from those down river and other communities scattered along the coastal plains. Second, assuming that groups were frequently moving down river to acquire resources from coastal environments (as suggested for several sites in the previous chapter) would have entailed consistent interaction with those located further south as people moved towards the coast. In this way, depending on the location of the settlement, individuals located further up river would have passed by settlements down river twice as often. Conversely, those settlements located further upriver would have had more autonomy in their daily activities particularly as one progress north into the uplands. These dendric configurations are highly visible during Period III and Period IV.

Third, the intensification of settlement of particular river drainages would have afforded some groups with control over movement along them. Here linear settlement systems create a strong locational dichotomy between centrally and marginally situated groups such that these arrangements "overburden the social mechanism available to egalitarian band societies" (Wobst 1976:56). These factors may have contributed the rise or increase in importance of some residential settlements over others.

Contrasting with foothill linear patterns of settlement, are settlement configurations on the coastal plains. Settlements on the coastal plains are represented by a dispersed or open patterns of residential settlements clustered in particular localities. This is particularly obvious during Period II and Period IV where settlements are arranged along the coasts and would have promoted frequent interaction among regional social groups. This pattern is observed in the area surrounding El Bronce (PO-11) where three other small settlements were identified in the vicinity of the site forming a local cluster or site complex. This pattern is also observed in the eastern portion of the study area on the coastal plains of Santa Isabel and Salinas.

The major difference between the coastal or open forms of settlement is that in linear settlements each residential settlement has unimpeded access to *only* one or two significant neighbors where as in open systems there are more opportunities for movement and interaction. Hence, in open systems interaction is highly varied with increased numbers of potential neighbors (Clarke and Blake 1994). Increasing isolation of groups through the configuration of liner river settlements would have limited these unimpeded interactions thereby contributing to the localization of social groups through time.

Contradictions in Expansive Social Networks and Community Formation

As alluded to throughout the previous discussions, the settlement of inland river valleys during Period III would have resulted in the insulation of local social groups from other more distant groups occupying drainages with equally limiting topographic constraints. This is not only a result of the restrictions of topography but also a result of the increase in the number of neighbors which create intervening nodes along the network creating a buffering effect of some settlements from others. The insulation of social groups within particular localities would have led to the intensification of social interaction and formation of localized social groups, or communities, in these areas.

Examination of the number of near-village neighbors represented by the 5 km cost path intervals and visualized through the 5 km cost-catchments makes this point obvious Figure 7-17). First, examination of the number of near-village neighbors of a given site, also known as “degree centralization” in social network theory (Wasserman

1995), demonstrates the increased number of immediate adjacent connections between individuals within particular settlements. Here, while the social connections observed during Period III were increasingly connected at the regional level, they appear to have been contracting or intensifying locally. Hence, while the clustering of near-village territories indicates the increased connectivity of settlements, *it also appears that they become increasingly insulated at the local level*.

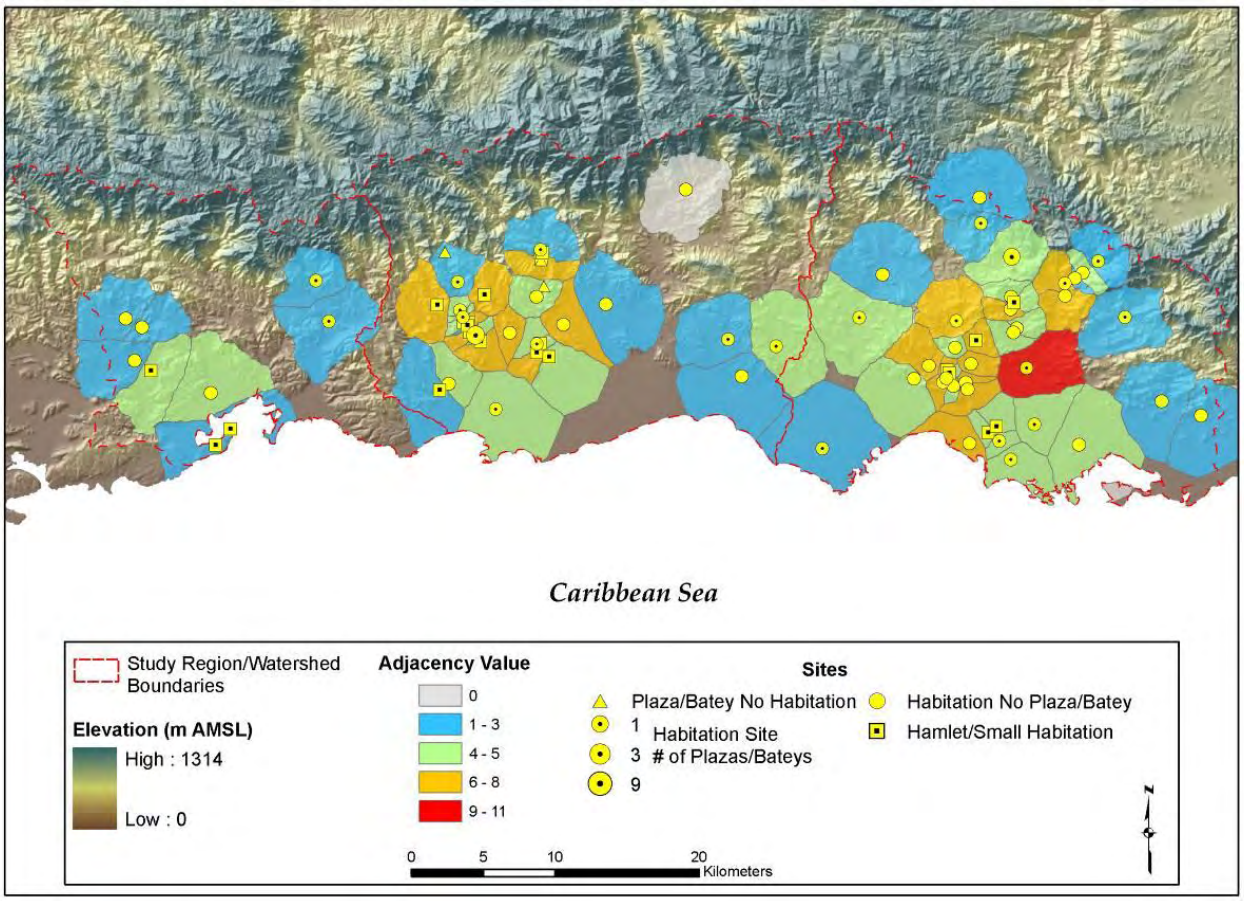

Figure 7-17. Period III settlement centrality based on number of adjacent neighbors.

In conjunction with the map showing the degree or number of adjacent neighbors of settlements during this time, other aspects of the MST network can be used to quantify this phenomenon (Table 7-2). Using tools from social network analysis, I constructed a distance matrix noting the number of steps along the MST network between all settlements. This was done using UCINET social network analysis software (Borgatti *et al.* 2002). The software uses an algorithm that finds the number of links in the shortest path between settlements creating a matrix of geodesic distances. I then used the data to compute the harmonic mean of the entries in the distance matrix (*i.e.*, the normalized sum of the reciprocal of all the distances) to measure network "compactness". Compactness has a value of 1 when the network is a clique (everyone is adjacent) and zero when the network is entirely made up of isolated nodes.

Table 7-2. Settlement neighbors represented by connected 5 km cost-catchments through time.

Period	Number of Residential Settlements	Neighbor Adjacency (Degree) Mode	Avg. Distance	Compactness	Mean Number of neighbors
Period II	16	3	4.4	.36	2.6
Period III	80	5	13.9	.14	4.5
Period IV	48	4	10.4	.18	3.6

The data show that in Period II the most frequent number of adjacent neighbors (3) and the average distance linking all settlements (4.4) was low. Despite the limited number of sites, the compactness of the network is relatively high at .36. In contrast, during Period III the number of adjacent neighbors (5) and the average distance linking all settlements was high (13.9). This supports the idea that people are becoming more insulated because while people are more locally connected (shown by the neighbor adjacency value) it takes more steps (the average distance) to other members of the network. Finally, the compactness is very low (.14) indicating localized cliques more *insulated* from the broader regional network. This pattern is also evident for Period IV although these values decrease slightly. In sum, while social connections during Period III became increasingly linked at varying spatial scales, they appear to also have been contracting or becoming more locally focused.

Summary of regional network dynamics: Settlement pattern analysis at the local level demonstrates that there were two simultaneous settlement configurations operating within the south-central region after AD 600. The first settlement type consists of a loosely clustered *linear* settlement pattern along the major river courses up into the narrow valleys of the foothills. The second consisted of more open settlement configurations scattered throughout the coastal plains. This latter settlement configuration is present during Period II and can be observed for Saladoid settlement of adjacent islands of Vieques and the northern Virgin Islands (Altes 2010; Hardy 2008).

Two important patterns are evident here. First, in linear systems settlements have access to one or two significant neighbors while in open systems interaction is less restricted. Second, in linear systems settlements will have differential access to others depending on their position in the network. The important observation here is that with the settlement of interior river drainages, people's movement became increasingly restricted from the broader settlement system. Using aspects of social network analysis to quantify these measures, I demonstrate that while the social network during Period III was expanding, social groups were contracting and becoming more locally focused. This localization (or regionalization depending upon the scale of discussion) is readily apparent in other dimensions of sociality and materiality. I elaborate on this concept further in the proceeding section.

Regional Social Diversity

Similarities and differences in the diachronic distribution of pottery styles offer a way to look at historic patterns of the distribution of cultural traditions (or ideas) to provide a contextual basis for examining historical realms of regional interest and social interaction (Caldwell 1964) during Period III. The discussion at this point is strategic in that I intend to demonstrate that among some of the demographic changes in regional settlement there were concomitant processes related to the regionalization and negotiation of social identities which contributed to the emergence of political communities. While detailed understanding of the spatial and temporal origins related to the development of pottery traditions is beyond the scope of this work, the implications noted in the distribution of pottery for the south-central region holds important clues to the socially and politically diverse landscape that developed in the region after AD 600.

As a material medium, pottery is one artifact class through which information is expressed (Hegmon 2005; Ortman 2008; Wobst 1977). While highly contested as a temporal and cultural indicator both within the Caribbean (cf. Rodriguez Ramos 2007, 2010; Rodriguez Ramos *et al.* 2010) and other parts of the world the importance of the stylistic distributions of pottery can be utilized to denote the spatiality of broader ideas and ways of being that are more intimately situated in the actions of people's daily lives (Hegmon and Kulow 2005). From this perspective pottery represents a historical connection to regional interactions that while not necessarily *determinative* of social identity *per se*, these materials provide a backdrop for regional interaction and social diversity. By briefly examining this aspect of materiality it is possible to contextualize some of the social and political transformations, implied in previous and later discussions, for the south-central region.

Typically, pottery styles of the Ostionoid series are considered to be more or less affiliated with social groups from the Mona Passage (Ostionan) and Vieques Sound (Elenan) areas in which the spatial distribution of pottery styles are found in varying ratios between the east and west portions of the island and appear to be related to the distance from either area (Goodwin and Walker 1975; Robinson 1985; Rouse 1952).

The differentiation of east and west horizontal interaction spheres manifested in Ostionoid styles begin to emerge in this south-central region around AD 500 with Pure Ostiones style pottery registered just east of Tibes in the Cerrillos River Valley at sites PO-23 (2σ median AD 427) and PO-38 (2σ median AD 598). Shortly after AD 600, several sites around Tibes begin to show mixing of pottery styles at sites like El-Bronce, Lago Gely, Collores, and El Parking (Robinson 1985; Rodriguez 1983; Thomas and Swanson 1986; Weaver *et al.* 1992). Currently the earliest solid evidence of mixed Ostionoid style pottery comes from El Bronce (with Ostiones and Santa Elena pottery), to the southeast of Tibes (C14 2σ mean AD 750 [Robinson *et al.* 1985]).

In the area around Tibes, many sites show evidence of Elenan *and* Ostionan assemblages from associated stratagraphic contexts mixed in similar proportions (Weaver *et al.* 1992; Robinson 1985; Rodriguez Lopez 1985; Rouse 1952; Thomas and Swanson 1986). And while this mixing of assemblages is not uncommon in different parts of the island (*e.g.,* Goodwin and Walker 1975), the frequency of occurrence and similarity in ratios at some sites around Tibes suggest that the region was a point of interaction in which social groups historically associated with the Mona Passage and Vieques Sound areas overlapped.

In addition to the mixed pottery assemblages at sites around Tibes, some sites in the area do actually display more affiliation with Ostiones or Elenan styles. For instance, Hernández Colon, a site within 5 km cost-distance of Tibes, and with evidence of earlier Saladoid occupation, is primarily characterized by Ostiones ceramics (Maíz 2002)--as is PO-21 in the Cerrillos Valley east of Tibes (Espenshade 1987) suggesting stronger ties to western Puerto Rico. Conversely, Tibes, La Mineral, Los Gongolones and PO-29 all display more affiliation with Elenan styles, which would indicate stronger ties to areas in eastern Puerto Rico. Sites in the study region during this time that possess similar pottery assemblages are often immediately adjacent to one another.

To visualize the distribution of pottery styles and their overlap in the region, I generated a simple "home range" model based on the point distributions for both Elenan and Ostiones pottery styles (Fig. 7-18). Home range models are generally utilized by wildlife ecologists for visual representation of animal territories (Burt 1943).

Examination of the distribution of pottery style by settlement clusters (or localities) throughout the study area generally conforms to an expected pattern whereby sites in the west are more homogeneous—represented primarily by pottery of the Ostiones sub-series and sites in the eastern portion of the study are possessing more Elenan sub-series. However, in the center of the study region immediately surrounding Tibes and some distance east, there is considerably more diversity in the representation of pottery styles suggesting that the social groups settled around Tibes while developing locally, had historical connections to groups to eastern *and* western Puerto Rico. Further, it points to the Tibes locality as part of a larger system of interaction between social networks from these two areas and as a point of articulation of people and ideas from different spheres of historical and social influence.

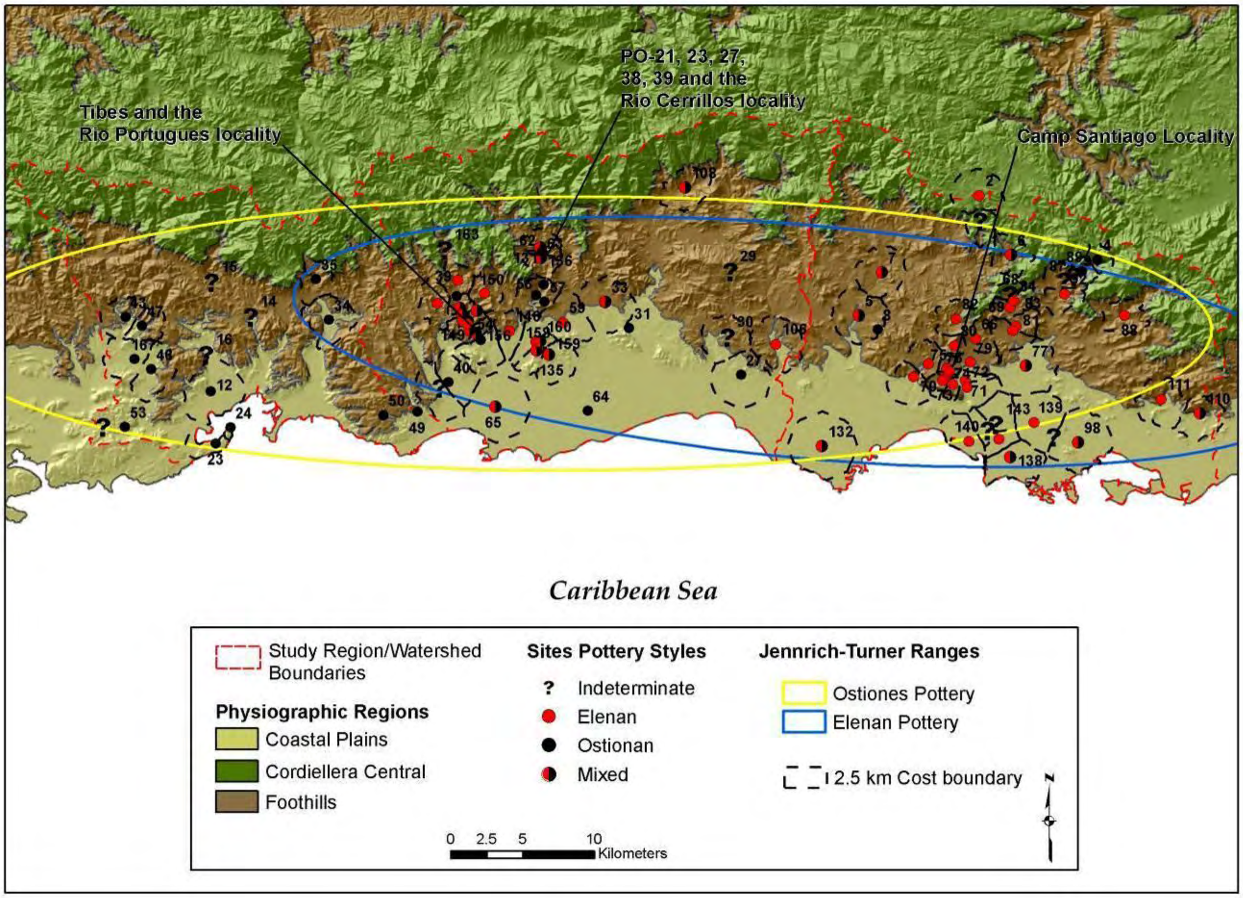

Figure 7-18. Pottery distribution of Ostiones and Elenan Ostionoid pottery styles and Jennrich-Turner Ranges (90% probability ellipse).

Fredrick Barth (1969) predicted that social group distinctions would become less pronounced in areas of interaction because the two groups would tend to become economically interdependent and thus wish to deemphasize differences that could potentially become divisive. While this mimetic practice is often the case, it sometimes works in reverse in instances of interaction and conflicting interest groups may tend to emphasize their identity in opposition to others (Côté and Levine 2002).

In the first scenario, one would expect a hybridization of design elements and pottery forms. However, while some mixing of vessel morphology and design elements have been noted (Robinson 1985) the majority of documented sites in the region maintain distinct stylistic designs and vessel morphologies suggesting a strong tendency towards the maintenance of socially learned practices of pottery making that were tied to the eastern and western spheres of interaction. Certainly, while the pottery distributions in the region are represented in mixed contexts, the practice of making the pots themselves continued to follow a particular grammar that was regionally specific among local social groups. This would suggest that while there was considerable interaction between social groups, social boundaries and traditions of "doing" were maintained that reflected the "where" and "who" of individuals within particular communities.

Settlement Landscape of the South-Central Region: Summary and Conclusions

While the analyses presented in this chapter only begin to scratch the surface of the complexities of the south-central region's social landscape through time, some of the underlying processes influencing community formation between AD 600 and AD 1200 are discernible. To summarize, population growth and the expansion of settlements between Period II and Period III likely led to an increase in the complexity of regional social networks. These developments presented new challenges at various levels within society including the maintenance of moral and ideological order, access to resources, and ultimately the negotiation of social identity. The consequence of these new socio-spatial configurations, while linking people in more inclusive regional social interactions, promoted the localization and centralization of social groups.

Initial conditions in the south-central region during Period II shows settlements as widely dispersed along the coastal plains with limited penetration into the foothills and interior portions of the island. Cost-distance modeling indicates that settlements were loosely linked at the 5km interval with settlement clusters at distances roughly equivalent to or greater than a one-day walk.

Based on the core structure of the regional network, settlement and interaction during Period II appears to have been oriented horizontally east-west along the coast. The dispersed spacing of settlements and small settlement clusters may have provided some level of autonomy in the handling of daily social and local political affairs. The spacing between settlements would also have reduced competition over natural resources because arable lands would have been readily available.

By AD 600 the proliferation and widespread distribution of settlements suggests rapid growth in regional populations. In some instances, settlements emerged in areas near those occupied during Period II and in other cases they did not. In the case of the former the development of new settlements near preexisting Saladoid villages indicates continuity of local social relationships and occupation of particular localities. In the case of the later, it suggests the formation of new local social groups and relations between people and their settlement landscape.

In both scenarios, settlement expansion promoted the emergence of new socio-spatial networks entailing the creation of social synapses between various social groups that had not previously existed in the south-central region. In particular, Saladoid networks, oriented east-west along the coast, became complicated by north-south interior to coast relationships that developed during Period III. One of the most important observations for this period is that while the social landscape became increasingly dense and socially connected, settlement clusters in different portions of the landscape became increasingly insulated because of settlement buffering and occupation of geographically restricted areas (*e.g.,* narrowly constricted river drainages). As a result of increased populations and the complexification of regional interactions, ambiguities in regional social relationships likely emerged; exacerbating differences between settlement localities.

At the local level, network linkages between settlements within the 5 km cost-interval suggest particular localities, comprising several neighboring settlements, emerged. These neighboring settlements, or multi-settlement social communities, would have been constituted by first-order, or face-to-face social relationships. Interaction at this scale involves those who are co-present, have the greatest potential to intimately interact, form local social networks, and develop symbolically shared forms of meaning and behavior relative to their unique space time contexts. Interactions at this level lead to systematized patterns of social relations from which enduring social institutions emerge (Giddens 1984).

Yet, even though local social communities were emerging and shared many interests, the overlapping catchments of settlement clusters would have stimulated increased competition for local social and natural resources. Individuals living in densely clustered settlement configurations would have had to negotiate access to these resources not only with members of their community cluster but also with neighboring ones. Increased competition for these resources would have prompted conflicts and required new mechanisms for establishing land rights and maintaining social order. The establishment of communal identities, linked to kinship and geography, would have relieved some of the ambiguities engendered by emerging social networks by establishing land rights and tenure, rules of marriage/alliances, and who could be called on in times of need.

Based on the available data, it appears that social networks during this time were evolving in a context of differing social realms of interest (Garrow *et al.* 1995: 233). This point is readily apparent in the regional social diversification represented in the material traditions of pottery that emerged along this east-west vector of interaction indicating the emergence of new social interaction spheres in different parts of the island. The mixing of pottery styles at many sites in the region surrounding Tibes during Period III indicates that this was a place of articulation between diverse spheres of interaction amongst regional communities.

While the data indicate some similarities in social and demographic processes at the regional level, differences in settlement configurations within watersheds indicates that some of these processes were contingent on situational responses to local engagements. With these new social configurations came new challenges for post AD 600 denizens of the south-central region and likely other parts of the island. In the next chapter I elaborate further on some of the processes presented in this chapter to examine how the transformation in regional settlement affected the structure of co-resident groups and the organization of social communities.

CHAPTER 8
ENVISIONING THE LOCAL LANDSCAPE: RESIDENTIAL SETTLEMENT AND COMMUNITY COMPOSITION

In the previous chapter, I presented a diachronic view of the south-central region depicting major changes in the settlement configuration of social groups between AD 600 and AD 1200. This was a period of increased population, the creation of new settlements, and the emergence of new social and symbolic ideals as evident in material cultural throughout the region—particularly pottery and the construction of stone-lined plazas/*bateys*. With the surge in population, and the expansion of settlements throughout the landscape, social networks became increasingly connected and complex. At the same time, social groups concentrated in particular portions of the landscape resulting in constraints on interaction due to settlement location and growing complexity of regional social networks. These changes, observed at the regional level, were concomitant with other social transformations at smaller social scales evident in the organization of residential settlements and co-residential corporate groups.

In this chapter, I present archaeological data from the Tibes locality, and other well-documented sites from the south-central region, to examine the composition of residential settlements and the organization of co-residential corporate groups between AD 600 and AD 1200. To do this I document changes in the spatiality of residential settlements in terms of size, general layout, and domestic structures to explain the implications of these patterns on the formation of communities in the region during this time.

I initiate this discussion by first briefly reviewing relevant ethnographic examples of settlement configurations from lowland South America and archaeological conceptualizations of co-residential corporate groups to contextualize socio-spatial organizational patterns at the scale of the residential settlement. I then relate these observations to archaeological data for the south-central region for settlement sizes and domestic structures to characterize changes in the structure of co-residential corporate groups in the region between AD 600 and AD 1200. I evaluate these observations with evidence from two residential settlements recorded during the course of the TASP survey which I presented in Chapter 5 (PO-42 and PO-43). Through an examination of their settlement layouts, sizes, and pottery accumulation rates, I provide estimates for their residential population and duration of occupation. Through this I develop an image of residential settlements and provide a basis for comparison with other well-documented habitation sites in the region.

Ultimately, I reveal Period III represented a fundamental restructuring of basic social groups that differed from previous forms of community organization. Specifically, the data presented in this chapter indicates that permanent, small, dispersed residential settlements became the primary socio-spatial configuration during this time. These settlement shifts, and the associated organizational changes implied by them, appear to have promoted heritability of property through social and occupational continuity of particular localities which served as a foundation for the creation of local identities and the development social and political communities.

Organizational Patterns of Residential Settlement

Ethnographic literature from northern lowland South America and Amazonia describe numerous indigenous groups with varying settlement configurations; however, two types of residential settlement stand out and offer useful points for comparison for the discussion and interpretations presented in this chapter. These include the single communal house and the multi-house nucleated village (Rivière 1995).

In the single communal house settlement, the residential settlement is typically characterized by a single large round or oval domestic structure (*i.e., maloca*) in which all members of the settlement reside (Hugh-Jones 1985). The ethnographic literature of the region is replete with examples of such settlements (*e.g.,* Chagnon 1968; Hugh-Jones 2007). In contrast, the nucleated settlement is composed of several domestic structures clustered in a single location. Domestic structures in this context can either be large, comprising multiple extended families (*e.g.,* Heckenberger 2005) or smaller domestic structures consisting of "nuclear" family units (*e.g.,* Siegel 1989). Nucleated settlements often possess a clearly defined central plaza, bounded by residential structures configured in a horseshoe or circular fashion, with the circumference of the habitation area bounded by domestic refuse middens (Gregor 1977; Seeger 2010:14; Versteeg 1991; Versteeg and Schinkel 1992; Wüst 1994; also see Means 2007 for overview)

Circular village settlements are considered a primary form of socio-spatial organization and scholars have used concentric and diametric models to explain the symbolic importance of this pattern in the ordering of social life (Heckenberger 2005; Leví-Strauss 1963; Means 2007). Within the settlement, the central plaza space often serves as a materialization of the "ancestral core", or *axis mundi*, linking the settlement to the cosmos. Circular/horseshoe settlement configurations, considered common for Saladoid settlements, are present in archaeological contexts from the Lesser Antilles and Puerto Rico (Siegel 1996a). Archaeologically documented settlements in Puerto Rico, as with modern analogs from South America, this space likely served as a space for conducting both ritual and quotidian activities. In many of the documented Saladoid settlements in Puerto Rico this central space also functions as a public burial ground (*e.g.,* Curet and Oliver 1998; González Colon 1984; Keegan 2009; Rodríguez Lopez 1992; Siegel 1999).[1]

Households and Co-resident Corporate-Groups

Questions of identity and long term transformations in the fabric of communities cannot be discussed without specific focus on the household (Gerritsen 2003:105). As introduced in Chapter 3, the household is typically defined as a social group, formed through relations of blood and/or marriage, that shares a single residence, and who cooperate regularly in a number of basic socio-economic activities (Ashmore and Wilk 1988:6; Wilk *et al.,* 1984). Households perpetuate themselves through social transmission, economic, and ritual practices, and in particular marriage, and post-marital residence.

Despite the fact that households seem to be recognizable in all societies, theoretical and methodological applications of the concept have proven to be a challenge to many scholars who acknowledge that overarching cross-cultural definitions are futile. These problems stem from how households are contextually constituted and the realization that economic roles and social membership can vary considerably within a given society.

Recent approaches to understanding households emphasize their mutual constitution within broader social constellations (*e.g.,* Gerritsen 2003; Soutavzi 2008). In this context, emphasis is placed on the habitual activities performed by interacting households and what these activities can tell us about the relational properties and

[1] Based on a suite of radiocarbon dates, Siegel indicates potential continuation of this practice up to AD 1150 at Maisabel, and Pestle to approximately AD 900 at Tibes (Pestle 2010; Siegel 1999).

ordering of small-scale social groups. The underlying corporate (Goodenough 1951)[2] nature of these relationships can form a durable socio-symbolic institution that structures interactions among its constituent social actors (Beck 2005; Gillespie 2000). Hence, the relations between households or social "houses" provide a basis for the formation of more inclusive corporate collectives and communities.

Despite arguments regarding social membership and co-residence based on shared architectural space, I assume that aspects of group organization are manifested in spatial patterns at the site level, particularly the size of settlements and domestic architecture. While not necessarily equivalent, domestic structures provide us with some idea about the size, composition, and membership of co-resident groups associated with households (*e.g.,* Kolb 1985).

Variation in the size and distribution of domestic structures within a residential settlement is often used to infer corporate functions of households (*e.g.,* production, distribution, transmission, and reproduction) (Hayden and Cannon 1982; Wilk and Rathje 1982). Hayden and Cannon note two main types of residential corporate groups based on the size of domestic structures (1982:141-142). The first is characterized by several families living in single large structure. In their second type each family unit occupies a separate structure "but where all structures forming part of the group are placed next to each other in a patterned fashion" (Hayden and Cannon 1982:142).

Both small and large households each have select advantages for accomplishing various tasks—particularly in terms of scheduling and organizing labor. For instance, large extended family households are better suited for coping with many simultaneous

[2] Goodenough (1951:30-31) defined corporate groups as "groups that function as individuals

tasks, particularly in situations where there are incompatible activity requirements. Based on ethnographic studies, these often include women's economic tasks and child care, along with men's subsistence tasks that require time consistently spent away from the residential settlement. Extended family households are also prevalent in situations where labor is in short supply but land is abundant (Netting 1993). As such, the pooling of labor is a way of intensifying resource procurement. However, Hayden and Cannon (1982) note that there must be strong factors (typically economic, environmental, or defensive) for groups of families to co-inhabit multi-extended family houses within a single residential settlement, since extended families are harder to maintain due to conflict and jealousy (*c.f.*, Chagnon 1968).

In contrast, nuclear family households are more common in situations where labor is abundant but land is scarce. Nuclear households generally require fewer resources due to their constituent size and tend to be more productive since it is easier to allocate/schedule tasks and single out noncontributing individuals. Smaller households also are considered best suited for situations where mobility is important or where linear scheduling of spatially restricted resources takes place (Wilk and Rathje 1982). Byrd (2000:90-91) argues for the primacy of the nuclear family household over the extended family on the grounds that the nuclear family possesses adaptive flexibility in economic situations where settlement patterns and subsistence strategies are in flux. These adaptive responses represent the ability for smaller domestic units to be less constrained in their economic choices. Nuclear households are also considered to denote a shift towards increasing importance on personal property and the most effective way of passing resources from generation to generation by alleviating ambiguity in heritable property rights. Also, smaller households have the advantage of fewer people which reduces scalar stress and intragroup conflict.

The status or standing of households and co-residential corporate groups is based on wealth and prestige stemming from control over social, symbolic, and/or natural resources. These can take varying forms including “women, animals, land, reefs, totems, magic, and public architecture” (Schweizer and White 1999:189). In formative agricultural societies this wealth is also expressed in the most important resources necessary for survival--land and labor. Accumulated or inherited wealth and political prestige were assets likely defined by settler’s rights that convey ownership of productive lands to the groups that first laid claim to a territory. In this context, wealth was also a product of positioning within the local and regional settlement and social networks which influence the effectiveness of households to cooperatively interact and form labor alliances.

Social groups engaged in incipient agricultural practices often develop mechanisms for the transmission of collective land rights that emphasize legitimacy through ancestry and unilineal descent (Keesing 1975; Forde 1947:70; Netting 1993; Sack 1986). The importance of reckoning descent in such settings can be seen in the reduction of conflict over land through establishing heritable property rights based on kinship (Netting 1993). For example, research conducted amongst the Tsembaga Maring tribe of New Guinea indicates that a single kin group with low population density might “grant land rights in its abundant resources to a wide variety of relatives, but as the supply of open land declined and conflicts over farms …increased, a tendency to confine use and inheritance would be apparent” (Rappaport 1968:28-28).

Influencing the membership of residential corporate-groups are the relations between locally situated households and their shared rights and responsibilities as kith and kin. In the post-AD 600 landscape of the south-central region these links were transformed based on the consequences of settlement dispersion, the occupation of new territories, and the increased complexity of regional social networks. Critically, I believe these changes structured and were structured by a fundamental shift in concepts about collective rights, responsibilities, and identities of social groups both within their residential domestic settings as well as the broader local sociopolitical community.

As will be demonstrated for the remainder of this chapter, the reconfiguration of the social landscape between AD 600 and AD 1200 coincides with social practices that facilitated the solidification of collective rights, responsibilities, and identities. Specifically, this entailed the creation of smaller domestic units to promote heritability in property and to sediment members of co-residential corporate groups within local and regional social networks. While seemingly contradictory, the consequences of these changes also promoted the centralization of social groups within particular spaces and places which reinforced the formation of social and political communities.

Size Matters: Changes in Residential Settlement

Diachronic examination of settlement sizes offers a starting point to refine our understanding of residential settlement and community (trans)formations in the region. Settlement size is used in many studies as an indicator of both population and political importance (*e.g.,* Johnson 1980). Coincidentally, most researchers agree that settlement size is one of the primary factors influencing settlement dispersion and village fissioning; however, there is some debate as to how the process occurs. The common perspective is that as settlement populations increase, competition for natural resources particularly game or cultivable land leads to internal conflicts (Overing and Passes 2000). This becomes a centripetal force dispersing people out and away from parent settlements.

Another perspective suggests that the larger the settlement, the more complex the social composition; an idea initially promoted by Carneiro (1967) (also see Tuzin 2001). In this context, sheer social density leads to interpersonal conflicts as increased population decreases relatedness (Chagnon 1968) through an increase in the proportion of "delicate" affinial relations or by multiplying the number of internal groupings (or cliques of various types) that have potential to become political factions (Mayberry-Lewis 1967). On the issue of how large a village can grow before fissioning varies from 50-70 persons (Arvelo-Jimenez 1977:109) to 70-100 persons (Whitten 1976:125) and as much as 100-200 persons (Maybury-Lewis:1967; Chagnon 1968:18).

Archaeologically, one of the problems noted in the use of settlement size as a proxy for evaluating residential populations are the site formation processes related to the duration and intensity of settlement occupation through time. For instance, older settlements tend to be larger by virtue of occupation continuity and rates of artifact accumulation and patterns of discard (*e.g.,* Varien and Mills 1997; Schiffer 1987; also see Espenshade 2000 for an example from Puerto Rico). Further, differential intensities of settlement in different portions of a given site through time can be misleading, as can changes in residential population through time. Yet despite these issues, it is widely accepted that there is *some* allometric association between settlement size and resident population (*e.g.,* Chamberlin 2006; Curet 1998; Kirch 1980). Comparative examination of the archaeological record provides a basis to evaluate the relative settlement variability through time and to develop explanations related to the processes associated with these patterns.

Examination of regional settlement through time shows substantial changes in the size of settlements between the pre and post AD 600 landscape (Figure 8-1). Residential settlements with evidence of occupation during Period II range in size from 1 to 15 ha (mean 2.7 ha, std. 3.5 ha). Approximately 68% of settlements from this period are between 3 and 11 ha. The largest of these sites, particularly those 6 ha or greater, are all situated along the coastal plains. Several large Period II settlements from the study region include Cañas (PO-08), Tecla (GY-01), Hernández Colon (PO-13), and Collores (JD-06). The relatively large size of early Saladoid residential settlements is also documented in other parts of the island including the sites of Maisabel (Siegel 1992; 1999) and Punta Candelero (Rodríguez López 1991, 1993).

Thirty percent of Period II sites in the region range between 1 and 2 ha in size and the majority possess Cuevas and Ostionoid pottery styles suggesting that they may have been settled between approximately AD 400 and AD 600/1000 (Rouse's PIIb). The implication of this pattern is that between AD 400 AD 600 population was dispersing, and the larger "highly welded" Saladoid settlements began to fragment.

Assuming that the data for Saladoid settlements is true, then based on the size of settlements presented here and documented in other regions (as discussed in Chapter 2), three important aspects of organization can be inferred. First, the larger residential settlements promote safety (in numbers) in a potentially hostile landscape (*e.g.,* Chagnon 1968). This is particularly relevant in light of the fact that Saladoid immigrants to the island entered a landscape already occupied by Archaic social groups that may, or may not, have been welcoming (Keegan 2009; Siegel 1991).[3]

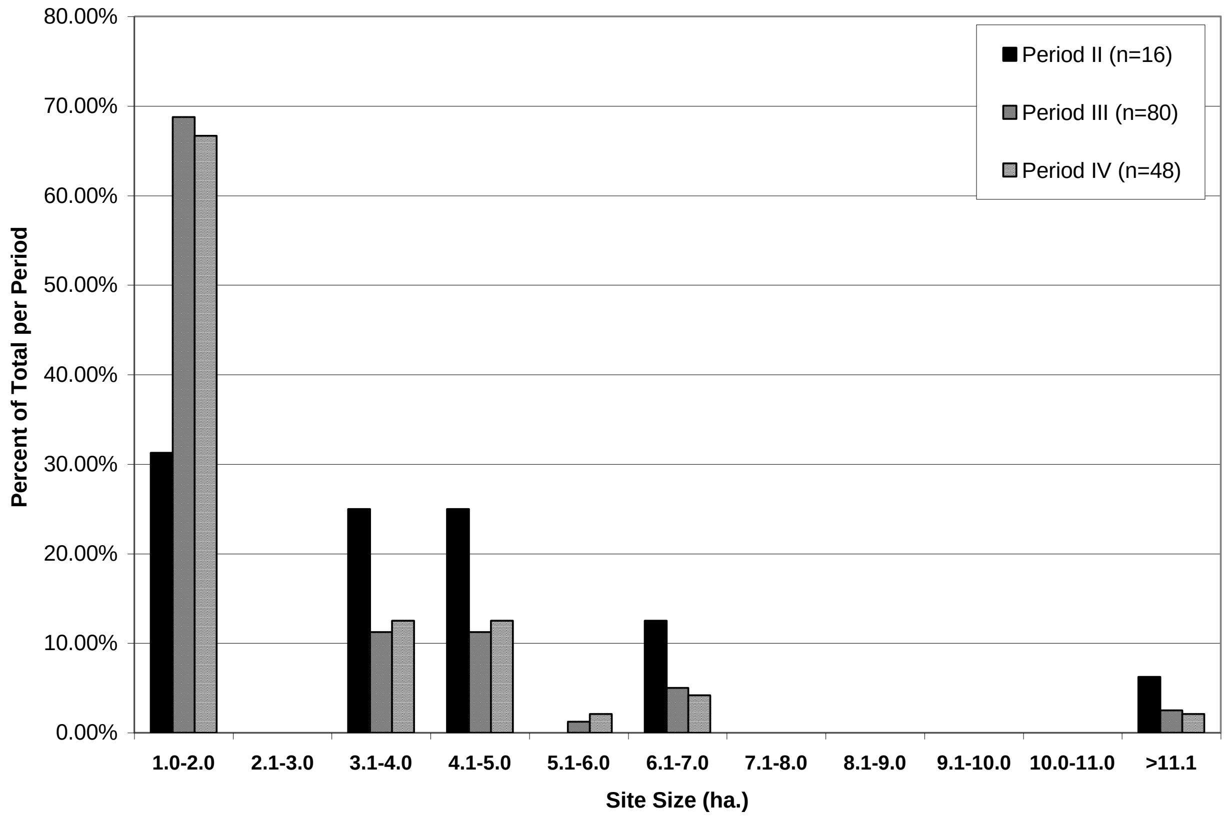

Figure 8-1. Residential settlement sizes through time.

Second the size (and shape) of the settlement may not only be an indication of population, but also the ability of these settlements to accommodate visitors from more distant regions for various social, economic, and ritual interactions. In this context, larger settlement size would allow for periodic intervillage social gatherings between widely dispersed settlements as well as potential incoming migrants. Third, larger

[3] Current evidence not only shows absence of conflict, but positive evidence of interaction between Archaic groups and Saladoid immigrants (*e.g.* Cueva Maria La Cruz and Punta Candelero).

settlements could accommodate reasonably large residential populations consistent with what is expected for sites comprising multiple extended family households (Heckenberger and Petersen 1999; Versteeg and Shinkel 1992; Versteeg 1991).

Looking forward to Period III, there is a notable decrease in the size of residential settlements with 69% of habitation sites measuring less than 2 ha (mean 1.6 ha, std. 1.9 ha). Only 22% of settlements from this period measure between 3 and 5 ha with less than 10% of the sample of settlements over 4 ha. Settlements with areas over 4 ha are primarily situated along the coast and possess Period II components. This change in settlement size contrasts with the prevalence of larger settlements noted for the previous period. Critically, the increase in smaller settlements during Period III coincides with the expansion of existing social groups into topographically restricted areas in the foothills and uplands. The creation of these smaller settlements also supports processes of dispersal and/or fissioning of larger Saladoid settlements into smaller habitation sites.

Settlements after AD 1200 follow a similar pattern from Period III although there is a decrease in the overall number of sites throughout the south-central region (Curet 2005; Torres 2001, 2005, 2010). Further, there is a slight decrease in the number of smaller settlements between .5 and 1 ha and a slight increase in the number of sites over 3 ha (mean 1.6 ha, std. 1.7 ha). This pattern alludes to aggregation of local populations during Period IV particularly on the coastal plains (Torres 2001; Curet 2005). However, the average settlement sizes for this period remain relatively small. Almost 86% of all settlements in the region during this period are under 5 ha with Caracoles (PO-10) and La Florida/Los Indios (SI-4) both measuring just over 4 ha.

Some larger settlements are documented during this time in the eastern portion of the study region along the coast.

There are several inferences that can be made regarding the observed changes in settlement size particularly between Period II and Period III. First, assuming an allometric relationship between settlement size and population it is reasonable to expect Period III residential settlements comprise smaller populations than those in Period II. Second, the decrease in size of residential settlements for Period III also indicates limiting of space available for large scale communal activities and the number of visitors a given site could accommodate for the physical act of such activities. This observation suggests that for some habitation sites, the hosting of large feasts and interregional engagements was not a part of the settlement's activities or overall function within the regional settlement network. In this context, the ability of every settlement to accommodate higher level social engagements became less important. By extension, this also suggests that while the regional settlement system was expanding social groups were becoming less focused on the maintenance of broad social relationships at the social scale of the residential settlement.

This is not to say that interregional social relationships did not exist or were not important, but rather that there is an increased focus on the relations between local social groups and their immediate neighbors. Supporting this idea is the formal construction of integrative ritual facilities at many sites which became community centers to negotiate and solidify local and regional identities. Smaller facilities complemented larger ones that were likely used for social or ritual activities at the level of the residential settlement and its immediate neighbors. I discuss this topic further in Chapter 9.

Another important observation is that as settlements fission they will replicate the organizational pattern of the parent settlement. *However, settlement configurations during Period III contradict organizational patterns from Period II based on the implications presented by changes in settlement size and (as will be shown) domestic structures*. Cross-cultural research conducted by Murdock notes that such shifts in residence patterns often precede fundamental changes in social organization primarily in the reckoning of "kindreds, lineages, and sibs" (Murdock 1949:221). This transformation in residential settlement has other implications in the construction of social and political communities—specifically the fragmentation and recombination of social "houses" (or perhaps lineages [Widmer 1994]). The reconfiguration of local social groups and particularly increased clustering of people within specific localities required new forms of social order and integration. However, prior to turning our attention to these issues, it is first necessary to complete the discussion of residential settlements and the archaeological evidence for how the people who dwelled within them were situated within the local and regional social landscape.

Domestic Structures

A study of living communities and their articulation to broader social formations relies on our ability to characterize the residential settlement both in terms of its domestic and social morphology, or in other words, their composition. In general, there appears to be a decrease in the size of domestic structures through Period III on the island of Puerto Rico (Curet 1992b). Researchers suggest that the reduction in the size of domestic structures indicates a shift in emphasis on the nuclear family unit as a response to changing sociopolitical conditions, which necessitated increases in domestic efficiency (Moscoso 1981) and the consolidation of personal and heritable property (Curet 1992b). Combining concepts of property, especially landownership, which in farming communities also means production, with the theme of locating or sedimenting social groups in space leads to developing links between dwellings, temporal succession, and ancestral lines (Lévi-Strauss 1987:152). Yet despite the recent discovery of several post-Saladoid domestic structures on the island (*e.g.,* SEARCH 2008; Kaplan 2009) the implications of changes in domestic structures, as related to the organization of households, co-resident corporate groups, and broader social communities remain poorly understood.

The majority of our understanding regarding domestic structures in Puerto Rico and Hispaniola comes from ethnohistoric documentation at the time of European contact. Spanish chroniclers indicate that domestic structures (or *bohio*) were round and constructed with wooden posts and thatch (see Curet 1992; Kaplan 2009; Loven 2010, Samson 2010). Ethnohistoric records also note that the average house size was approximately 9-12 m in diameter (Las Casas 1951:I:243) with that of the village head of households (or *cacique*) potentially much larger.

Large structures have been documented at the Saladoid/Elenan Ostionoid site of Maisabel (Siegel 1992 [576 m^2]) and at the Elenan Ostionoid site of Lujan on Vieques (Rivera and Perez 1994 [11 and 21 m in diameter]). Research by Miguel Rodríguez López at Punta Candelero documented a large number of post molds of which many were very large indicating large structures. However, this has yet to be formally documented (Curet 2011, personnel communication). While relatively few domestic structures associated with Saladoid components have been documented in Puerto Rico, there are several examples of large domestic structures dating to this period from the Lesser Antilles. One notable case is presented by Versteeg and Schinkel (1992) who identified several structures including two relatively large domestic structures at the site of Golden Rock on St. Eustatius measuring 19 and 14 m in diameter respectively.

Common to the archaeological record of post AD 600 Puerto Rico, and several islands in the Lesser Antilles, are smaller nuclear domestic structures ranging from approximately 4 to 12 m in diameter. Evidence for potential nuclear family structures during this time are recorded at Golden Rock (Versteeg and Schinkel 1992), Kelbey's Ridge (Hoogland 1996), Tutu (Robinson Righter 2002), and Anse à la Gourde (Hofman and Hoogland 2004). Recent research by Samson at the site of El Cabo in the eastern Dominican Republic also documented evidence supporting this pattern with late Ostionoid domestic structures ranging between 7 and 8 m in diameter (Samson 2010). By presenting these patterns I am not trying to generalize the changes and process that created them but merely indicate that these material changes are well documented over a wide region during this time.

Until recently, archaeological evidence for domestic structures post-dating AD 600 in Puerto Rico was limited to only a few sites (Curet 1992). However, recent studies provide a larger sample that offers a basis for examining the composition of small scale residential social groups after this time (Table 8-1). For instance, SEARCH recently documented several domestic structures at AR-38 located on the north side of the island in the municipality of Arecibo (SEARCH 2008).

Table 8-1. Sample of sites with domestic structures from Puerto Rico. *Evidence for additional structures but no metrics.

Site	Location	Shape	LxW or Diam.	Area m^2	Component	Source
Maisabel	Vega Alta	Oval/Oblong	52x14	576	Saladoid/Elenan	Siegel 1992
AR-38	Arecibo	Circular	7	38.5	Ostionan	SEARCH 2008
AR-38	Arecibo	Circular	7	38.5	Ostionan	SEARCH 2008
AR-38	Arecibo	Oval/Oblong	6x3	18	Ostionan	SEARCH 2008
AR-38	Arecibo	Circular	5	19.6	Ostionan	SEARCH 2008
AR-38	Arecibo	Circular	6	28.2	Ostionan	SEARCH 2008
AR-38	Arecibo	Indet.	8	50.2	Ostionan	SEARCH 2008
AR-38	Arecibo	Circular	6	28.2	Ostionan	SEARCH 2008
Playa Blanca 5	Ceiba	Oval/Oblong	7.1x6.6	37	Chican	Rivera and Rodriguez 1991
El Bronce*	Ponce	Oval/Oblong	5.2x5	20.4	Elenan/Chican	Robinson *et al.* 1985
El Bronce	Ponce	Oval/Oblong	5.6x5.3	23.3	Elenan/Chican	Robinson *et al.* 1985
El Bronce	Ponce	Circular	7.6X4	23.8	Elenan/Chican	Robinson *et al.* 1985
PO-29 (#1)*	Ponce	Oval/Oblong	7x4.2	35.4	Ostionoid	Kaplan 2009
PO-29 (#3)	Ponce	Oval/Oblong	7.4	38.9	Ostionoid	Kaplan 2009
PO-29 (#5)	Ponce	Circular	6.5x6.8	44.2	Ostionoid	Kaplan 2009
PO-21	Ponce	Oval/Oblong	8X6	48	Ostionan	Espenshade 1987
PO-39	Ponce	Circular	7.4x6.6	48.8	Ostionan	Garrow *et al.* 1995
PO-27*	Ponce	Circular	7.2	50.2	Ostionan/Chican	Krause 1989
PO-38* (#1)	Ponce	Circular	6	50.2	Ostionan	Weaver 1992
PO-38 (#2)	Ponce	Oval/Oblong	7	50.2	Ostionan	Weaver 1992
PO-38 (#3)	Ponce	Circular	7.3	50.2	Ostionan	Weaver 1992
Río Cocal (A)	Sab. Seca	Circular	4.7	17.4	Chican	Goodwin & Assoc. 2003
Río Cocal (B)	Sab. Seca	Circular	3.5	9.5	Chican	Goodwin & Assoc. 2003
Río Cocal (C)	Sab. Seca	Circular	5X6	23.7	Chican	Goodwin & Assoc. 2003
Río Cocal (D)	Sab. Seca	Circular	5	19.6	Chican	Goodwin & Assoc. 2003
Lujan*	Vieques	Circular	21	346.3	Elenan	Rivera and Perez 1997

At this Ostionan Ostionoid site (2σ cal AD 980-1490), she recorded seven potential domestic structures; all round to oval in shape and measuring 5 to 8 m in diameter. Other examples from Puerto Rico with similar structural configurations include Playa Blanca 5 (Rivera and Rodríguez 1991), Río Cocal (Goodwin & Associates 2003) and Lujan (Rivera and Peréz 1997) all measuring less than 8 m in diameter. This pattern in domestic architecture is also well represented in the south-central region of Puerto Rico.

Evidence for domestic structures in the immediate region surrounding Tibes comes from 12 structures associated with six sites[4]: PO-11, PO-21, PO-27, PO-29, PO-38 and PO-39 (Figure 8-2). Based on the available sample, structures range in size from 5 to 12 meters in diameter with a mean of 8.2 m. The sizes and dimensions of these structures are congruent with those generally associated with nuclear dwellings (see Kolb 1985) and are much smaller than expected for an extended family *maloca* style dwelling purported to be the norm for Saladoid social groups. Importantly, the size of these structures appears to conform to other structures documented from the island that date to after AD 600.

The vast majority of the residential settlements possessing these small domestic structures also have primary occupational evidence between AD 600 and AD 1300 (Figure 8-3) suggesting this was likely accepted practice in the region during this time. Assuming the trend to smaller households is true, then “it is probable that these

[4] Additional structures were identified at PO-29 (Kaplan 2009). However, at the time of this study, they have not been formally analyzed. Further, structures presented for PO-38 and PO-27 are projected based on the authors’ critical review of available site maps and feature documentation from these sites. Additional evidence for nuclear domestic structures near TIbes was also revealed in excavations at the site of Caracoles (González Colon and Rodríguez Garcia1985). However, no formal measurements regarding the interpreted size configurations of posthole features are documented in the report.

changes included modifications in the nature, size, and form of indigenous domestic groups" (Curet 1992b:161). It is important to note that such re-organizations often follow changes in larger social, cultural or ideological orders rather than short term adaptations to "local" pressures or the ambitions of individual families (Berman 1994:26). The question here then not only becomes why smaller houses, but how?

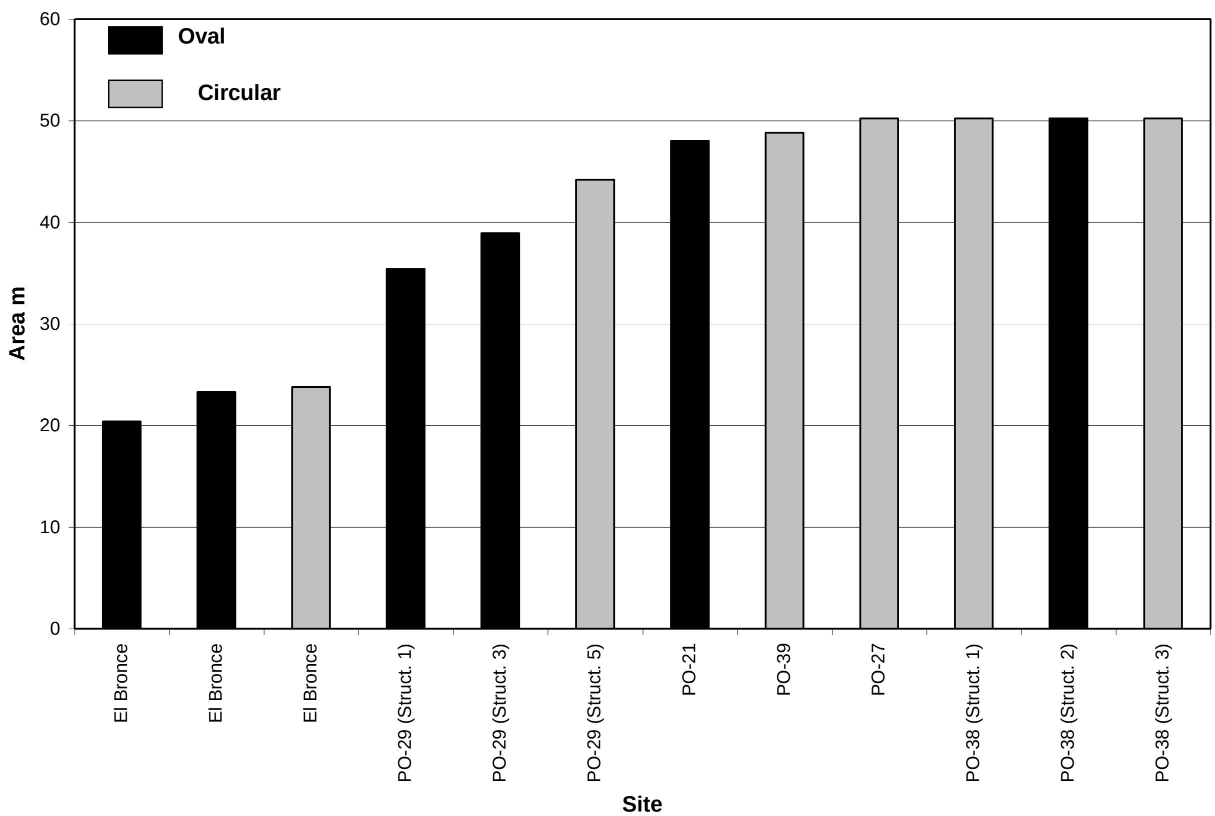

Figure 8-2. Documented domestic structures from excavated sites with evidence of post AD 600 occupation within 11 km of Tibes.

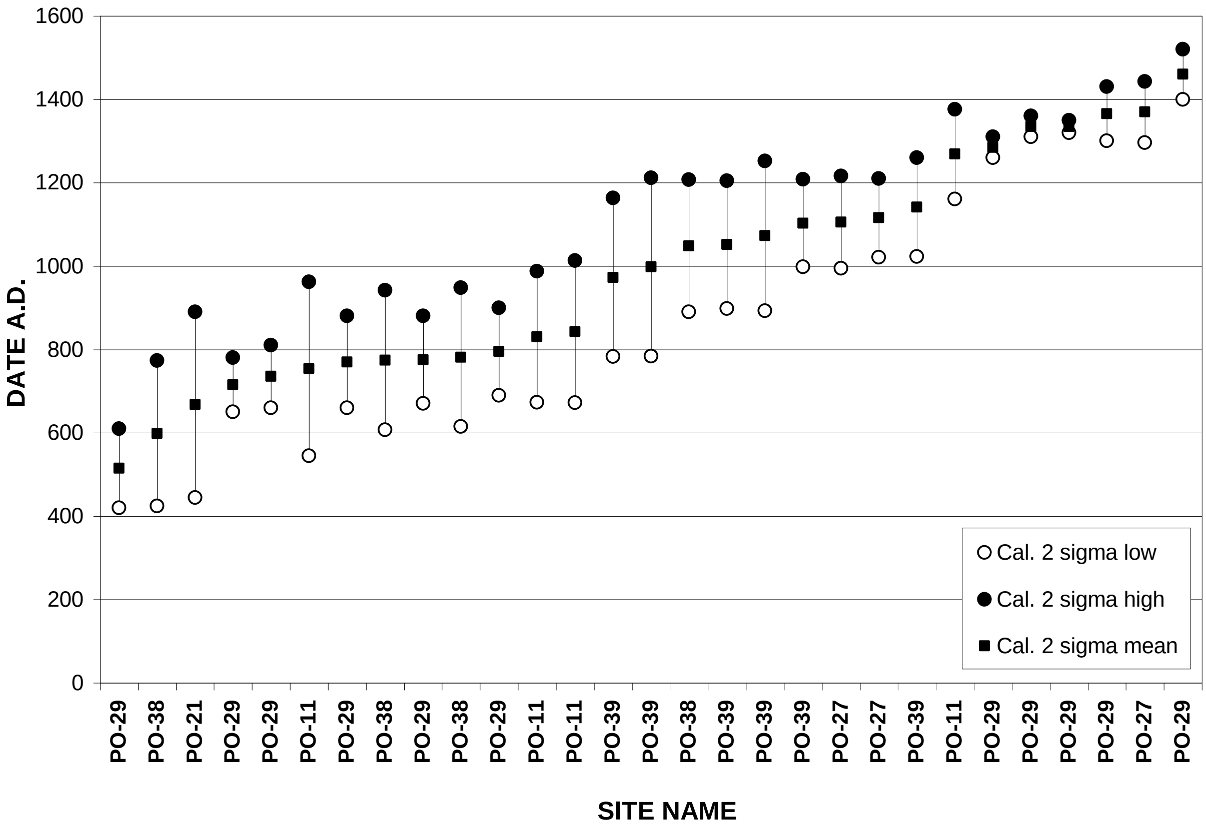

Figure 8-3. Radiocarbon determinations for residential settlements possessing documented domestic structures from the south-central region.

The answer to the latter part of this question lies partly in the data presented in Chapter 7 and earlier sections of this one which discuss settlement dispersal and fissioning. While conflict in its many forms is inherent at all levels of society, there is ample research to indicate that this process may not have consistently entailed physical violence (Simmel 1964). Several documented cases indicate that social groups will split prior to the onset of violence and well below settlement population capacities (Chagnon 1968; Carneiro 2000; Tuzin 2001).

One explanation for the emergence of new permanent settlements involves the creation of “Garden Places” (Butt 1970) or “Garden Hamlets” (Heckenberger 2005). For societies with shifting cultivation practices, such as in New Guinea and Amazonia, agriculture is generally conducted within 5 km of the habitation site and the development of fields greater than this distance will often require substantive modification to the settlement system (Arnold 1985). Usually, such modification entails the creation of residential settlements outside the parent settlement through the development of a farmhouse adjacent to cultivated land, which are initially occupied on a semi-permanent basis. These often become permanent through time and represent one form of new settlement creation.

Ethnographic research conducted by Butt (1970) among the Akawaio of the Guiana Highlands, reports the emergence of new, small settlements because of the construction of "Garden Places" at shorter distances outside of primary village settings where families often prefer to spend most of their time (Butt 1970:38-39). Heckenberger (2005) also notes the creation of new settlements that frequently develop immediately outside or at the edges of the near village territory to be closer to cultivable garden plots and maintain ties to the parent settlement. In time, the household responsible for its upkeep will sometimes move to these locations where they establish permanent residence (Butt 1970). Once residence is permanently established, these locations can develop into hamlets or small villages based on attraction of additional households or through birth and rules of residence in subsequent generations.

In the case of wholesale fissioning, in which segments of the village up and move to new locations, *one would expect a replication of the spatial structures present in the parent settlement*. Specifically, one would assume the fissioning of Saladoid settlements result in the replication of larger sites and domestic structures (*maloca*) at new sites as families attempt to recreate their social order. However, they do not and it appears that post-AD 600 settlements are smaller settlements with nuclear domestic structures, and likely fewer inhabitants which support the Garden Plot model of settlement dispersion. Smaller settlements and their associated domestic structures would also have been selectively advantageous as social groups moved into the foothills of the islands where settlement space was increasingly restricted due to topography.

These changes held important consequences for community formation. First, changes in the form of domestic structures would also have promoted new identities through creating associations between *place* and households or social "houses" (Gerritsen 2003). Second, these changes likely also coincided with reorganization in the relations of production tied to availability of labor and land (Curet 1992b; Moscoso 1981, 1986, 1999). Third, and as noted by Heckenberger, "These moves have the effect of both decentralizing local power and expanding the overall position of the community, as both discrete and related groups" (2005:244). *All of these factors entail a recombination of social groups that required new ways of articulating people and maintaining order within the broader social community*. This was partially done through the recreation of shared life histories that were intimately connected to particular localities in the increasingly packed regional landscape after AD 600. This will be discussed in further detail in Chapter 9. For now, I continue to focus on the occupational contexts of residential settlement of the post-AD 600 landscape to develop an understanding of the composition of local social groups and how organizational patterns at this level affected broader social and political community formations.

Settlement Continuity and Local Identity

The dispersal of residential settlements and an infilling of the landscape impacted the organization of local groups in measurable ways--most notably in residential mobility and continuity. Residential mobility and continuity are important aspects that structure the organization of social groups and local and regional landscapes. First, as demonstrated in the previous chapter, the location of earlier settlements contributes to the locational positioning of social groups within broader networks as well as influencing interrelationships amongst old and new settlements. As the location of new settlements was guided by the locations of those already existing, the ability to establish occupation continuity would have been important for sedimenting people within regional social networks. By virtue of their continuity or persistence, such settlements and local landscapes come to take on symbolic or perhaps metonymic associations between peoples (*e.g.,* lineages, clans) and the places in which they live. Such associations between people and landscape are well documented in the anthropological literature (*e.g.,* Gerritsen 2003; Santos-Granero 1998; 2002) and provide the local groups with a basis of group membership that permits access to social and natural resources within particular areas.

Second, settlement mobility and persistence are important because they relate to social group's mode of production in terms of how people gain (and maintain) access to critical resources in agricultural societies specifically land and labor (Varien 1999:208). The movement of social groups or their persistent occupation within particular localities is based on several factors including rules of residence and demography. One critical factor affecting the persistence of residential settlements is generational domestic cycle (Goody 1958). Residential settlements (and households) grow as children are born and decline as inhabitants leave to form their own households (Gerritsen 2003:107 for discussion). Settlements are often abandoned when inhabitants become elderly and die or move to be cared for by another household.

Recent research suggests that there are also demographic constraints on the occupation duration of small-scale residential groups and that this influences domestic cycling (Chamberlin 2006). , Gaines and Gaines (1997) modeled population dynamics of small residential settlements in the American Southwest focusing on the biological, cultural, and behavioral characteristics of the settlement group and tracking what happened to individuals living in the settlement for a period of 70 years. They noted the continuity of small residential settlements was influenced by mortality rates, marriage, and post-martial residence rules. Shifts in the ages and genders of surviving members of the group also effected population growth and the continued occupation or abandonment (collapse) of the settlement. Their study revealed that less than half (47%) survived for 70 years and in 90% of the cases there was little or no growth during the last 40 years of the settlement. Hence, it would be expected that settlement locations would shift after having been occupied for 40 to 60 years. While this case study was specific to factors involving communities of the ancient American Southwest, it is important to note the constraints on settlement longevity of small residential social groups (*e.g.,* Hassan 1981).

Examination of the available radiocarbon dates of residential settlements from the south-central region contradict the observations supplied in the Gaines' study (Figure 8-4). Specifically, relatively small (<3 ha) well-dated residential settlements in the region persist for long periods of time and in many cases for several centuries. Supporting this longevity is relative chronological data based on pottery evidence (despite noted temporal overlap in styles) indicating a range of long-term occupation components spanning centuries.

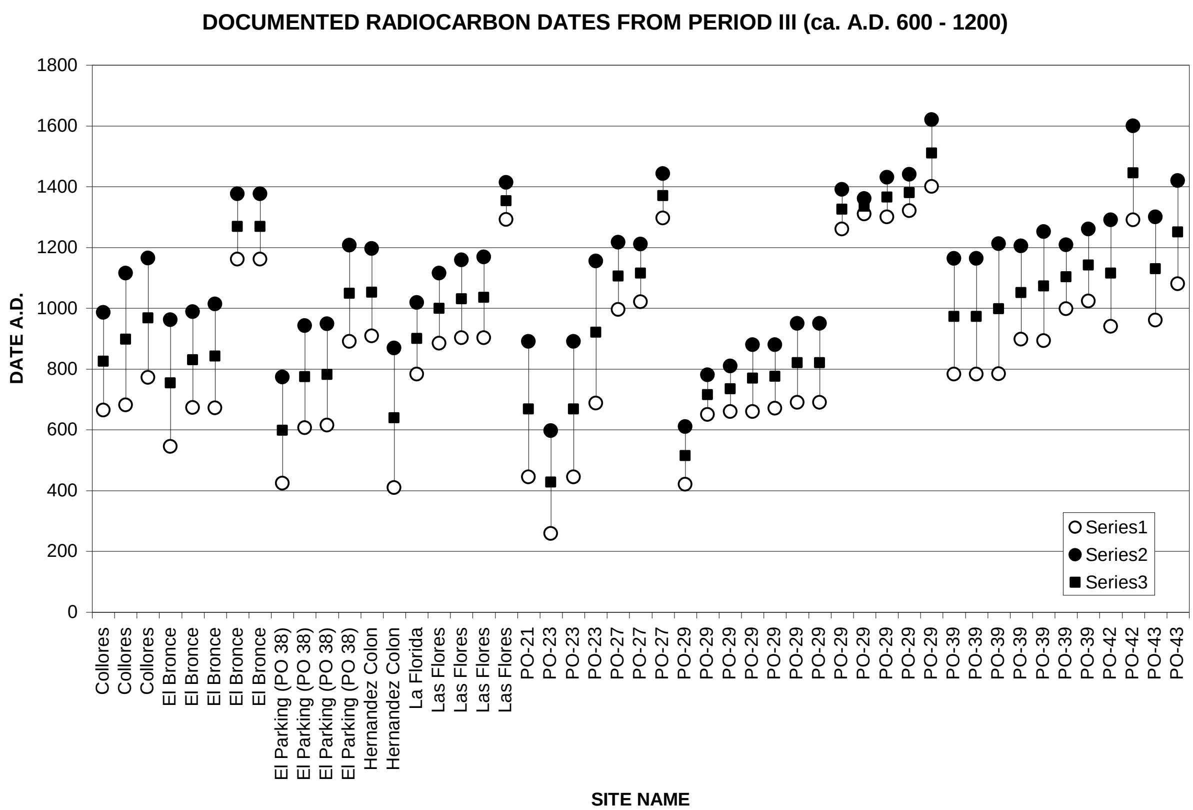

Figure 8-4. Radiocarbon dates from well dated small settlements (<3 ha).

Radiocarbon and pottery evidence suggests that particular social groups maintained generational continuity in particular localities for extended periods. This observation is heightened when taken in conjunction with the observation that while the entire region experienced the creation of new settlements through dispersion, areas where new settlements emerged in close proximity to those from the previous period indicate persistence and settlement continuity of particular localities.

Recent research by Samson corroborates this observation. In her recent doctoral dissertation, Samson demonstrates the persistence and social continuity of not only the residential settlement but the actual domestic dwellings themselves. In her study, Samson showed that particular households occupied the same location for a period of several centuries (Samson 2010). This pattern of settlement continuity reflects the "house" as a tangible corporate and symbolic institution. Such permanency of residential settlement is often found in situations where there is strong linearity in the local kinship systems (Fox 1967; Sack 1986).

The longevity of small residential settlements noted for the south-central region may have been a product of limited access of lands (as noted previously). However, the persistence of these settlements suggests a durability of the household or more broadly the settlement "estate". It must be noted that settlement permanence is also well documented for Saladoid settlements in the region. Indeed, available data suggest that habitation sites in Puerto Rico are generally permanent fixtures with populations tending towards long term occupation of specific locales. Similar observations can be made for many low-land South American groups where large settlements of extended family households exhibit "fixity" of place contributing to the sedimentation of local identities (*e.g.,* Heckenberger 2005, 2007; Santos-Granero 2000). However, what is unique in this situation is the permanence of *small* residential settlements despite the demographic various constraints associated with domestic cycling noted in previous studies (Gerritsen 2003; Varien 1999). Also it is useful to see how some localities on the landscape formed long lived settlement histories particularly in areas where the emergence of new settlements occurred in areas immediately associated with earlier Saladoid settlements.

Such residential stability would have limited the subsequent location of daughter settlements and created persistent places associated with particular families. The limiting of new areas for settlement would have fostered systems of heritable property, land tenure, and long-term negotiations of access and use with neighbors. This all seems to suggests that settlement/house structure locations, and likely associated lands immediately associated with the residential settlement, were passed down from one generation to another. These persistent places, as noted previously, structure the landscape in meaningful ways and would have become symbolically associated with their residents. Such persistence grounds local identities based on kinship relations (through blood and marriage) and shared histories of place through dwelling and living in particular localities.

Land tenure is a risk-reducing strategy ensuring local social groups perpetual access to local resources (Adler 1996). Systems of land tenure vary from communal access[5] to formal systems of heritable property rights associated with particular individuals. In agricultural societies where land use is unrestricted, land is owned as long as it is actively utilized (a form of usufruct ownership); this is often the case where land is readily available and population is limited. When land availability is restricted, the permanency of residential settlements indicated by the persistent occupation of

[5] This does not necessarily mean equal access by everyone but rather ownership and use rights for groups above the individual or household.

particular locales indicate a shift from usufruct land rights, assumed to be the pattern associated with Saladoid households, to one more associated with inherited property.

The observations, and the construction of local identities, are also supported through subfloor inhumations and burials in domestic contexts—a practice which becomes increasingly common in the post AD-600 landscape of the island (*e.g.,* SEARCH 2008; Curet and Oliver 1998; Rivera and Rodriguez Lopez 1991; Robinson 1985). As cogently noted by Keegan "The abandonment of central place burials in favor of burials beneath domestic structures, and in other contexts, is a symptom of the emerging localization of social identity" (Keegan 2009). Curet and Oliver (1998) also note that this shift in burial represents an increased importance on particular families or households and perhaps the narrowing of social status and wealth during this time.

While the present discussion suggests that labor, land rights, and the prestige were perhaps narrowing, the clustering of coeval settlements in particular localities points to a high degree of social and economic interdependence among them. Assuming this to be the case, land-use rights and access would have been negotiated among the broader community to maximize labor and production as well local social stability. Such negotiations would have intimately linked proximally related settlements in more inclusive social formations, providing a contrasting perspective from previous models of political development in the Caribbean, which indicates that kinship decreased in importance. To the contrary, such negotiations simultaneously reflect the importance of kinship and local corporate groups as a communal institutions and the importance of the accumulation of community level prestige and status within particular localities.

Modeling Residential Settlement Composition and Occupation

The size of the residential unit is one aspect of household reconstruction that has been the subject of considerable study. Cross-cultural research indicates some correlation between the total floor area of domestic dwellings and settlement population, although mean values are highly variable (*e.g.,* Kolb 1985; Naroll 1962). One of the most widely cited studies is that of Naroll (1962), who estimated 10 m² domestic structure floor area per individual to estimate prehistoric populations within a household. Naroll's results have been widely used and criticized by archaeologists to estimate the number of individuals residing in residential structures and, by extension, the settlement.

In the absence of physical structures, researchers have employed a range of methods for estimating population of residential settlements. These include the use of formulae for estimating population based on settlement size or the rates of accumulations of various material remains. As noted in previously, researchers generally assume an allometric relationship between site size and population. By contrast, accumulations research is based on the assumption that there is a correspondence between population size and the number of objects or material remains used and discarded by that population (Schiffer 1987).

In the final portion of this chapter, I critically examine two small residential settlements from the Tibes "community" to envisage other settlement localities of the south-central region between AD 600 and AD 1200. The two settlements that form the focus of the present discussion, PO-42 and PO-43, are immediately north of Tibes and documented during the course of the survey presented in Chapter 5. Through the following discussion and analysis, I create a deeper understanding of the social landscape and a firmer basis for inferring the organization of broader social communities during this time.

The examination of the two settlements presented in this section entails an evaluation of their composition and occupation duration through the development of population estimates and pottery accumulation rates. The purpose here is not to establish thresholds for inferring demographic basis of social complexity (*e.g.,* Wobst 1974). While certainly useful for contextualizing regional demography, my primary concern is the social composition of residential settlements and showing how households were organized and articulated across the social landscape during this time.

PO-42 and PO-43 were selected for this portion of the study for several reasons. First, the radiocarbon and pottery evidence indicates that the sites were occupied sometime between AD 600 and as late as AD 1500 with the likely period of intensive settlement being between about AD 900 and AD 1400. This is both during the apex and decline of Tibes' use-life and the emergence of PO-29 as well as during a period when changes in regional settlement were solidifying. Second, both sites appear to represent a similar range of quotidian and ritual practices evident in the artifact assemblages, faunal remains, and the stone lined *batey* features. Finally, the condition of the sites and the amount of material recovered from them allows for the projection of accurate site size and accumulation rates.

To initiate this discussion, I estimate population for residential settlements using the logarithmic formulae as developed by Curet based on settlement size. In previous research Curet employed ethnographic data from lowland South America as an analog for calculating settlement populations (Curet 1998). Curet developed two formulae for calculating these estimates; one for small (<9,000 m²) and one for larger sites (>9,000 m²) respectively.[6] To calculate the population of the sites based on size, I first subtracted the projected area of the plaza/*batey* features from the total site areas as this space, while potentially used for various activities, is not the location of domestic living space.

The results of the calculations indicate relatively large populations for both sites. For PO-42 (measuring approximately 2.5 ha) the site estimate totals 368 people, or assuming a maximum of six individuals per nuclear household, 61 domestic structures. Similarly, the estimates for PO-43 (measuring approximately 1.4 ha) are 183 people or 31 domestic structures. While Curet's population formulae has proven effective for providing rough population estimates for settlements (Samson 2010; Torres and Curet 2008), the initial calculations revealed values that were slightly higher than what could be intuitively projected for both sites based on the density and distribution of midden deposits across the site.

Specifically, the locations of midden deposits mapped at the sites are considered directly associated to particular domestic structures as these would have been formed through the activities most closely associated with them such as cleaning living spaces and cooking . As such, spaces lacking refuse in immediate association with the middens are assumed to be the location of domestic structures as these areas would have likely been kept clean of long term refuse dumping. Based on the configuration of the middens at both sites and the projected size of domestic structures during this time,

[6] The regression formulae are listed in Curet 1998. The formulae for estimating population based on sites less than 9,000 m² is: $y= -441.37 + 149.89 * LOG(x)$. For sites greater than 9,000 m² the equation is: $y = -2579.2 + 671.58*LOG(x)$. In both equations, x is the size of the settlement in m².

current settlement configurations at both sites could not easily accommodate the estimated number of domestic structures suggested by Curet's population formulae.

Recent research presented by Samson for the site of El Cabo appears to support this observation (Samson 2010:302). Samson used nuclear house structures to calculate settlement population and found that the equation developed by Curet was overinflated by 23% (337 based on Curet's formula and 258 for Samson's household estimates). This over inflation can also be compared to research conducted by Espenshade at the site of PO-21, approximately 3 km due east of the Río Portugués drainage. Using Curet's formulae, the estimated population of the site is 85 people (based on site size of approximately .5 ha). In contrast, accumulations research conducted by Espenshade (2000) at the site indicated 1 to 6 concurrent domestic structures. According to Espenshade these estimates "are consistent with ethnographic datasets and the site contexts that fit well with the strong technological and stylistic consistency of pottery from all areas of the site" (Espenshade 2000:18). Assuming that the site contained 1 to 6 structures and that each housed 6 people this would have yielded a population of between 6 to 36 people occupying the site.

Examination of the artifact accumulations offers an opportunity to refine the population estimates provided by Curet's equation and offer a view of residential settlement composition in terms of number of domestic structures, and by extension households. Pottery accumulation studies have been an important dimension of archaeological research over the past 30 years (Schiffer 1987; Varien and Mills 1997). These studies address how and why materials accumulate in the archaeological record based on the underlying assumption that particular types of refuse materials will accumulate at consistent rates thereby establishing a relationship between the use group population and occupation duration.

Based on the relatively intact nature and the large ceramic assemblage from PO-42 and PO-43, these sites offer the opportunity to explore these questions and compare them to Curet's method. The primary assumption in this analysis is that the total number of vessels deposited can be extrapolated from the excavated sample and that this projected value can be used to estimate the accumulation rate of deposition, thereby offering a proxy to calculate potential site population and the length of settlement. In this work, I genially follow methods used by Espenshade (2000:18) at the site of PO-21.

At PO-42 and PO-43, vessel lots identified in Chapter 6 are used to estimate the minimum number of vessels at the site. In total 344 lots were recovered from PO-42 and 366 from PO-43. Based on shovel testing, the highest density areas of the site are represented by the intact midden deposits at each site. These cover approximately 4% (1083 m^2) of the total site area for PO-42 and 3 % (441 m^2) for PO-43. Due to the uneven distribution of cultural material across the sites, I approximated that the sample of material from each site represented about 5% of the total extant pottery assemblage. Hence, the proportional density of vessel lots can be projected as 3,354 individual vessels at PO-42 and 3,568 at PO-43. This estimate assumes that portions of vessels found in the midden deposits may be distributed throughout the site, with each vessel not limited to a single point in space (see Espenshade 2000).

The next step is to determine an estimate of vessel use-life in order to calculate the rate of vessel accumulation in the middens. Examination of several ethnoarchaeological studies indicates a diverse range in the use-life of ceramic vessels (Deal 1983, 1985, 1998; DeBoer 1974, 1985; DeBoer and Lathrap 1975; Gill 1981). Experimental studies have complemented this research by examining how production and use affect breakage rates (Schiffer and Skibo 1987; Skibo 1992). These studies indicate that pots with the highest rates of attrition are those used for cooking (1.7 years) and serving (1.2 years) (Varien and Mills 1997). Vessels used for storage (7.5 years), fermentation of alcoholic beverages (10.3 years), or ritual functions (11.6 years) have use-lives extending well beyond those of cooking and serving vessels (Varien and Mills 1997:152, Table II).[7]

It is assumed that the primary function of the vessels at both PO-42 and PO-43 was cooking and serving which was demonstrated in the vessel form analysis presented in Chapter 6 and supported by their association with domestic middens comprised of food (faunal) remains at both sites. Based on the values associated with cooking vessels documented in previous research, the lifespan of individual vessels from PO-42 and PO-43 is estimated at 1.7 years.

The final step is to determine the number of vessels in use[8] at one time within a given household. With a household defined as a nuclear-family group comprising approximately six people (Curet 1992b, 1998), the number of vessels potentially utilized by this household at a particular point in time is estimated at 10. This estimate is based on ethnographic studies that show that anything less than 10 pots per nuclear family household is likely too low (Rice 1987; Varien and Mills 1997). Following the previous

[7] Fitzpatrick and colleagues recently identified a ritual vessel on Carricou dating several hundred years earlier than the associated assemblages indicating that certain ritual vessels have extremely long use lives through heirlooming (Fitzpatrick *et al.* 2009)

[8] Also referred to the systemic number in previous accumulations studies (Schifffer 1987:51).

assumptions, it is possible to estimate occupation duration through the use of the formula developed by Pauketat (1989:291) and applied by Espenshade (2000) where: Time = (Total Number of Vessels x Use Lifespan)/Average Household Pot Assemblage.

Based on the projected 3,354 (PO-42) and 3,568 (PO-43) vessels and a 1.7-year average lifespan for cooking pots, a single nuclear household using 10 vessels would have taken 570 years to deposit the material in the modeled midden deposits at PO-42 and 607 years at PO-43 (assuming a constant population). These occupation durations obviously decrease with an increase in projected number of households (Table 8-2).

Table 8-2. Accumulations estimates for PO-42 and PO-43. Assumes 10 vessels used per household. *Duration in years.

Site PO-	Vessel Lots	Projected Number of Vessels	Average Use Life Years	Households/Occupation Duration*				
				1	2	3	4	5
42	344	3,354	1.7	570	285	190	143	114
43	366	3,568	1.7	607	303	202	152	121

Assuming the radiocarbon dates collected from each site offer a starting point to approximate temporal occupation ranges, these initial values can be further refined. Looking at the median date ranges for PO-42 we arrive at a range from cal. 2σ AD 1120 to AD 1445 or 325 years. Similarly for PO-43 we arrive at a range from cal. 2σ AD 1130 to AD 1250 or 120 years. Based on the estimates provided here, and the general distribution of the midden deposits at these sites, it is possible to develop an image of what these settlements may have looked like in antiquity. Based on the radiocarbon dates, artifact accumulations, and general distribution of pottery, PO-42 was likely comprised of 1 to 3 domestic structures on the south side of the drainage during the early phase of occupation with perhaps two domestic structures developing to the north side of the drainage with the onset of the Period IV component (Figure 8-4)

In the case of PO-43 radiocarbon determinations indicate that the site was occupied for a shorter period of time. The site configuration shows domestic midden deposits surrounding a likely central plaza/*batey* feature. Based on the distribution of the middens and the accumulation rates in conjunction with the radiocarbon estimates suggests 3-5 domestic structures present at the site at any one time.

I contend that both PO-42 and PO-43, under conservative estimation, were likely comprised 5 or fewer domestic structures at any point during their occupation. This puts the number of individuals occupying each site at under 50 people at any given time. As 68% of the documented settlements in the region from Period III are of similar size to PO-42 and PO-43 (*i.e.,* ≤2.5 ha.) this pattern may not be an isolated phenomena. Several other well documented sites in the region show similar patterns. For instance, in addition to the aforementioned PO-21 (2000), Robinson (1985) notes that the Elenan/Chican Ostionoid site of El Bronce, just southeast of Tibes, "was never very large, and it seems quite likely that there never were more than six residential structures (if that many) at any given time" (Robinson 1985:77).

In another study, excavations at the Elenan Ostionoid settlement of G-15-01 in Salinas yielded similar interpretations. G-15-01 was noted as a small habitation site interpreted as consisting of no more than 10 households at the site at any one time (Robinson 2004a). Similar to PO-42 and PO-43, G-15-01 possesses a small plaza/*batey* feature which potentially served for hosting local ceremonial activities (Robinson 2004:17). In addition to G-15-01, the of F-4-01 (Ochos Concheros) also located within Camp Santiago yielded comparable results with shell middens at the site consisting of localized concentrations less than 10 meters in size (Robinson 2004b). Based on excavations at the site Robinson compared this site to the PO-21 six household estimates (Robinson 2004:13). Both G-15-01 and F-4-01 are both noted to be *relatively large* compared to other documented sites within Camp Santiago indicating that the majority of settlements were likely smaller settlements comprised of fewer than 6 to 10 households (Robinson 2004:13). Additional examples of such settlements are also apparent in the Cerrillos River drainage with the mid to late Ostionoid sites PO-38, PO-23, and PO-27 all yielding similar results.

Another important observation is the fact that these settlements *are occupied for extended periods of time*, well over 100 years in the case of PO-42 and PO-43 and at least 300 years in the case of El Bronce (Robinson 1985), well beyond the proposed demographic models (Gaines and Gaines 1997). This continuity in settlement would have contributed to the sedimentation of local social groups in particular places on the landscape.

The short distances noted between many residential settlements as presented in the previous chapter indicates that, while maintaining some level of autonomy at the scale of the household, they were engaged in interdependent social relationships with neighboring settlements. Hence, local social communities appear to have consisted of interdependent small residential settlements comprising multi-household corporate-groups linked through relations of kinship, affinity, and social propinquity. These groups likely engaged in various communal activities that could have consisted of house building, cultivation of garden plots, and the construction of and ritual participation at communal ceremonial facilities.

Summary: Local Communities in Context

The patterns observed in this chapter show a dramatic transformation in the organization of residential settlements and their associated households between AD 600 and AD 1200 in the south-central region. *These settlement changes indicate a complete reformatting of social communities which emerged in the foothills of the south-central region and which did not replicate earlier Saladoid settlement patterns.* The archaeological data indicate changes in social organization at basic levels that entailed the emergence of small interdependent settlements in particular localities on the landscape.

One of the major changes noted is the proposed transition from large settlements, consisting of one or more extended family dwellings, to small, dispersed residential settlements comprised of multiple nuclear family domestic structures. Based on site sizes and population modeling, the archaeological data suggests that these settlements likely comprised an extended family and their affines residing in under 10 nuclear family structures, and more likely 3 to 5 structures.

This transformation in settlement appears to have been associated with processes of dispersion and mobility in which social groups created new social places in the landscape. Due to the lack of evidence for widespread physical violence, this appears to have been a result of three processes of settlement dispersion from parent settlements that were not necessarily mutually exclusive. The first suggests that social groups bud off parent settlements because of social conflict. These conflicts may have been the result of a variety of factors including jealousy which is commonly noted as a factor influencing fissioning. Another factor may have resulted from shifting power relations and attempts for households to maintain social equality or autonomy through settlement fragmentation (Overing and Passes 2000). Finally, dispersion may be a direct result of settlement growth where social groups gradually shift the focus of their activities to areas they most frequent, in this case, perhaps small garden plots at the edge of near village territories associated with large parent villages.

As mentioned previously and documented elsewhere (Heckenberger 2005) farmhouses are usually built because distance to agricultural fields or garden plots becomes inefficient to traverse from the parent settlement. In this situation, the cultivable lands surrounding the immediate/convenient area of the parent village are all accounted for. As a result, families set up and ultimately move to new farmhouse locations on available land outside or at the borders of the near village territory. Over a generation or two the farmstead transforms into a hamlet or small village. In any of these scenarios, the dispersion of settlements would have contributed to the decentralizing local power and expansion of the overall community (Heckenberger 2005:244).

It is not hard to conceive of these initial farmhouses taking the form of a small *bohio* or hut. As the settlement grows (through births or in moving relatives) in the next generation, other huts sprout up at this location. Since inland locations on the island possess limited space for settlement and cultivation due to their restrictive topography, the social groups able to organize and persist in small scattered settlements would have had an advantage for maintaining land rights and perpetuating their position within the broader social landscape.

Current evidence indicates that once established, settlements were indeed relatively stable fixtures within the landscape with many occupied for several centuries. This “fixity” of place promoted the concretization and legitimization of land rights and local identities. The implications of these patterns suggest that particular localities, and perhaps river drainages, became intimately linked with proximally related, interdependent co-residential social groups which contributed to the formation of social communities above the residential settlement.

Through the nucleation of households in particular localities, it is not hard to see how communities became more clearly defined as did their wealth, status, and position within the local and regional network. As a result, power and prestige were likely centralized in particular households or social “houses”. Heads of households (*i.e., caciques*) often hold sway on scheduling of events at the household and residential settlement scale. Some come to represent social groups in different settings and at different scales raging from the household, residential settlement (multi-house corporate groups) and supra-village agglomerations (Heckenberger 2005). Head of households likely emerged becoming responsible for managing aspects of communal family life such that the house and residential settlement comes to be respected by outsiders. While seemingly contradictory, the consequence of emergent heads of households would have promoted the centralization of local social groups, through associations with land and neighboring settlements, which likely reinforced more inclusive social and political relations.

To conclude, local social community, comprised of multiple residential settlements and strongly associated with particular localities, became prominently represented as a coherent sociopolitical entity in the Ostionoid through its stable and proximally related settlements and construction of its ritual integrative facilities. This all indicates that certain localities had authority invested in local and micro-regional issues of land use and habitation.

In many of these matters, communities probably acted as a cohesive entity much like single settlement Saladoid communities would have in the previous period. This may seem at odds with the suggestion made by the reduction in size of households that indicates that nuclear family households become more important accumulators of wealth and status. However, it should not be forgotten that claims by individual households would never had been exclusive. It is likely that the settlement groups retained a certain measure of control over arable lands irrespective of whether they were farmed individually. Hence land use may have been regulated by local social groups comprised of clusters of residential settlements. This shift required a complete reformatting of social identities and the social landscape. The answer as to how these social groups were able to maintain social cohesion and establish local identities relates to a process of the way in which people construct their identities and shared histories in relation to place.

CHAPTER 9
THE SYMBOLIC CONSTRUCTION OF COMMUNITIES: PLAZAS AND BATEYS

In the previous chapters I documented settlement and social changes at the regional and local levels which demonstrate major transformations in the organization of basic social groups in south-central Puerto Rico between AD 600 and AD 1200. An important outcome of these changes was the proliferation of small residential settlements and their clustering in particular localities. In this redefined landscape, new challenges would have emerged including competition for resources, maintenance of moral and social order, and resolving ambiguities in social relations caused by increasingly complex social networks.

While the reduction in the size of households and the establishment of persistently occupied localities many have reduced some of the ambiguity related to persons and property, maintaining social cohesion and reifying the interests of household corporate groups would have become increasingly important. The resolution of this problem required the creation of new mechanisms to structure the engagements between local and regional communities and contribute to the formation of their social identities. Material evidence for the resolution of these issues is visible in the formation of ritual integrative facilities in the form of stone-lined plazas and *bateys*.[1]

The emergence of ritual integrative facilities in the Greater Antilles, and other parts of the Americas, is often viewed as a response to organizational stress stimulated by regional population increases (Adler and Wilshusen 1990; Carneiro 1967; Johnson 1977; Tuzin 2001). In this context, these features are generally considered the outcome

[1] Other aspects of material culture which indicate dynamic socio-cultural transformations during this time are the emergence of artifacts meant for public display (discussed in Curet 1996) such as stone collars (Walker 1993) and elaboration of cemis (Oliver 2009) which are only found in Puerto Rico and southeastern Hispaniola.

of elite agency to create social and political order while serving their individual interests (*e.g.,* Earle 1997). Yet, despite current conceptualizations regarding these features in Puerto Rico, there are still critical aspects related to their construction, function, articulation, and meaning that have eluded archaeological interpretation, specifically questions persist regarding the full range of activities associated with these features as well as the consequences of their development (Rodríguez Melendez 2007; Curet and Torres 2010).

One of the major limitations hindering interpretation of these features in Puerto Rico are perspectives that adhere to inflexible hierarchal models and homogenous trajectories of regional sociopolitical organization and development. These perspectives lack consideration of the relational properties of people and places and the role of these features in the social and symbolic construction of communal identities. Because of this, a multiplicity of structural relationships is compressed obfuscating organizational variability and the intricacies of human sociality at local and regional scales.

In recent studies from other parts of the Americas researchers highlight the social role of ritual facilities for negotiating social diversity which entail the dialectical relationships between the construction of communal biographies in the creation and solidification of identity *as well as* institutions of power (*e.g.,* Heckenberger 2005, 2007; Pauketat 2000, 2007). This is a necessary point for further elaboration for researchers seeking to explain how communities are linked in social, symbolic, ideological, and political relationships at varying scales.

In this chapter I attempt to discuss some of these processes based on available data for plazas/*bateys* from the south-central region. To do so entails examining plazas/*bateys* within the contexts of community formation and how they may have functioned at different scales. This requires a critical evaluation of the variability of these features, their construction, and the implications of their emergence in the contexts of societal continuity and change.

In the first part of this chapter I provide a brief overview of the scholarly research related to plazas/*bateys* on the island. This section also examines the archaeological data for these features with specific focus on the south-central region. Here I examine the timing for the emergence of these features and the regional social and spatial contexts in which they develop.

In the second portion of this chapter, I evaluate the functional roles of these features at different scales within the region. In this section I demonstrate that their development reflects a more variable pattern in the structure of community power relationships than previously conceived. In the third and final section of this chapter, I present a discussion related to the physical construction of these features in order to demonstrate how these spaces formed part of the ideological and social fabric that "sedimented" (*sensu* Heckenberger 2007) local communities in sacred histories of people and place. Ultimately, I demonstrate that the emerging sociopolitical landscape between AD 600 and 1200 was organized in a series of cascading social relationships that promoted local *community* status and identity through shared ancestral biographies. This organization also suggests that the sociopolitical landscape was more variable and fluid than previously conceptualized.

Plazas and *Bateys*: Archaeological and Historic Contexts

Since the late 19th century, plazas and *batey* structures have stirred the imaginations of many who study the island's pre-colonial past. Through the years, plazas and *bateys* have served as a focal point of scholarly inquiry and, as noted earlier in this work, continue to form the basis for the archaeological interpretation of supra-village political units throughout the island. While not exhaustive, the following discussion offers a context to situate the present study in relation to recent research. For a comprehensive overview of plazas and *bateys* on the island of Puerto Rico, the reader is directed to the work of Barnes (1999), Curet and Stringer (2010), Curet and Torres (2010), Gonzalez-Colon (1984); Oliver (1998, 2007), Rodríguez Melendez (2007), Siegel (1996, 1999, 2010) and Alegría's now classic study *Ballcourts and Ceremonial* Plaza*s in the West Indies* (Alegría 1983).[2]

Plazas and *bateys* in Puerto Rico are generally defined by the presence of stone-lined enclosures typically arranged in a square or rectilinear fashion.[3] These features often consist of two opposing parallel stone rows either lying flat like a pavement (*e.g.,* Tibes), or as partially buried upright slabs that enclose a cleared open public space (*e.g.,* Caguana) (Figure 9-1). Variations on these structural themes are present throughout the island (see Rodríguez Melendez 2007). For instance, some structures are represented as a simple single row of stones with the opposing end bounded by natural rock formations. Other shapes of plaz*a/bateys* are also noted consisting of square and (a limited number of) circular structures (as observed at Tibes and Caguana and possibly PO-39).

[2] For additional background and perspective the reader is directed to Fox (1996), Scarborough's (1991) edited volume on Mesoamerican ballcourts and, Whalen and Minnis' (1996) research on ballcourts of the Hohokam.

[3] Soil is also noted as construction element for some plazas in Hispaniola and *plaza/batey*s are not all necessarily rectangular.

Considerable variability is also present in the documented number and size of features at a given site ranging from small single enclosures under 100 m^2 to large multi-structure complexes with over 4000 m^2 of delineated space. In many instances, elaborate petroglyph carvings are found on the stones constituting these structures particularly at sites during the Late Ceramic Age (*e.g.,* Caguana and PO-29). These features are also known to demarcate public cemeteries typically associated with earlier Saladoid components (Curet and Oliver 1998; Keegan 2009; Rodríguez Lopez 1997; Siegel 1992, 1996, 1999).

The basis of our knowledge regarding plaza*/bateys* in the Greater Antilles primarily comes from documents written by Spanish chroniclers at the time of European contact in reference to the ball game (Oviedo y Valdez 1975; Las Casas 1951). Sixteenth-century chroniclers describe the ball courts and the game, both called *batey*, as central architectural and social features of Taíno settlements. Oviedo notes the ubiquity of these features where "in every village there was a place set aside…for [the playing of] a ball game (Oviedo y Valdez 1975:104). Las Casas also notes these features within settlements stating:

> there was a large clearing, better swept and smoother, longer than wide, which in the tongue of these islands they called *batey*….There were other houses too very near to this clearing, and if the town was very large, there were other clearings or courts for the ball game which were of lesser size than the main one…. (Alegría 1983:8)

Bartolomé de Las Casas provided one of the best physical descriptions for the *batey* noting their dimensions approximately three times longer in length than width (1967: 350). Based on this description, *bateys* are generally considered such if they are rectangular and those of other shapes (*e.g.,* square or circular) are considered plazas as they are considered to be better suited for different types of activities not associated with the ballgame (Curet and Torres 2010).

Figure 9-1. Examples of plaz*a/bateys*. Looking southeast at Batey de Herradura at Tibes (top). Looking east at western row of Plaza A at Caguana (bottom). Note slab construction and elaborate petroglyphs (Photos courtesy of Josh Torres).

Recent research emphasizes the potential variability in the functional uses of features classified as *bateys* and criticizes the overreliance of ethnohistoric analogs dependent upon the ball game for their functional interpretation and social import in pre-contact society (Rodríguez Melendez 2007). Two related but different questions are: how such sites functioned to integrate social groups at varying scales and how do they reflect the social and political order of the island (Oliver 2007; Curet 2010b; Curet and Torres 2010)? Assumptions of centrality and hierarchical order are typically invoked by many Caribbean archaeologists in answering these questions where the presence of plaza*/bateys* signifies the presence of chiefdom type sociopolitical organization *ipso facto*.

The first scholarly research of plaza*/bateys* in the modern era was conducted by Augustin Stahl in the late 1880s. Stahl identified plaza*/bateys* as *bateys*, and provided discussion and interpretation of these features based on Spanish ethnohistoric accounts (Stahl 1889). Fewkes (1907), also relying heavily on Spanish accounts (and in large part Stahl's work), offers some of the earliest anthropological research regarding the existence and function of these features on the island.

These observations were later substantiated by J. Alden Mason's work at Caguana (also known as Capá) in 1915 (Mason 1941). Caguana, located in the modern municipality of Utuado, was the first ceremonial site to be intensively studied on the island. During field investigations, Mason documented several stone-lined enclosures--many with elaborate petroglyphs. Mason's work also revealed a series of landscape modifications entailing several construction episodes of building and rebuilding structures at the site.[4] In the 1930s Froehlich Rainey and Irving Rouse also documented plaz*a/bateys* at several sites in the foothills and mountains; however, they did not consider these sites within broader regional social and political contexts.

Based on the early findings of Mason, Rainey, and Rouse, plaza/ *batey* features were thought to be associated only with the late ceramic age populations (Curet 2010). This idea was based on ethnohistoric documents and supported by early archaeological investigations where sites possessing these features primarily yielded late pre-contact pottery assemblages (*i.e.,* Chican Ostionoid). It was not until the archaeological investigations at Tibes that the existence of plaza/*batey* features predating the late pre-contact era were recognized (González Colon 1984; Curet 2010). This was later supported by archaeological investigations in the immediate region surrounding Tibes at the sites of El Bronce (Robinson *et al.* 1985) and Las Flores (Ortiz Aguilú 1975), both of which provided evidence suggesting construction and use of these features prior to AD 800. Since the documentation of these sites in the late 1970s and early 1980s, additional plaza/*batey*s have been identified from the south-central region that appear to have temporal components pre-dating AD 1200 (*e.g.,* Garrow *et al.* 1995; Robinson 2004; Espenshade *et al.* 2011).

Alegría's study was the first modern synthesis of plazas and *bateys* in the Caribbean (1951; 1983). Alegría noted the majority of these features were primarily located in the mountainous interior with limited numbers on the coastal plains. He attributes this distributional pattern to historic agricultural practices. According to Alegría:

[4] Recent work by Oliver (1998, 1999) and Juan Rivera Fontán (1992, 1999) provides and excellent overview and interpretation of the site.

> Lack of archaeological remains on the coast could be explained by the fact that the coastal plains have been intensively cultivated with sugar cane since the late 16th century, destroying all evidence of *bateys*. The interior of the island, especially the small valleys between the rivers, was densely populated during the Taíno occupation of the island. These areas have been used primarily for coffee growing, cultivation of which does not require total clearance of the land, thus preventing the destruction of the rows of stones which mark the *bateys*. (Alegría 1983: 115-117)

Since Algeria's publication, several researchers have studied the distribution of these features throughout the island including González Colon (1984), Rodríguez Lopez (1995), and most recently Rodríguez Melendez (2007). The number of registered sites possessing plaz*a/bateys* has grown over the past 20 years, in large part due to the increase in cultural resource management projects on the island (Barnes 1999; Rodríguez Melendez 2007).

The origin of these features on Puerto Rico is currently a matter of speculation. Alegría suggests they were likely the result of Mesoamerican influences which diffused through Lower Central America to Northeastern South America and eventually reaching the Greater Antilles (1983). Recent research alludes to morphological and structural similarities between Puerto Rican plazas/*bateys* and stone pavements registered in Costa Rica (Rodríguez Ramos and Pagán Jiménez 2006; Wilson 2007). The structural similarities between these features, in conjunction with other similarities in stylistic attributes in gold, jade and lapidary artifacts appears to indicate potential social and ideological linkages between Puerto Rico and the isthmo-Columbian region (Rodríguez Ramos 2010). However, the nature of these relationships and their influence on the development of Puerto Rican plazas/*bateys* remains unanswered.

Puerto Rico contains the highest number of registered stone-lined plazas and *bateys* in the Caribbean with approximately 150 sites currently documented possessing these features (Rodríguez Lopéz 1995; Rodríguez Melendez 2007). Yet despite the frequency of these structures on the island, intensive archaeological investigations of them remains limited (as noted by Barnes 1990; Rodríguez Melendez 2007:18). The majority of existing data often consists of brief descriptions that lack their specific location, dimensions, and the number and geologic composition of stones constituting them. Unfortunately historical agricultural processes, and more recently urban development and looting, are rapidly erasing evidence of these structures (and important pre-contact sites in general) from the archaeological record of the island. However, despite these issues in recordation and preservation, data is available for many which provide a basis for their regional context in this study.

In her recent doctoral dissertation, Rodríguez Melendez (2007) compiled a detailed list of all registered sites possessing plaza/*batey* features on the island. Many of the sites reported have limited information, largely due to the circumstances related to their initial documentation. Despite the lack of fine-grained data, all reported sites can be placed within specific *municipios* (analogous to counties in the United States). *Municipo* boundaries, while representing arbitrary modern political divisions, are in most cases predicated on the natural landforms such as rivers and mountain ranges and offer a means for spatially visualizing these distributions across the island. Using the list provided by Rodríguez Melendez (2007:43-51), a map was generated for the island showing the number of features registered within each *municpio* (Figure 9-2). No attempts were made at this level to refine or distinguish temporal association as the distributional configuration of these features at this scale is telling in and of itself.

Obviously survey coverage of the island and historical landscape alterations may skew some of the distributional patterns.

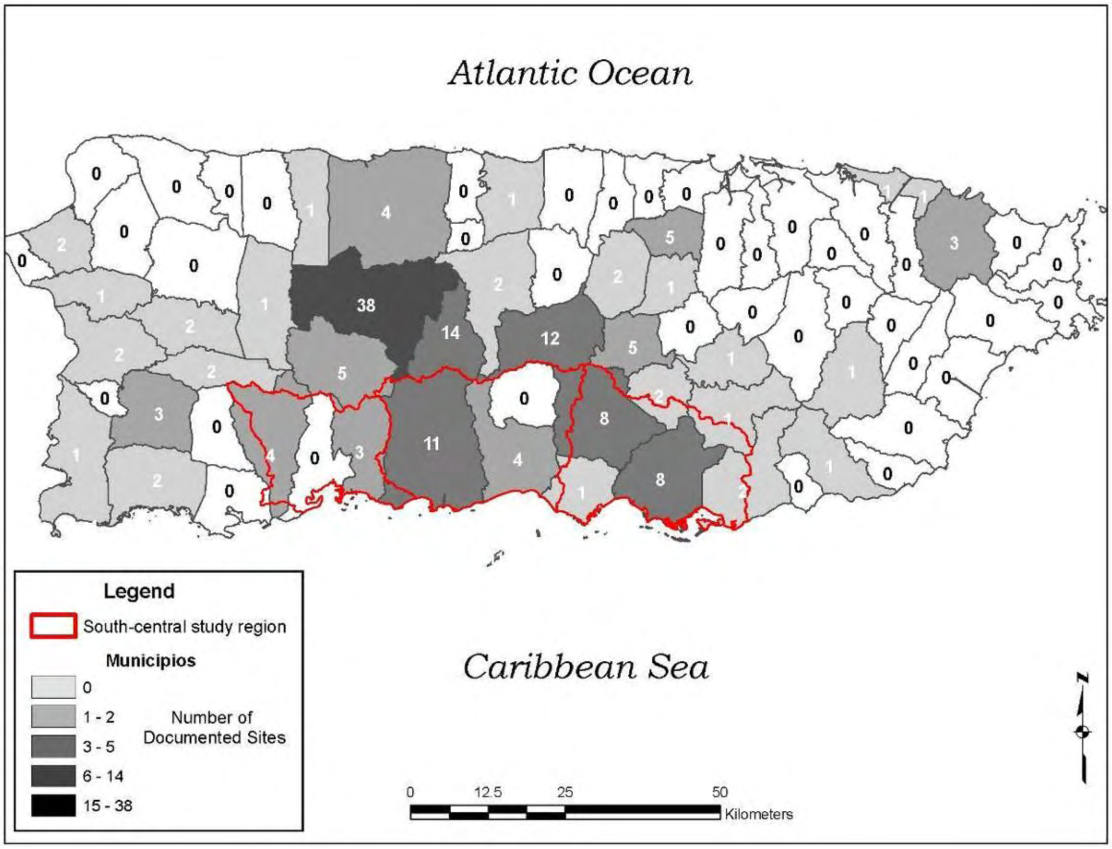

Figure 9-2. Chloropleth map showing the distribution of registered sites with plaza/*bateys* throughout the island (based on Alegría 1983, Rodríguez Melendez 2007; Siegel 1999).

Cursory examination of the distribution of sites possessing plaza*/bateys* reveals that the majority of them are located in the in the mountainous interior within and surrounding the municipality of Utuado as well as dense clusters in the south-central region in the municipalities of Ponce[5], Coamo, and Salinas. The general temporal association of these features, while tentative in many cases, indicates that those in the central, mountainous portion of the island are *generally* later than those documented in the foothills and coastal plains to the south (Alegría 1983; Oliver *et al.* 1999). This follows empirical observations presented in Chapter 7 and previous research regarding island-wide settlement patterns where earlier Saladoid residential sites are primarily located along the coastal plains and foothills and move inland in greater numbers around AD 600.

Of particular note is the relative paucity of these features in both the western and eastern portions of the island. While the lack of documented plaza/*batey* features in the western part of the island is likely a result of limited archaeological investigation in that area, their relative absence in eastern Puerto Rico is not as easily explained as large areas have been subject to intensive archaeological survey (*e.g.,* Sanders *et al.* 1994, 1997, 1998; Sara and Franz 2006; Sara and Mclintock 2008; Sara and Ortíz Aguílu 2003; SEARCH 2011b; Tronolone and Cinquino 1984; Tronolone *et al.* 1984).

Shifting our attention to the south-central region, an examination of available chronological data (*i.e.* radiocarbon dates and pottery) indicates that all but three sites with these features possess a Period III component (Figure 9-3). The majority of sites with a Period III only component are documented in the eastern watershed. Out of the 16 sites with these features, only half persist into Period IV. In contrast, out of the twelve sites in the central watershed with Period III components more than half persist

[5] Rouse mentions that *plaza/bateys* were generally earlier and more elaborate in sites possessing Elenan Ostionoid pottery (associated with the Vieques Sound interaction sphere) than on Ostionan Ostionoid sites (associated with the Mona Passage interaction sphere) (Garrow *et al.* 1995:32).

into the proceeding period. This observation coincides with the settlement patterns presented in Chapter 7 which denotes a decrease in settlements throughout the region and shifting of populations in the eastern watershed during Period IV.

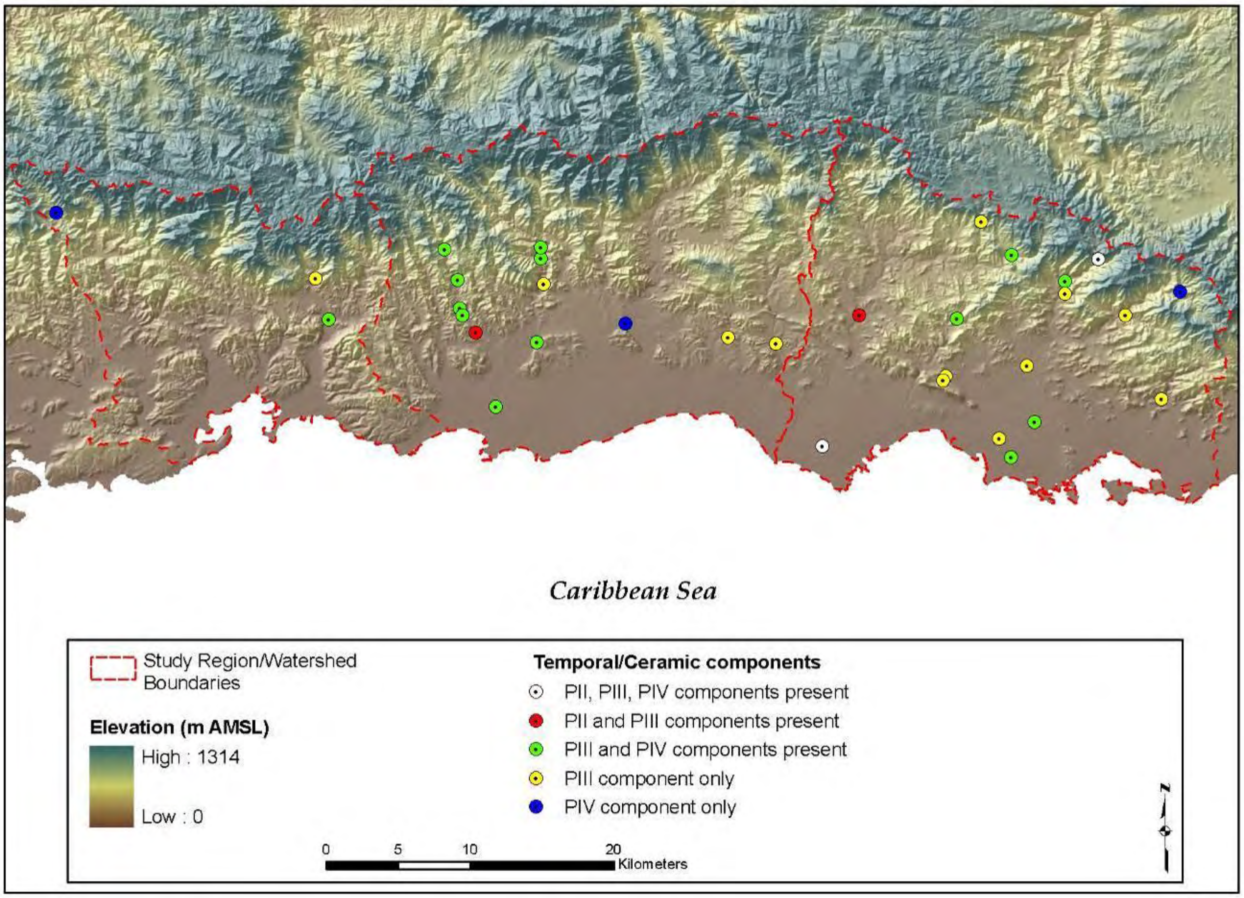

Figure 9-3. Temporal distribution of plaza/*batey* sites for the south-central region.

Importantly, variability in the temporal shift in these features during Period IV suggests that there were different organizational process occurring above the local level during the previous period which produced these later patterns. This coincides with previous work conducted by Curet (2005) who suggests micro-regional variability in demographic processes. This variability in organization will be discussed in the proceeding sections.

Constructing Histories, Identities, and Place

Plazas are inherently spaces for social encounters (Gregor 1980; Fox 1996; Heckenberger 2005; Morre 2004; Scarborough and Wilcox eds. 1993; Whalen and Minnis 1996).[6] While typically associated with the Antillean ballgame, other uses of stone-lined enclosures in Puerto Rico are detailed in European documents.[7] One important function of these spaces recorded in ethnohistoric documents shows that they served as arenas for the performance of *areyetos*, or ceremonial dances which *recounted* important social events. According to Oviedo y Valdez:

> These people had a good and pretty way of recalling the past and ancient things; and this was in their chants and dances, which they call *areyeto*. The areyeto was performed thus. When they wished to have pleasure, celebrating some notable feast among them, or lacking that, as a simple pastime, a great many Indians of both sexes would come together (sometimes only the men, at others the women alone). In the general festivals, such as celebration of victory or defeat of their enemies, or the marriage of a chief or king of their province, or for other cause, which brought pleasure to everyone, men and women were mixed together. (Oviedo y Valdez 1975:69)

Among indigenous societies of Puerto Rico, it is not difficult to imagine how group identity was tied to these spaces regardless of their quality, size, and in some cases apparent lack of ritual specialization (Rodríguez Melendez 2007). Such variability in these features is likely functionally related to use-group size where not all of them

[6] As Gregor notes "…the literal translation for plaza is "frequented space"" (Gregor 1980:51).

[7] European chronicles also indicate that these spaces served as political arenas for the negotiation of power and disputes as well as betting. In one famous case, a young Christian, taken captive during the revolt of 1511, was tied to a tree and the ballgame played for the winner's right to kill him (Oviedo y Valdez 1975).

served as loci of large scale community or intercommunity events. The arrangement and materiality of these spaces thus likely served to link people at different social scales from the level of the smallest residential settlement to the broadest conception of community. Here it becomes useful to envision these features as socially produced *places* whereby the recounting of histories through performative action *articulated* (*sensu* Oliver 2004:263) social groups in shared sociality anchoring them in lived topographies of landscape.

Archaeological research in conjunction with ethnographic documentation presents strong evidence that in addition to the ballgame, if not more so, stone enclosures were utilized for ritual practices associated with ancestor veneration, recanting myths, and communal memories (Oliver 2009; Siegel 1999; Stevens-Arroyo 2006). Current archaeological data from many of the earliest documented stone enclosures indicates that these spaces were utilized as burial grounds in which the plazas were built to delimit the extent of preexisting Saladoid interments (Curet and Oliver 1998; Siegel 1999; Keegan 2009). While there is some debate regarding the continuity of this practice through Period III, current research indicates that they were somewhat variable with evidence of continued use for burials at some sites past AD 800 (Siegel 1999) while not at others. Detailed treatment of the variability in mortuary patterns throughout the island is beyond the scope of the present work; however, it is important to note how these socially constructed spaces served to articulate the worlds of the living and the dead with the landscape.

Keegan has recently postulated that Saladoid burial practices may represent postmortem mobility whereby the burial of community members residing (post martially) in locations outside the immediate locality were interred at death in their natal community (Keegan 2009).[8] While this hypothesis has yet to be tested, Keegan's idea is compelling. If true, such practices support the emergence of supravillage identity formation during Period II. Whether or not this was indeed the case, it is clear that during Period III these negotiations of identity, and arenas of broader social interaction, became increasingly public through performative ritual practices that served as a central component to community formation.

Ritual performances and moments of gathered humanity were likely accompanied by communal feasting--a primary form of human socialization (Hodder 2005; Potter 2000). Feasting celebrations offer one way in which to collectively assemble local and supra-local community groups for various exchanges of goods, information, and marriage partners (Rossman and Rubel 1986). Such events (and the *places* where they occur) gather individuals together from diverse social arenas from both within and outside the local community. Feasting events, and the communal performances enacted at them, would have been inherently political because they offer an opportunity to bring to the forefront differences in identity and power between social groups for negotiation.

One commonly cited function of communal ritual events is that they allow for the sharing of ancestors which becomes a point of both unity and contestation (Heckenberger 2005:302; Siegel 1999). Hence," sites of these rituals, of social and symbolic reproduction, are critical nodes not only of space but of cultural memory, as places" (Heckenberger 2007:297). In this context, a strong focus on unilineal descent

[8] According to Keegan, "Because Saladoid material culture emphasizes a regional identity, it is here argued that Saladoid burials in the central plaza more likely represent regional integration and not homage to the people who lived and died in the village" (Keegan 2009).

provides a structuring mechanism for ordering social groups and individuals within and between communities. The relationships between the living and the dead are materialized on the landscape and become powerful symbols structuring social groups through time and space. The convergence of these associations promotes the identity and status of local groups as durable institutions. Ritual practices and the materiality of their construction had direct effects on the structuring of the social landscape where these features conveyed local property rights through peoples associations to place. Through time, such histories and spaces can be contested, manipulated, and transformed.

To be sure, the emergence of stone-lined plazas and *bateys* represents a significant transformation in the ordering of social groups from earlier cultural manifestations (Curet 1996; Siegel 1999). Less developed is an understanding of how these features operated at varying social scales in social and political ordering of communities (Curet and Torres 2010; Rodríguez Melendez 2007). To elaborate on this concept I examine two key analytical dimensions regarding these structures. The first deals with scalar aspects of functionality. The second examines the implications of the construction of these features to support the idea of differing scales of functionality and to elucidate the composition and organization of local community groups.

Performance, Function, and Scale

In a cross-cultural ethnographic study of middle-range societies in the Americas, Adler and Wilshusen (1991) note that integrative ritual facilities are common and that some facilities are meant to be used by entire communities, while others serve smaller portions of it. In their research they identified “low-level” and “high-level” integrative facilities which indicate differential scales of usage. Low-level facilities describe those spaces and structures that serve to integrate only a segment of a community (Adler and Wilshusen 1990). These features are generally associated with small scale architectural features constructed and used by households within a given residential settlement. They also note these spaces tend to be more functionally *generalized* serving a range of uses for both quotidian (profane) and ritual (sacred) purposes; a point suggested (but not formally demonstrated) for smaller stone enclosures in Puerto Rico (Oliver 2007; Rodríguez Melendez 2007).

In contrast to low-level facilities, high-level facilities are for social activities involving groups from multiple low-level facilities incorporating several households or residential settlements. These features are typically ritually *specialized* and utilized by relatively large use-groups, often including the members of several interacting, but separate communities (Adler and Wilshusen 1990). The formalization of these specialized integrative facilities does not necessarily imply an increase in the number of activities associated with them but rather a decrease in their generalized function and overall profane usage. In many cases, high-level ritual facilities are inhabited by a small population that maintains it and coordinates communal gatherings (Adler 1989).

Based upon the amount of labor required, the number of people involved in the construction, and specialized uses of the facilities in a single location, large (or "monumental") public works generally fall into this high-level category (Adler and Wilshusen 1991:135; Moore 2004; Kolb 1997; Kolb and Snead 1997). They also showed a correlation between use-group and facility sizes in which small low-level facilities typically accommodate fewer than 180 people and large high-level facilities communities over 250 individuals (Adler and Wilshusen 1991:143).

Specialized integrative facilities that operate at different functional scales are well documented in several regions of lowland South America where segregated communal space is present within a central residential settlement that serves its constituent members as well as other settlements from the surrounding community (*e.g.,* Butt 1977; Gregor 1977; Thomas 1982; Heckenberger 2005). Specialized structures within the community, such as men's houses, which serve smaller more intimate segments of the community, and open public plaza spaces that serve a broader array of local constituents. Here, it is possible to see how different facilities served as overlapping nodes of interaction which cascade out to broader more inclusive social formations.

In the case of plaza/*bateys*, this point corroborated in their ability to physically accommodate different use-group sizes and how they affected communication. In his 2004 study, Moore showed that there are relationships between the organization of ritual spaces (specifically plazas) and the nature of communicative ritual performances engaged at them (Moore 2004). Using concepts derived from linguistics, Moore identifies modes of ritual communication within plaza settings based on structural characteristics of ceremonial architectural space and the bodily interactions of individuals and groups within them. Moore notes:

> Ritual concepts are expressed and created via paralinguistic, verbal, and nonverbal modes of human communication. Because of the innate properties of human perception, spatial thresholds structure the ability to communicate over distance. And consequently, the architectural settings of rite reflect the modes of ritual communication that occurred in those spaces. (Moore 2004: 789).

Moore recognized that the increase in size of ceremonial facilities increased the physical distance between speakers (or performers) and observers. Based on the distance between speakers, the perceptive qualities of human interaction vary from intimate to public with each associated with different modes of communication "distinct potentials" (Moore 1996:793). Variability in the sizes of documented plaza/*batey* features stimulates consideration of the *scales* interaction and their socio-symbolic function within the residential settlement and broader community. *Hence, the various sizes of a given plaza/batey likely reflect the potential communicative function of these spaces based on the number of individuals they can physically accommodate and the contextual scale of the performative actions conducted within them*. To explore this idea, we can look at the census of registered plaza/*batey* sites in the region surrounding Tibes. There are 30 sites registered with ceremonial features associated with Period III in the region (Table 9-1).

Unfortunately, not all of the sizes of these features are documented due to the context of their recordation and impacts of historic agricultural and modern development. However, a small sample of sites with documented areas (n=12) is available and provides a means to discuss how these features functioned at varying scales. Available data shows a wide range in sizes from sites with single, very small structures (SN-24, 37 m²) to large multi-structure sites (Tibes, totaling 4434 m²) (Figure 9-4).[9] Variability in size suggests that these features functioned at different scales of social interaction based on the number of people that could be accommodated by them.

[9] Examination of the size distribution of registered sites with ceremonial architecture indicates the median ceremonial space is 720 m² (std. 1185.1 m²).

Table 9-1. Documented ball court/plaza sites within the south-central region study area.

Site No.	Name	Period	Site Area	Plaza Area m²	# of Structures	Reference
AI-04	Vega del Seburuco	PIIIb	?	?	1	Site Form;
CO-01	Las Flores	PIIIb	20234	1000	1	Alegría 1983;Ortiz Aguílu 1991; Siegel 1999
CO-02	Villon/Cuyón	PIIIb/PIV	32500	1620	3	Alegría 1983; Siegel 1989
CY-01	Jajome	PIV	?	?	?	Rodríguez Melendez 2007; Site Form
CY-02	Las Planas	PIIIb/PIV	4046	?	?	Site Form
GA-09	XP-5	PIIIb	25000	?	?	Site Form
JD-03	Venegas	PIV	2023	?	2	Lundberg 1985; Site form
JD-07	Río Cañas	PIIIb	4046	?	1	Site Form
PN-01	Caracoles	PIII/PIV	?	?	1?	González Colon; Site Form
PN-03	La Jagua	PIIIb	?	?	1	González Colon 1984; Site Form
PO-01	Tibes	PIIIb	40468	4435	9	Curet *et al.* 2010; González Colon 1984; Site form
PO-10	Caracoles	PIIIb/PIV	44100	?	1?	Rodríguez 1985; Site form
PO-12	Maraguez	PIIIb	4046	?	1?	Site Form
PO-27	PO-27	PIIIb/PIV	20188	720	1	Krause 1989; Solís Magana 1989
PO-29	PO-29	PIIIb/PIV	20234	2000	1	Espenshade 2009; Espenshade in press
PO-39	La Iglesia de Maraguez	PIIIb/PIV	5400	200	1	Garrow and Associates 1995
PO-43	Los Gongolones	PIIIb/PIV	13705	750	1	Torres 2008
PO-42	La Mineral	PIIIb/PIV	24570	90	1	Torres 2008
PO-41	El Colmado Perez	PIIIb/PIV	4046	480	1	Site Form; Site visit by author
SI-06	Las Ollas	PIIIb	8093	?	?	Rodríguez 1985
SN-03	Turrado	PIIIb/PIV	2023	?	1	Rodríguez 1985
SN-05	La Plena 2	PIIIb/PIV	2023	?	1	Rodríguez 1985
SN-11	El Llano	PIIIb	4046	?	1	Rodríguez 1985
SN-16	F-4-01	PIIIb	12140	?	1	Rodríguez1985

Table 9-1. Continued.

Site No.	Name	Period	Site Area	Plaza Area m²	# of Structures	Reference
SN-18	M-14-01	PIIIb	?	?	1	Rodríguez1985
SN-28	G-15-01	PIIIb	?	343	1	Rodríguez1985
SN-30	P16	PIIIb	?	?	1	Rodríguez1985
SN-33	P19	PIIIb/PIV	?	?	1	Rodríguez1985
SN-34	P20	PIIIb/PIV	?	?	1	Site Form
SI-04	La Florida/Los Indios	PIIIb/PIV	40468	?	1	Rodríguez 1985; Pantel 2006; Rouse 1952
PO-11	El Bronce	PIIIb/PIV	16956	400	1	Robinson *et al.* 1985
SN-04	La Plena 1	PIIIb	8093	?	1	Rodríguez 1985
SN-07	El Coco	PIIIb/PIV	12140	?	1	Rodríguez 1985
SN-02	Esperanza	PIIIb/PIV	?	?	?	Alegría 1983109-111, Pantel 1977, Rouse 1952
YA-03	Mattei	PIIIb/PIV	?	?	1	Rouse 1952; Alegría 1983

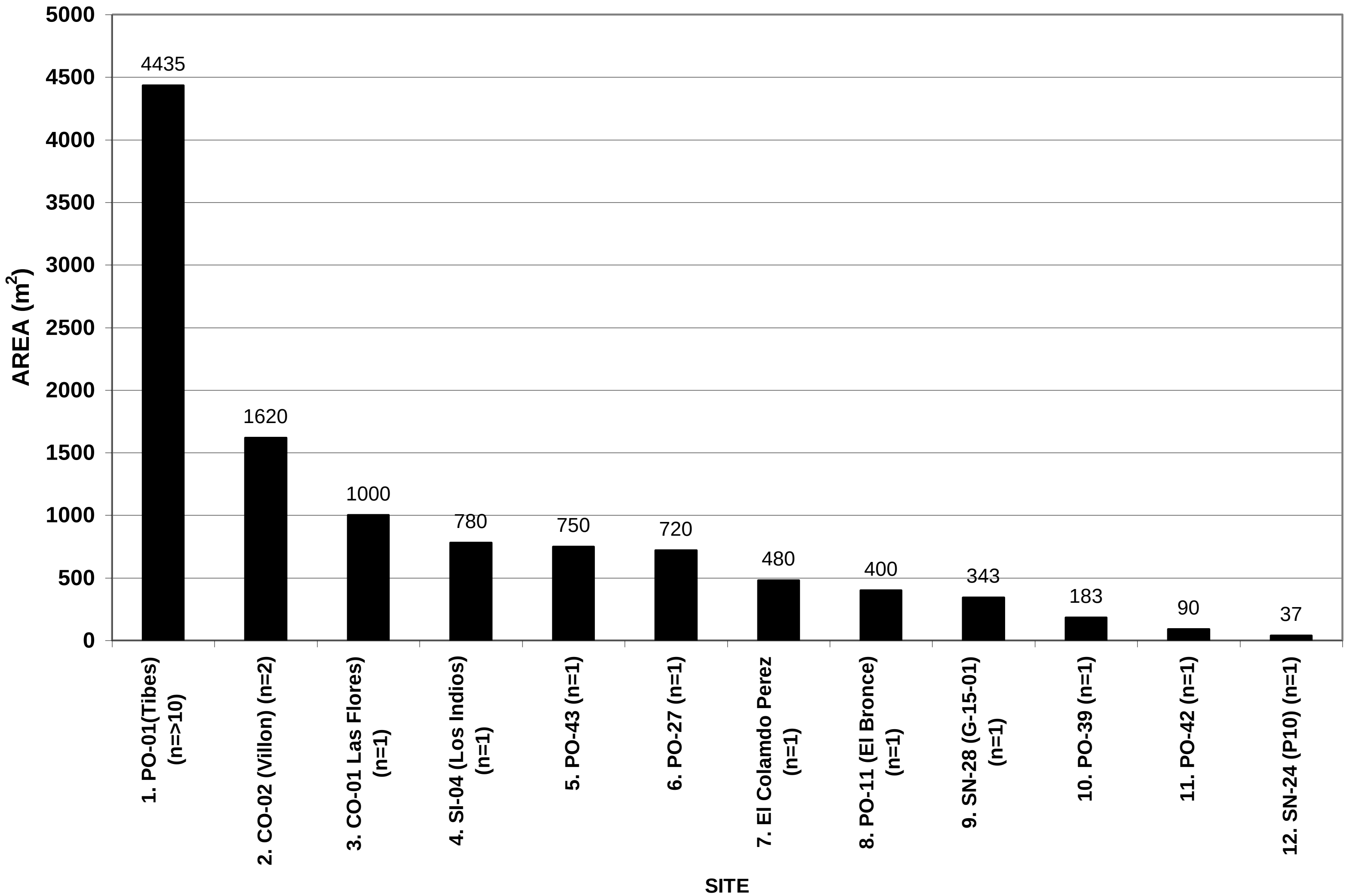

Figure 9-4. Documented plaza/*batey* sizes for Period III on the south-central region. (n=number of stone enclosures present at the site).

The distribution and size data show how these features may have articulated at different scales and forming a network of social interaction (Figure 9-5). Documented plaza/*batey* sites are primarily located in the central and eastern watersheds with no plaza/*batey* features registered for the western watershed for Period III. At the 2.5 km interval plaza/*batey* sites are loosely clustered in the eastern watershed and more densely in the area around Tibes. This arrangement likely reflects differences in the interactions within and between local communities in the region with high-level ritual facilities forming hubs linking smaller low-level facilities and community clusters.

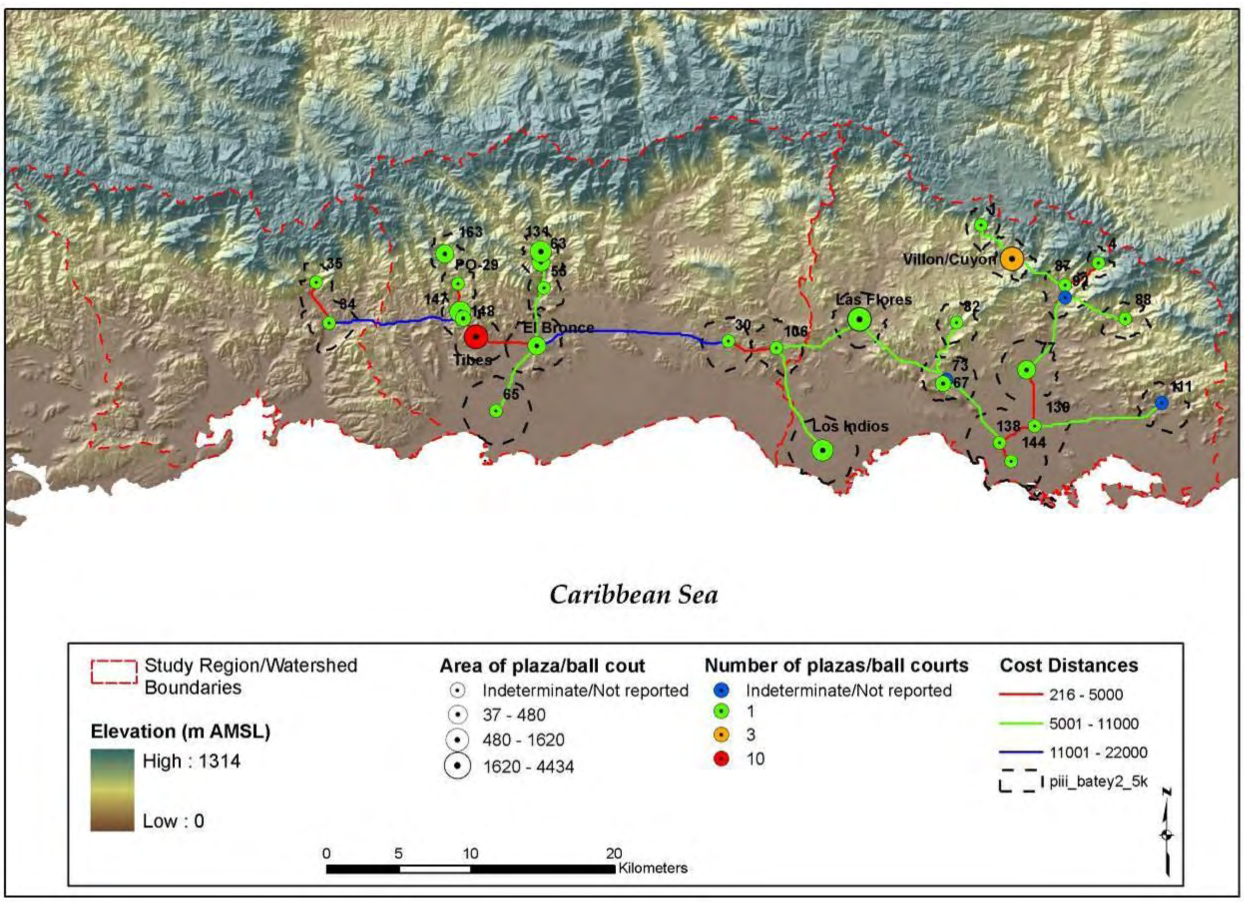

Figure 9-5. MST and size distribution of Period III *bateys* showing linkages and 2.5 km clustering.

The geographic distributional pattern suggests that there was regional variability in the organization of local social groups. In eastern watershed these sites are linked over a greater distance and cover a wider geographic area than the displayed in the central watershed. In the central watershed sites with these features are tightly grouped. Two additional observations can be noted.

First, the clusters of ballcourts in the central and eastern watersheds are separated at distances over a days walk indicating socio-ritual interaction between the two groups was likely not occurring on a day-to-day basis. This conforms to previous discussions suggesting that incipient sociopolitical units that are delineated by just over a single day's walking distance (Spencer 1982; Helms 1979; Halley 1993). Second, the higher level integrative facilities like Tibes and Villon occur at the convergence of small settlement clusters, supporting Vescelius' early observation that some sites possessing these features tend to occur at the convergence of settlement clusters or potential sociopolitical groups. The implications of these patterns will be further discussed in the following sections.

Rank-Size Analysis

A rank-size analysis was conducted to critically evaluate the potential scalar functions inherent in the sizes of the various plaza/*batey* features in the region. Rank-Size analysis has traditionally been demonstrated as a useful tool for identifying hierarchical patterns in regional settlement systems (Crumley 1976, Johnson 1977; Li Liu 1996; Savage 1997). According to Johnson, "The rank-size rule consists of the empirical observation that rank-size distributions from many different settlement systems have the same basic form, specifically that a settlement of rank *r* in the descending array of settlement sizes has a size equal to 1/r of the size of the largest settlement in the system" (Johnson 1980:144). Hence, rank-size analysis correlates the relative sizes of sites to each other to examine hierarchy, integration and codependence (Drennan and Peterson 2004; Johnson 1980; Savage 1997). This measure relies upon the tendency for centralization given specific levels hierarchical organization. The presumption here is that hierarchical patterns will show a distribution of settlement sizes which correspond to some measure of importance within the regional community network.

The rank-size rule was developed by economic geographers as empirical generalization of settlements (Haggett 1966, Stewart 1958) to inductively explain, the processes that created them. The relationship was originally observed by Auerbach (1913) and further developed by Zipf (1949). Rank-size analysis is based on concepts associated with CPT which predicts that a hierarchy of places will develop because of economic activities. In this case settlement sizes conform to a series of graded sizes based on their relation to the primate or regional center. The result is a stepwise ranking system in which places of equivalent function should be of equivalent size (Christaller 1966). However rank-size analysis is considered a more robust method for identifying these patterns as the reality of settlement sizes is often represented by continuous gradations that do not necessarily conform to a neat step-wise pattern. Critically, Crumley (1976:65) and other researchers (Savage 1997) have suggested that the utility of the rank-size analysis is not in the identification of steps in the distribution but rather interpretation and implications of the curve itself which can (and often does) deviate from a log-normal pattern.

Interpretation of rank-size analysis is based on deviations from a log-normal distribution, in which each rank is twice the size of the previous one. Deviations from the log-normal line have been variously interpreted (Savage 1997:234). For instance, compared to the log-normal plot, a convex curve (rising over the log-normal line) indicates settlements larger than the expected values. This suggests lack of integration or a network based on horizontal (peer) relationships (Johnson 1980). In reality, such a distribution does not necessarily indicate equal standing, as access to particular resources, be they social, political, or economic, may differentiate equally-sized settlements.

In contrast a primate plot (falling under the log-normal line) indicates smaller than expected values likely representing greater aggregation with less horizontal integration and hierarchical structure (Johnson 1982). Primate distributions are indicative of strong vertical integration, that is settlements are integrated in a set of hierarchical relationships emphasizing particular centers, rather than as distributed horizontal networks. In this idealized model, settlements are articulated to one another through larger settlements. This is the pattern could be created by a large settlement with public integrative facilities (Siegel 1996) surrounded by smaller settlements or integrative structures. Primate patterns may suggest the existence of higher order ceremonialism and/or inter-regional exchange (Li Liu 1996).

Rank-size analysis has been utilized in the Caribbean, albeit in a limited number of cases. Wilson (1989) employed rank-size analysis on Nevis to examine regional settlement structure and contemporaneity among Ostionoid settlements. Recently, Hardy utilized rank-size analysis to examine the integration of settlements in the Virgin

Islands (Hardy 2008). Previous application of rank-size analysis in Puerto Rico was used by Siegel (1996) to demonstrate political hierarchies during the late pre-contact period.

Siegel's (1996) previous research presented the rank-size analysis of plaza/*batey* features focusing on demonstrating the ranks or tiers in the sociopolitical system rather than interpretation of the curves themselves. Further, the sample used in the study was represented by few sites for the entire island. At this scale the implicit assumption is that the *island* represents the social and spatial unit of analysis. *However, I would contend that while at this scale may suggest regional hierarchies, they are more likely to reflect the size and organization of the local use group populations rather than a spatially broad or overarching hierarchical or political ranking system.* In this study rank-size analysis was conducted for Period III plaza/*bateys*, for each basin, to provide a picture of the fractal nature of regional political landscape and to provide a springboard for further discussions of function related to size.

Examination of the Period III data, based on the size of ceremonial features incident at a given site, is also represented by a strong primate curve (Figure 9-6). Examination of the curve in relation to the log-normal line shows three to four tiers indicating a potential hierarchy of ritual integration during this time. This pattern matches Siegel's observations in that integrative ritual facilities appear to be graded in distinct tiers. In this case, Tibes is clearly the primate center. However, is the regional rank-size necessarily indicative of regional authoritative socio political structures and a strict vertical hierarchy or does it reflect local patterns of community organization?

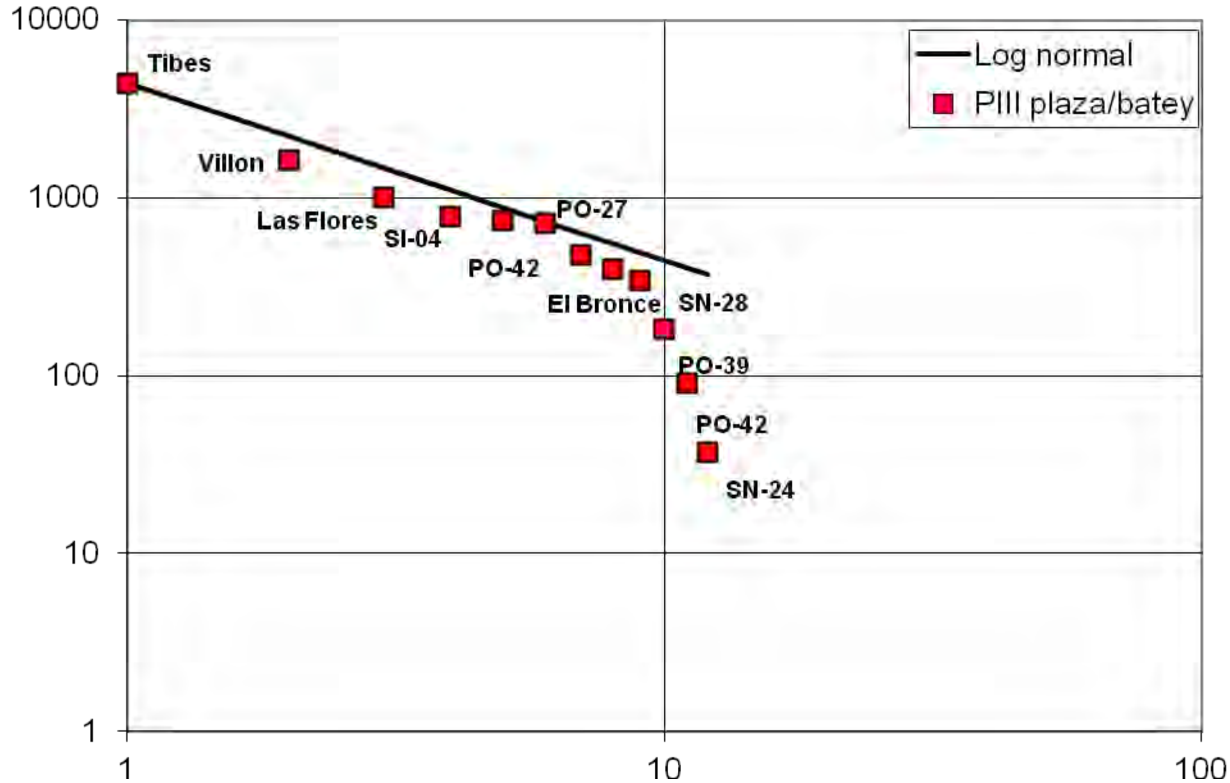

Figure 9-6. Rank-size plot for all PIII plaza/ballcourt features. Plot based on structure size m².

To address this question it is necessary to examine rank-size at the sub- or micro-regional level. The western watershed while containing a limited number of plaza/ball court features lack a sufficient sample and the size data necessary for analysis. Hence, they are not considered in the following analysis. Examination of the rank-size plot for the central watershed exhibits a strongly primate curve with Tibes clearly representing the primate center again (Figure 9-7). However, variability in the curve below the log normal line suggests other organizational dynamics with what appears to be a secondary tier flowed by a sharp drop off in the size of ceremonial space. These differences suggest that there were differential scales of ritual integrative facilities in the area. So, while the immediate region surrounding Tibes strongly indicates a primate or strongly hierarchical pattern, the balance of the sites indicates the potential for secondary and local use group facilities that may have provided for ritual activities independent of Tibes.

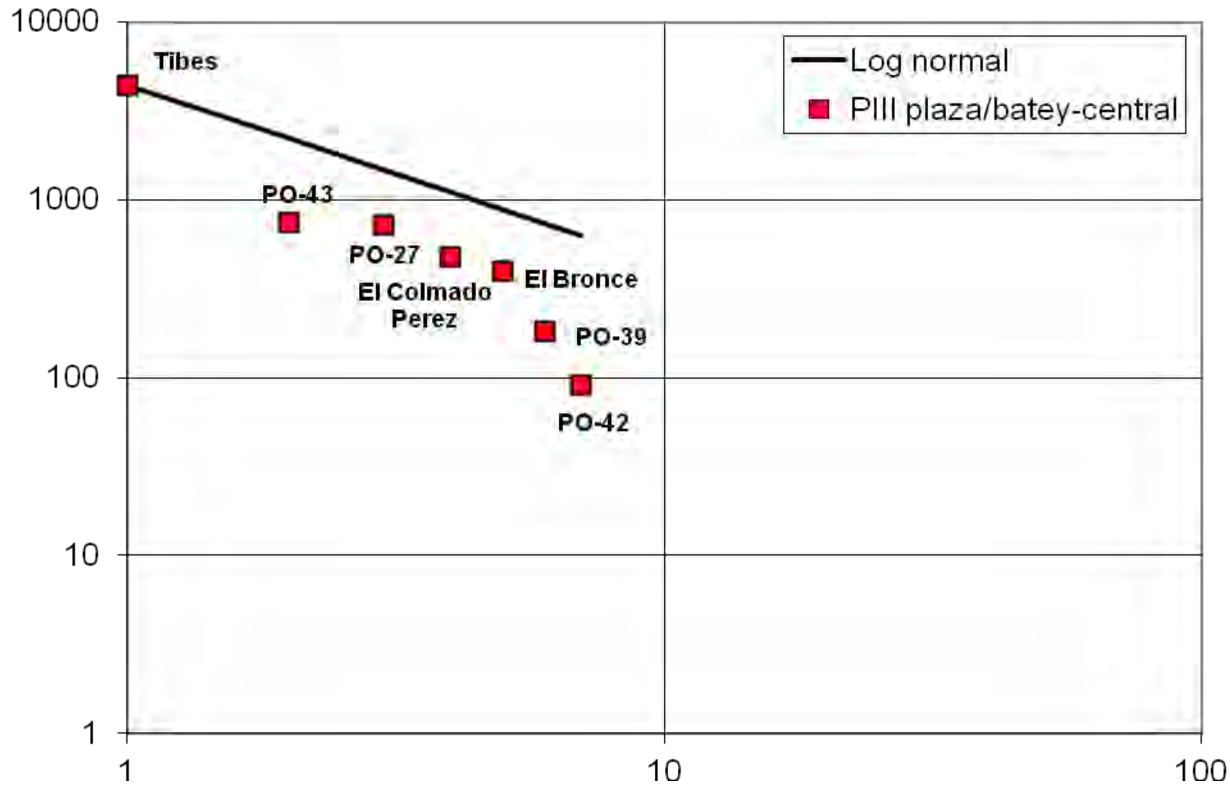

Figure 9-7. Rank-size plot for all PIII plaza/*batey* sites with area data. Plot based on plaza/*batey* size m² (central water shed).

Shifting our focus to the eastern watershed a different pattern emerges which demonstrates a convex curve above the log-normal line. This pattern indicates a less vertically integrated system and one characterized by more horizontal relationships than vertical (Figure 9-8).

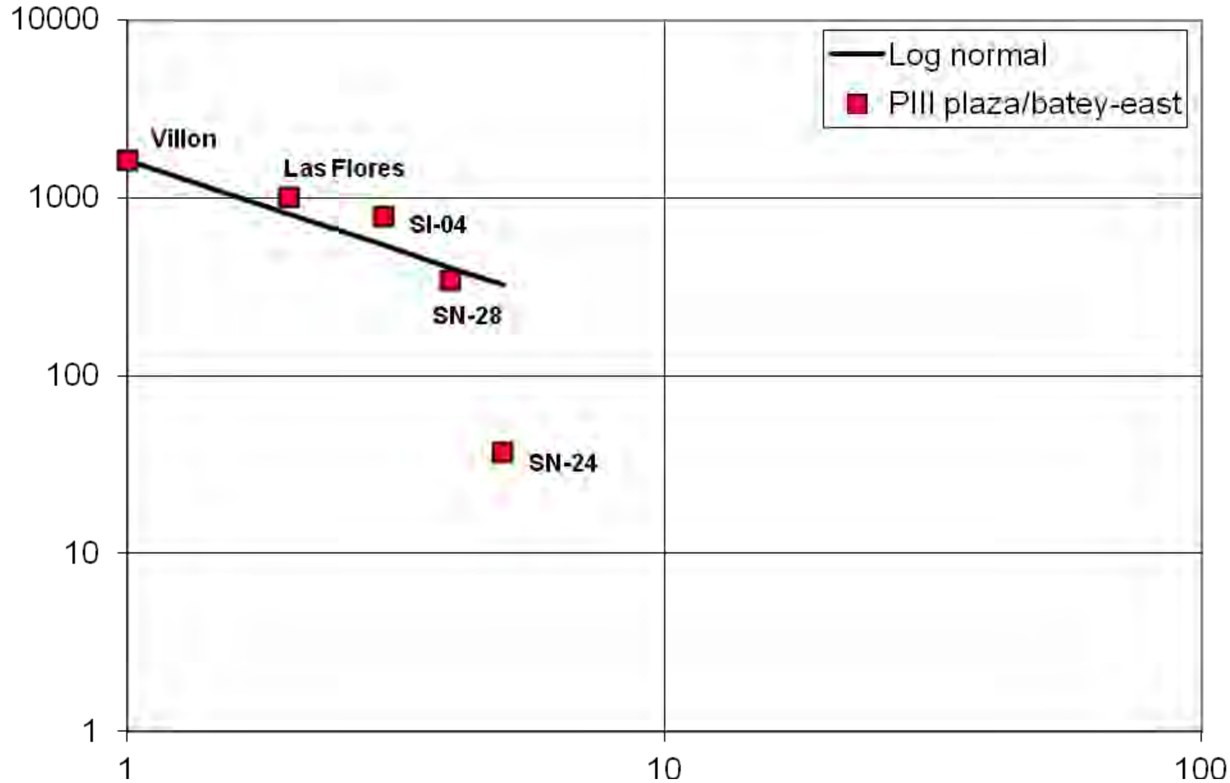

Figure 9-8. Rank-size plot for all PIII plaza/*batey* sites with area data. Plot based on plaza/*batey* size m² (eastern water shed).

Removal of Tibes from the rank size plot of the central watershed reveals a strong convex plot with steps above the log normal line as expected in rank size analysis when the primate center is not included (Figure 9-9). However, while Tibes clearly represents a primate ritual center in the region, it is problematic to assume that it served all portions of the study area equally as areas further distant outside the local community, particularly one to two days walk, were likely part of more local sociopolitical engagements.

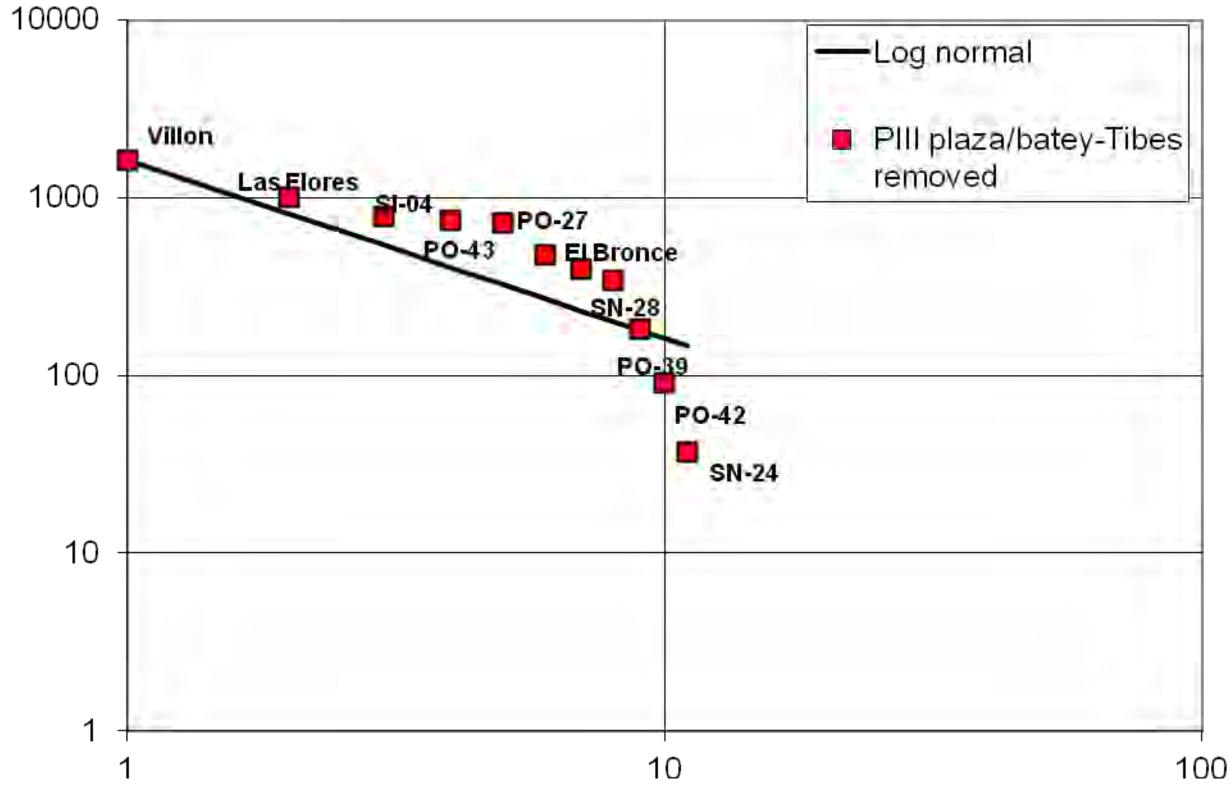

Figure 9-9. Rank-size plot for south-central region PIII plaza/*batey* sites with area data. Plot based on plaza/*batey* size m² (Tibes removed).

Summary and Functional Interpretations

The implications of the previous discussion suggest that the sociopolitical landscape during Period III consisted of local community formations that had ritual integrative facilities which performed different functions at different social scales. The analysis presented here suggests that larger features were likely high-level facilities with smaller features acting as low-level facilities as noted by Adler and Wilshusen (1990). Based on the differences between the watersheds it appears that there were different levels of organization and interaction that were regionally variable and not necessarily organized in a strictly defined regional hierarchy (*e.g.,* Crumley 2003). Instead, the sizes of the stone enclosures in both the eastern and central watersheds indicate variation in use-group size and represent the scalar linkages of ritual practices in which lower-level facilities are more prevalent and were nested in ever increasingly larger public realms.

The smaller facilities represented in the sample, indicate ritual performances in more intimate settings entailing smaller use-groups. These lower level facilities occupy the lowest level of the rank-size plots. Due to the small sizes of many of these, they would likely not have been functional for the playing of the Antillean ballgame. Use-groups associated with these spaces were likely comprised of individuals from the immediate or perhaps adjacent residential settlement. Importantly, these smaller spaces were likely not places for the engagement of large numbers of individuals for large scale community events.

The use of small sites like PO-27, PO-11 (El Bronce), PO-39 and PO-42 indicate areas for events involving a limited number of people (20-30 perhaps) based on the number of individuals these spaces could physically accommodate. Further, the location of these features within or adjacent to identified settlements possessing larger facilities *suggest that they fulfilled a variety of functions reserved for the individual settlement with larger facilities serving the broader community or intercommunity functions*. Marriage, puberty rites, conflict resolution are a few of the village based ritual functions these smaller feature may have served (Garrow *et al.* 1995; Oliver 2009:41; Stevens-Arroyo 2006) with the larger adjacent ritual facilities serving for community or intercommunity social activities. In sum, the size of these smaller features suggests that the daily regulation of ritual social life *was conducted at the scale of the individual settlement*.

In contrast to these smaller stone enclosures larger and multi-structure complexes indicate the ability to accommodate larger use-groups in less intimate and more public settings. In the case of Tibes (4435 m^2) and Villon (1620 m^2), the size of these features in relation to the overall site sizes (representing 24 and 34 percent of the total site sizes respectively) and based on the presence of multiple stone enclosures indicates they would have been physically able to support public oriented ritual activities. While not possessing multiple structures, Las Flores (1000 m^2) also indicates its uses for large social engagements.

Medium sized ritual facilities range in size from 343 m^2 to 480 m^2 and 720 m^2 and 780 m^2. While not as large as Tibes or Villon they are not as small as PO-42 or PO-39. The wide spread distribution of these small features throughout the region indicates they may have been the location for engagements between local settlements within the community. Further the distribution of these sites, in relation to larger stone enclosure sites, potentially suggests that they were the locations of local leaders who may have been central in the community power structure.

The emergence of ritual integrative features, in conjunction with the intensification of settlement presented in previous chapters suggests increased social and symbolic focus on the local unilineal descent group or lineage for maintaining social order and the materialization of people and place. Hence, stone enclosures represent the history and organization of the *local community* inscribed on the landscape whereby the size of these facilities *not only* indicates the organizational complexity of local and regional interactions, but the scalar structure of ritual and kinship that tied local social groups into broader imagined communal formations.

Of Flesh and Stone: The Material Construction of Plazas/*Bateys* and Community

As a final point of inquiry, I examine the implications of the construction of plaza/*batey* features in relation to the organization of local communities and the social production of place. Here I present labor estimates from two proximally related but very different plazas/*batey* sites from the south-central region—Tibes and El Bronce. This examination supports the previous discussion regarding the scalar functions of these spaces both within the contexts of local villages as well as within the broader web of community relations and political landscape. Through this discussion I address factors related to potential use group population and how *place* is socially and materially tied to the construction of these features. Here I suggest that the construction of these features served to integrate communities as much as the sacred performances that were later conducted at them. As noted by Joyce and Hendon "If materiality is a means through which social actors transform fleeting identities into historical facts, then the different forms of permanent marking of the landscape…must be understood as the result of conscious actors using architecture to write different forms of community onto the landscape" (Joyce and Hendon 2000:154).

Over the last thirty years many studies of the construction of public architecture emphasize labor organization within the context of specialized economies in stratified social systems (Abrams 1987, 1995; Abrams and Bolland 1999, Moseley 1975). By virtue of the socio-cultural contexts, political organization is generally interpreted based on a particular typological construct in which power and the appropriation of labor are assumed to positively correlate to complexity *a priori*. This can be problematic in attempting to model or interpret potential organizational dynamics of mid-range societies where the composition of corporate groups and the interplay between labor organization and sociopolitical structure is highly fluid.

Most archaeological research regarding labor organization of mid-range societies have conflated the ability to appropriate labor with other dimensions of social structure--including political power which generally assume public labor projects represent coerced or corvée labor relations (Kirch 1990). Such models entail an innate assumption that the processes associated with the mobilization of labor are inherently exploitive to the benefit of the elite. In fact, archaeological research emphasizing these models often characterizes elites as “usurping, co-opting, preempting, or more frequently, controlling the surplus labor of dependant producers” (Saitta 1994:204).

As discussed in previous sections of this chapter, and throughout this research in general, there are other often overlooked aspects related to the political organization of social groups. This is particularly true for the construction of public integrative facilities that are absent from archaeological interpretation in the Caribbean. As with other dimensions of interpretation these discussions generally focus on interpreting labor relations based on previously conceived evolutionary societal typologies rather than exploring the ways in which our understanding of society and politics is informed by the archaeological evidence for these relations (Saitta 1997; Saitta and McGuire 1998).

Elliot Abrams has perhaps been the major contributor to the sociopolitical implications of architectural construction and labor studies in the New World. Abrams has developed this area of research known as architectural energetics (cf. Abrams 1987). Abrams’ work focuses on detailed quantification of labor estimates including raw material and physical construction costs and the roles of craftsman and specialists in architectural projects. His research emphasizes the correlations between the scale of the structure and sociopolitical and economic complexity as well as the systemic dimensions of status and power relative to labor organization (Abrams and Bolland 1999; Arco and Abrams 2006). For Abrams, labor associated with building construction is fundamentally quantified in terms of cost, "with cost serving as the analytic unit of measurement upon which comparative assessments of power or status within and among archaeological societies are based" (Abrams and Bolland 1999:264)

In the Caribbean, the construction of plazas and *bateys* are typically viewed in such exploitative terms that ultimately assume that ceremonial spaces were constructed under coercive or controlling circumstances (Ortiz Aguílu 2009). This concept is based on the idea that the *cacique* or shaman (*behique*) ultimately assumes control of these spaces and was therefore central to the motivation and appropriation of labor necessary for its construction. It is also assumed that these construction projects were considerable undertakings that required complex systems of organization and management. As Alegría states, the "labor force needed for the excavation of the courts, the construction of earth embankments, and alignment of stones required a powerful chief, as well as a society with a food surplus to sustain the laborers who were constructing the courts" (Alegría 1983:6). While this appears to be the case in some instances (*e.g.,* Caguana and perhaps Tibes), what about other sites with smaller features?

While certain dimensions of these interpretations are valid, we can neither assume coercive labor relations nor does the nature of these relations need to tie to typologically based organizational analogies. Current research suggests that the emergence of formally defined public ceremonial spaces represents a rupture with previous traditions and a change in the way people inscribe meaning to place. As such, it would be expected that the motivation and appropriation of labor would be sensitive to disrupting the social order of potentially unstable incipient political formations. Hence, I am skeptical of coercive labor relations in the construction of these features, particularly early on in their regional emergence on the island.

With this in mind, I think it becomes clear that there are other dimensions of sociality that warrant consideration in relation to the motivation for the construction and use of these communal labor projects in Puerto Rico. I agree that the creation of formalized ceremonial space on the island points to dramatic changes sociopolitical organization and the way social groups created and negotiated their social realties across the landscape. Importantly, it represents a new structuring of communal identity and associations tied to space and place. By shifting our focus to the empirical evidence for the construction and labor involved in these features, it is possible begin to form a firmer foundation for other interpretations that focus on the material construction of communities and how they were organized.

Research regarding the labor investment of public architectural features emphasizes labor arrangements at the level of the household and supra-household scales. When considering variability in the organization of these arrangements it is useful to conceive of them as a continuum evident in three types of architectural features: family, festive and corvée respectively (Kolb and Snead 1997:267). Family architectural feature are the most frequent type encountered in the archaeological record. These include domestic structures and associated outbuildings, small agricultural works and other features are generally utilized for basic domestic activities. An important aspect of family oriented labor works is that they generally lack bureaucratic involvement and are typically small scale projects in which labor is appropriated from within the domestic kinship group (Kolb 1994; Kolb and Snead 1997).

At the opposite end of the spectrum are the aforementioned corvée architectural markers that are considered common in societies where differences in status and privilege are pronounced. These architectural features are necessarily involving supra-family social groups and vary in degree of monumentality depending on the scale of labor invested in the structure (Abrams 1995; 1999; Kolb and Snead 1997). These projects often include large scale agricultural works, elite residences, defense systems and monumental ceremonial architecture. Corvée labor is characterized by labor relations where organization is highly centralized and participation obligatory (Kolb 1997). In many cases, the labor force consists of a full time specialized worker force and or craftsman (Abrams 1984; Moseley 1975). As incipient political formations are generally unstable, it seems unlikely that undue demands be placed on small local populations.

Between these two extremes are festive architectural features. These are typically defined as larger than family or individual household labor projects but "not truly monumental in terms of overall labor input" (Kolb 1997). These projects are organized at the level of the local community and labor is often exchanged for commodities such as food, prestige or security (Kolb and Snead 1997:4). These architectural features often consist of local level ritual facilities (Adler and Wilshusen 1990) or other public works (*e.g.,* raised fields, drains or canals) where ownership is usufruct at the level of the community. While many labor projects and their associated organizational dynamics defy clear classification this framework offers a heuristic discussing use group population and by extension elucidating the organizational dynamics of the local communities presented in this research.

Stone Enclosures at Tibes and El Bronce

The site of Tibes is composed of several middens, and twelve stone structure, ten of which are visible at the site today (Figure 9-10). In addition to the stone structures, the original excavations uncovered two clusters of burials (González Colón 1984): the first one is under the Plaza Principal, the central plaza of the site, while the second one is 50 m to the southeast of this under the Batey del Cemi.

Both burial clusters seem to belong to the Saladoid series and are thus older than the overlying stone structures (Pestle 2010). Other burials belonging to the Elenan Ostionoid subseries were found dispersed over the site, in most cases associated with domestic contexts (kitchen middens and/or possible house floors)--typical of Ostionoid mortuary patterns in Puerto Rico (Curet and Oliver 1998). Recent studies have suggested that the Saladoid occupation began on the north side of the site near Batey del Cacique. Through time with later intrasite development, the density of deposits gradually shifted south. However, it seems that the area occupied by the Plaza de Estrella and the Plaza Principal remained the primary focus of the site throughout its history (Curet 2010).

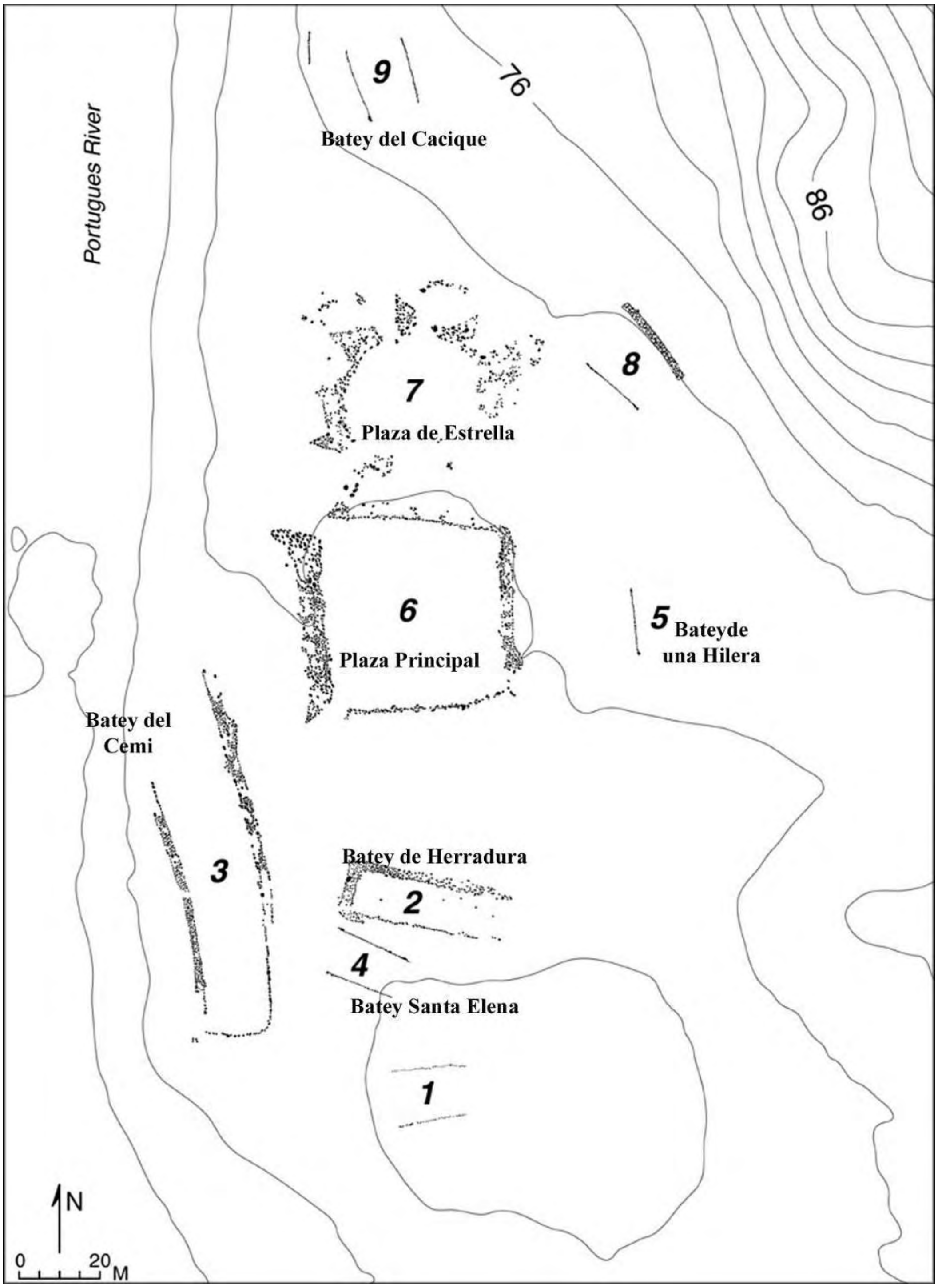

Figure 9-10. Map of the plaza/*batey* features at Tibes (adopted from Curet 2010:13).

Detailed documentation of the plaza/batey features at Tibes was conducted in 2001 by Castor and. Castor who completed a detailed survey of the stones that were used in construction of the bateys and plazas at Tibes (Rice-Snow et al. 2010). The objective of the study was to evaluate the representation of different rock types in the Tibes plazas, through identification and comparison of rock types in the present-day Portugués River bed because they would have provided the most convenient source of construction materials. The location of each stone within the bateys and plazas at Tibes were documented with tape and compass. Each stone was also documented based on its precise position within a particular plaza/bateys. The inventory ultimately registered 5,483 stones with each individually recorded for size and lithology. Based on this study, the stones used in the construction of the bateys were noted as being virtually all of local origin (Rice-Snow et al. 2010). This resulted in a large data set useful for the calculation of labor.

El Bronce is a much smaller site (Figure 9-11). The space encompassed by the plaza/batey is projected to measure approximately 20 x 20 m and many of the stones lining this feature were elaborated with petroglyphs (Robinson 1985:I1-I12). Thirty-six stones were documented comprising the stone enclosure. Unlike the stones documented at Tibes, which have small simple petroglyphs, many of these stones at El Bronce possessed highly elaborated petroglyphs (n=11).

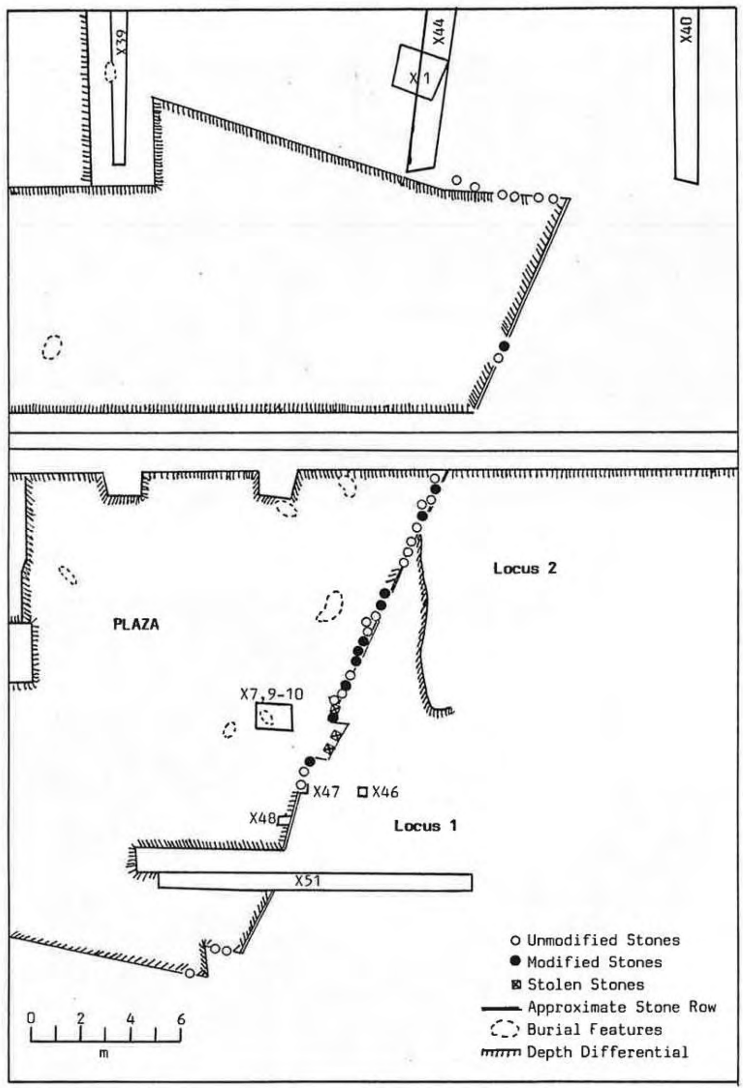

Figure 9-11. Map of the plaza/*batey* feature at El Bronce (adopted from Robinson 1985:I7).

The lithologies of the stones and their dimensions were also documented during mitigation of the site (Robinson 1985:I16). Because of the number and differences in the size of the features between these two sites, it is thought that examination of their construction will highlight the differences in their use group size and function. Table 9-2 summarizes the stone lithologies from both sites and Table 9-3 their stone inventories.

Table 9-2. Boulder lithologies of Tibes (Rice-Snow *et al.* 2010:185) and El Bronce (Robinson 1985:I6).

Boulder Lithology	Density (g/cm^3)	Tibes Avg. Boulder Intermediate Dimension (cm)	Tibes Number of Boulders	El Bronce Number of Boulders	El Bronce Avg. Boulder Intermediate Dimension (cm)
Quartz Diorite	2.8	28.5	713		
Gabbro	2.9	26.6	485		
Andesite Porphyry	2.9	27.6	330	12	26.5
Volcanic Breccia	2.5	27.6	932	2	29.6
Green Volcanic Breccia	2.8	28.7	181		
Tuff	2.2	23.2	419	1	17.3
Black Tuff	2.7	25.8	79		
Brown tuff	2.6	24.2	507		
Green Tuff	2.6	24.8	690		
Banded Tuff	1.8	27.9	67		
Tuffaceous Lithic Sandstone	2.6	25.1	981	1	33
Calcareous Sandstone	2.5	22.1	52	20	27.5
Limestone	2.7	27.0	36		
Packed Biosparite	2.7	25.2	65		
TOTAL			5537	36	

Table 9-3. Stone inventories for Tibes and El Bronce (Tibes data after Rice-Snow *et al.* 2010. El Bronce data after Robinson 1985 Appendix I).

Plaza/Batey (Tibes)	Total Number of Stones	% Surveyed	Total Projected Weight (kg)
Batey Herradura (Tibes)	867	95	21,602
Batey del Cemi (Tibes)	1674	95	41,425
Batey de una Hilera (Tibes)	30	100	454
Plaza Principal (Tibes)	1882	100	97,371
Plaza de Estrella (Tibes)	652	50	27,202
# 8 (Tibes)	332	100	9,319
Batey del Cacique (Tibes)	111	100	4,340
El Bronce	36	100	1,468

Calculating Labor Estimates

Labor expenditure is often measured in cost of human energy expressed in person-days (p-d). A “person” in this sense represents an individual laborer and “day” represents time as a fraction of a 24-hour day (Abrams 1999). In this research I rely on the classic work of Charles Erasmus who in the 1960s conducted field experiments in Tikul Mexico to calculate labor estimates related to the construction of the ceremonial site of Uxmal (Erasmus 1965). Labor estimates in Erasmus' study were calculated by measuring time costs of several individuals carrying cut stone weighing on average between 23 and 34 kg over several distance increments: 250, 500, 750 and 1000 meters. At these distance intervals, the amount of stone transported was 950, 500, 517 and 250 kg per person per day (Erasmus 1965:286-287).

Based on the documentation of the stones at Tibes and El Bronce it was possible to calculate density values for the different rock types to develop calculations of individual weights based on specific densities of the stones. These density measurements were made from river bed samples (and in the case of the calcareous sandstone, similar-appearing samples from outcrops in the Ponce area), with between one and four rock samples tested per lithologic type. Sample weights were obtained on a laboratory balance, and volumes determined by calculation of specific gravity through the immersion of samples in a known volume container with water poured from a graduated cylinder. Density values for lithologies varied between 1.8 and 2.9 g/cm^3 (Table 9-2). Volumes for individual stones were approximated by taking measured horizontal dimensions values as equivalent spherical diameters as many of the stones were partially buried. Combined with density values for the lithologies, these measurements offered good first-order approximations for calculating the weight of the boulders comprising the surveyed stone enclosures. As the stone inventory at El Bronce was previously published (Robinson 1985), and included size dimensions and boulder lithologies for the stones comprising the ball court, specific densities for each of the stones at El Bronce was determined based on the analogs provided by the research at Tibes.

The next step in developing the labor estimate model in person-days was to calculate the approximate weights (*i.e.,* mass) for each of the stones for each plaza/ballcourt. This was done by calculating the spherical volume ($v=4/3*\pi*r^3$) for each stone using its horizontal dimensions for diameter in centimeters. The volume of each stone was them multiplied by its specific density, yielding weight to volume (g/cc), based on its lithology. This resulted in the approximate weight of each stone (g). Using this method total mass for all stones for each plaza were calculated and converted to kilograms for subsequent calculations. For the El Bronce stones, calculation of the volume of the stone was conducted directly from the length, width and height measurements documented in the report (Robinson 1985:I6)

The weight frequencies of rock types used in the plaza/ballcourt construction at Tibes show that the majority of stones weighed 30 kg or less (n=3738) (Figure 9-12)—the ideal weight for hand carrying stones (Craig 1998; Erasmus 1965). Within this weight range, 32% were between 0 and 10 kg, 39 % between 10 and 20 kg and 28 % between 20 and 30 kg.

Based on this observation and recent research demonstrating the adjacent riverbed as the likely source of construction material (Rice-Snow *et al.* 2010), I also assume this to be the primary source of the stones comprising the structures. The Portugués River is approximately 250 m from the center of Tibes, and El Bronce lies adjacent to the Bucana River. Because of this, I used Erasmus' estimate for transporting stone .5 kilometers per person-day (500 kg) as a conservative estimate for the acquisition of construction material.

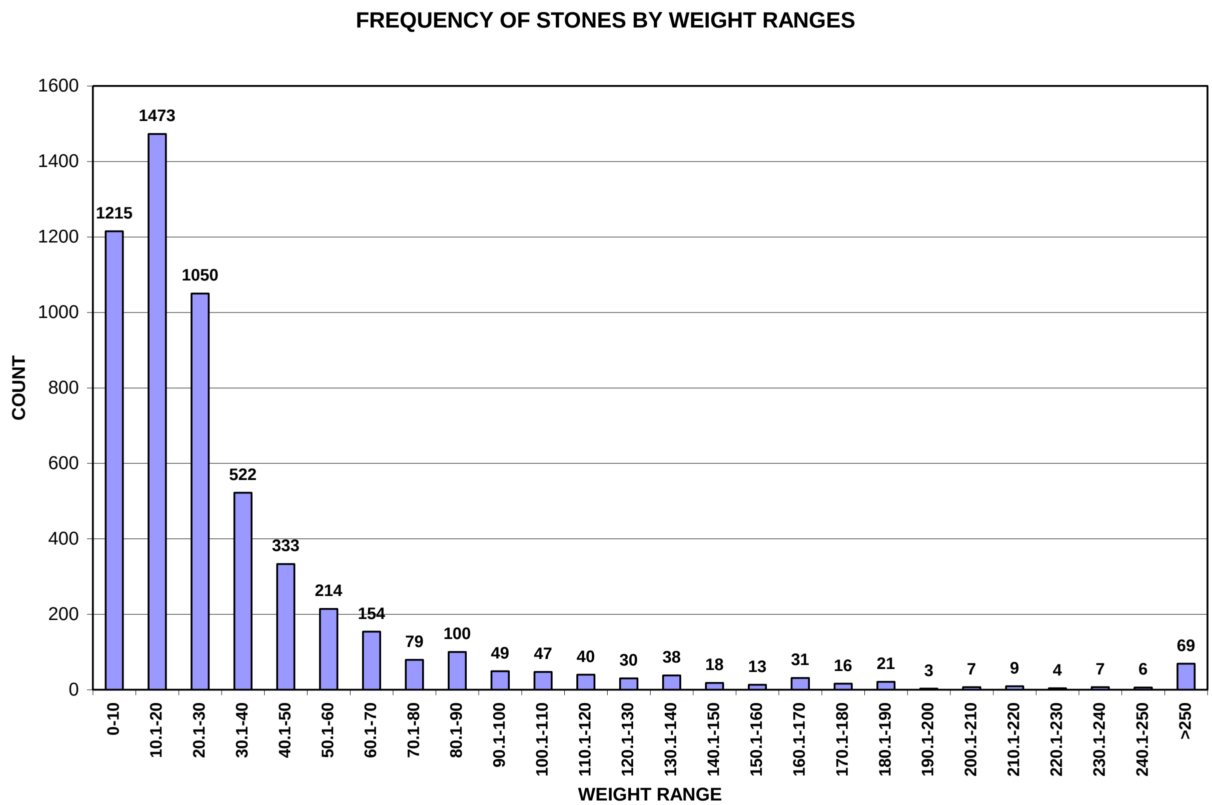

Figure 9-12. Histogram of stone weights documented in the plazas/*bateys* at Tibes (weight represented in kg)

While ample material would have been available likely on-site and within the 250 m range, it is likely that small stones that could be hand carried from the associated river beds may be depleted and builders would have to go to more distant locations that were slightly beyond this to acquire sufficient material. As such, the total mass for each ballcourt was divided by 500 kg to solve for the labor expenditures in person-days (p-d). Like Erasmus, I assume a 5 hour work day as labor parties in tropical climates both start and finish demanding physical activities early to avoid intense afternoon heat (Erasmus 1965:283).

Results and Discussion

The results of the calculations for the construction investment of the plazas/ballcourts are presented in Figure 9-13. These figures show the number of person-days based on increases in labor personnel. The highest labor expenditure calculated was for Plaza 6 (Plaza Principal) at Tibes which would have taken approximately 195 p-d. Based on the calculated estimates it appears that the features constructed at Tibes in total required a modest labor effort equaling approximately 466 p-d. In contrast, the labor require to construct the stone enclosure at El Bronce would have taken 2.9 p-d.

The size of the architectural features at Tibes suggests that they were constructed by local corporate groups comprised of individuals from multiple households and from multiple residential settlements in the area. Based on the general nature of construction, which I determine to be simple transport of building material to the site by hand, it appears that no specialized labor was required to construct these features. All that was required was leveling the ground surface, digging a trench, setting the stones, and firming the ground around them. No masons or other technological specialists were necessary to acquire and move the stones. However, post construction modifications to a few of the stones, in the form of petroglyphs, may indicate some specialized knowledge of symbols and authority to be allowed to modify them. This would also have been true for El Bronce which possessed several modified stones.

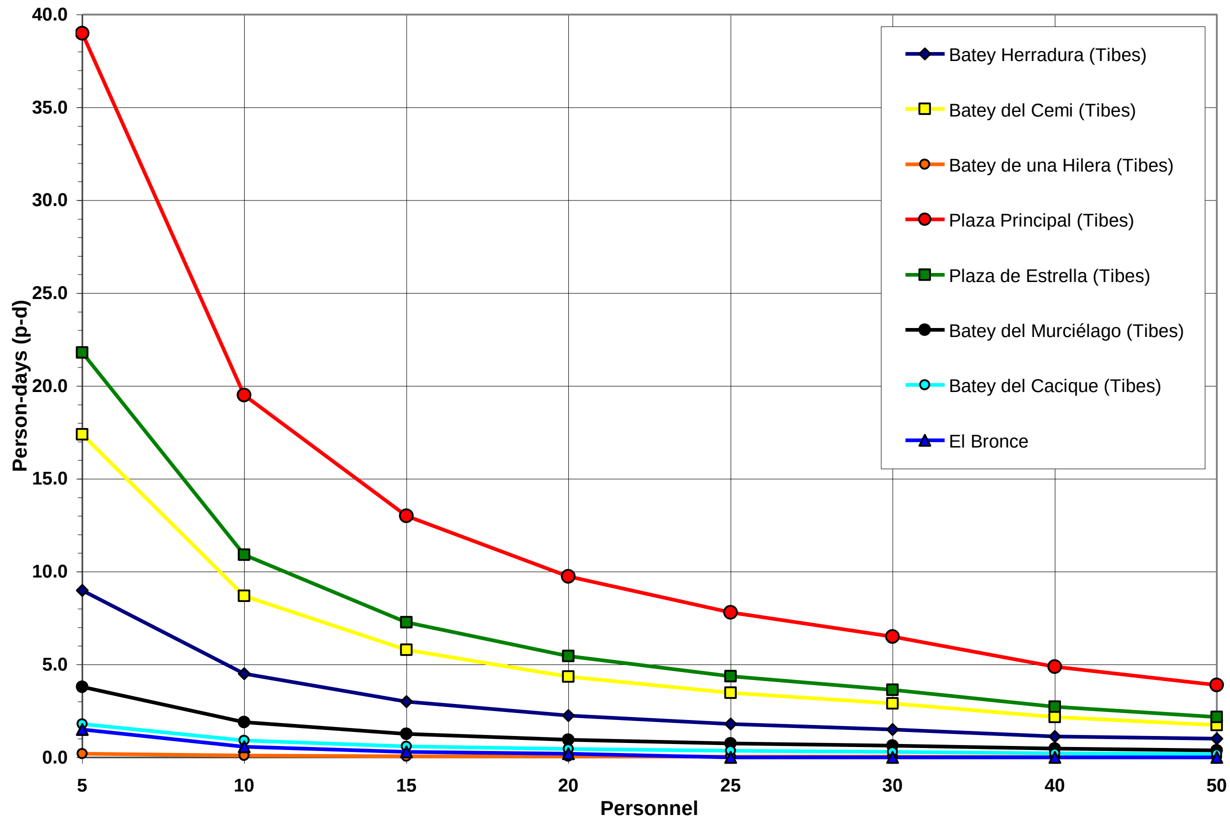

Figure 9-13. Labor estimates in person-days (p-d) with increases in personnel.

The estimate for the stone row at El Bronce clearly indicates that large amounts of labor were not required for its construction. This point is highlighted when comparing the labor required constructing the court at El Bronce with larger constructions at Tibes. Other significant differences can be inferred in the construction of facilities smaller than El Bronce in the immediate vicinity of Tibes, such as PO-42 which indicate that the feature would have taken a day or two to construct. The limited amount of energy required to construct these smaller facilities indicates construction at the level of the residential settlement that did not require or use labor from surrounding settlements.

In contrast, the labor investments for Tibes, while relatively modest, would likely have required labor from surrounding settlements to complete. Such deviations from the normal activities of daily life may have caused temporary decreases in household production and efficiency in other areas—particularly since residential settlements in the vicinity appear to be composed of relatively small populations. Because of this it is likely that these features were *not* constructed as a single event but sequentially with labor pooled from the surrounding community to expedite the process.

Within the contexts of these estimates, and stemming from my inferences, it is possible to suggest supravillage organization and coordination was necessary to construct some of the features at Tibes. At one level of the organizational structure are individuals necessary for determining the general layout and location of each structure and another level characterized by a labor force. Because at Tibes these structures were constructed in specific areas delineating ancestral (Saladoid) burials (Curet 2010; González Colon 1984) the organization and construction of the features would necessarily require institutional communal memory of where these burials were located. This is also notable for other sites with stone enclosures in the area in which they delineated communal burial grounds (*e.g.,* PO-29 [Espenshade and Young 2011]) assuming these features were constructed after the burials were interred.

As two stone enclosures at Tibes delimit earlier Saladoid interments this points to a dimension of a social memory of maintained knowledge where the bodies were (albeit perhaps imperfect as some of the burials appear to have been impacted by some construction activities). This also suggests that these areas were probably used for ceremonial activities *prior* to the construction of the plazas/*bateys,* as memory of the burial locations would have been carried through time as a product of recurrent ritual practices carried out in these spaces.

Here labor appears to have been the product of community coordination perhaps under the leadership of a particular “house” or household. This by no means suggests that the organizing individuals did not physically participate in the construction of these features. To the contrary, in many incipient political institutions, particularly in non-ranked and ranked societies lacking stratification, the elite are intimately involved in contributing to labor as a communal enterprise and reification of their active role within the community. In fact, supporting evidence demonstrates people in kin-based societies have power to resist egregious labor demands of the elite (Bender 1990). Based on the previous discussion labor relations involved in the construction of the stone enclosures appear to more closely resemble aspects associated with “festive labor” projects, albeit at different *scales* of the community when one compares the larger effort at Tibes to efforts at El Bronce and other smaller sites in the area.

The construction of public ceremonial space represents a materialization of beliefs and perceptions on the way in which the world is ordered (Geertz, 1980; Heckenberger 2005 Tambiah, 1979). Hence, the construction of these spaces themselves was transformative in that the physical act of their construction itself may have served to solidify communal identity and communal membership. From this perspective, it is not only the subsequent ritual and performative acts conducted within the structure which binds people in communal solidarity—*it is also the construction process itself* (as also observed by Tuzin for the construction of ritual facilities in New Guinea [Tuzin 2001:104-106]).

General concepts regarding ownership of ritual spaces/integrative facilities often relate to the transference of group power and identity to apical community members who link the past and present as well as the living and the dead (Curet and Oliver 1997; Heckenberger 2005, 2007; Siegel 1999). However the ownership of these spaces also underscores the relationship between community and its leaders. Here it is possible to also envisage the construction of these spaces as communal property which was transferred to particular members of the community who embodied their collective history, through sacred knowledge and/or the close hereditary links to the past through deceased (but still existing) members of the community (Heckenberger 2007). From this perspective it seems likely that construction labor may have relied on donations motivated by the *promotion of community status*. Communal "donations" of labor to support local ceremony is quite common in peasant and tribal societies worldwide and deemed necessary in many cases for the participation of households within larger communal collectives (Rubel and Rossman 1986).

At the level of the community, the construction of these features linked social groups in an order of ancestry and place. In the contexts of the broader social and political landscape, the mobilization of communal labor stimulated competition between disparate communities throughout the south-central region. Here, local communities rather than individuals *per se* sought to garner prestige and influence through the materialization of their heredity in space, denoting rights to property and visible displays of public wealth in the form of visible physical labor and sacred symbolism.

Summary and Conclusions

The previous chapter has highlighted the role of plazas/*bateys* in the social construction of communities in south-central Puerto Rico between AD 600 and AD

1200. Although the construction of the plazas/*bateys* at many sites in the south-central region have not been formally dated, current archaeological data point to their emergence in this region prior to AD 1000 (Curet *et al.* 2006; Gonzalez-Colon 1984; Wilson 1991).

Several of the documented plaza/*batey* features for this region are the earliest registered for the island at sites such as Tibes, Las Flores, and El Bronce. The early manifestation of these features in the region indicates a transformation and intensification of ritual practices from the previous Saladoid life ways in some localities. These transformations also demonstrate the consolidation of local social groups and the formation of political communities founded on the sacred connections between ancestry and place. Through their construction, these spaces became visible referents of community identity that could be actively mobilized and politicized.

The clustering of these features within particular localities suggests well defined loci of sociopolitical engagements and the development of ritualized landscapes where local communities sought to create social order and situate themselves within the burgeoning social landscape that was emerging after AD 600. The amount of ceremonial space registered at sites with plaza/*batey* structures has typically been used to create regional hierarchical models of sociopolitical power particularly for the late pre-contact period (Siegel 1992, 1996, 1999). However, examination of the available sizes indicates a more dynamic picture of their use than previously conceived.

The rank-size analysis indicates regional variation in the organizational dynamics of particular localities. Based on variation in the documented sizes of these features throughout the region, it appears that these features served different functions in the integration of social groups at different scales. In the case of lower level integrative facilities, these spaces likely served the individual settlement and perhaps immediately adjacent neighbors in village level ritual capacities. The proliferation of low-level integrative facilities within smaller settlements suggests some level of ritual and perhaps political independence through access to and use of these features within the contexts of smaller segments of the community. In contrast, larger more elaborate facilities would have promoted the communication of public messages and served larger groups in higher level social capacities. However, the presence of so many lower-level facilities at different points in the landscape indicates that social groups at different scales had some access to the underlying regional religious/political ideologies. *Hence, I would suggest that the sociopolitical system was decentralized with little administrative control of local settlements and their daily activities*.

Differences in function and scaling links of communal association are also supported when one considers the labor required to construct them. Smaller enclosures were likely the product of labor invested by the households within a given settlement. As the size of these features grew additional sources of labor were necessary to build them so that individuals that constructed low-level facilities may also have been involved in the construction of higher level integrative facilities. Hence, local social groups were not only a source of labor, but also a source of power. With increased scarcity of land and abundance of available labor, as indicated by the organization of domestic groups, labor was channeled into ideological power through the construction of higher-level integrative facilities. The construction of these larger multi-plaza/*batey* complexes served to institutionally codify the power, durability, and legitimacy of local community groups by sedimenting their association with particular locales. Through this process, local communities would have differentiated themselves from other similarly constructed communities which may have formed a basis for competition and regional differentiation.

The creation of these features would have come to serve in the negotiation of regional interactions by stressing boundary maintenance within local or regional systems. As such these features not only tied social and ideological order together at varying scales but *linked people and places within the landscape.* Hence, these features served to give legitimacy to particular residential groups for membership in the social community and all of the rights allowed as a result of that membership—particularly (I would argue) land tenure rights.

Collectively, plaza/*batey* features may be symbolic representations of local lineages that demarcated property rights and ancestral notions of "place" for particular local groups in an increasingly packed landscape. Therefore, these spaces may represent different ancestral "houses" or lineages within the community (Oliver 1998; 2007; 2009).

Residential settlements with ceremonial features were, through their construction and use, became centers of social and ideological production for larger social and political communities. The construction of these spaces represents the materialization of new forms of integration that were qualitatively different from earlier socio-cultural formations on the island. This transformation is part of the process of the development of multi-village communities in which local groups negotiated their social realities within larger spheres of interaction. What this all suggests is the use of a shared ideological framework above the village level that was employed, manipulated, and transformed at the local level in the service of the construction of communal identities. This framework formed a basis for the creation social biographies linking places, history, and memory through ritual actions that facilitated community formation and transcendence from village life to the emergence of the polity.

CHAPTER 10
COMMUNITY ORGANIZATION AND THE SOCIOPOLITICAL LANDSCAPE OF SOUTH-CENTRAL PUERTO RICO AD 600 – AD 1200

The image of the past created in this research is one of a landscape of diverse social and political actors situated at a crux in Puerto Rico's history. While this history began some 6,000 years ago with the arrival of the island's first inhabitants, this work emphasizes the period between approximately AD 600 and AD 1200 as an important era of social and political development in the island's pre-colonial past. Through an examination of settlement landscapes, rituality, and the social and historical contexts of these developments, I provide a number of insights into the origins of new forms of community organization and their relationship to the emergence of regional sociopolitical institutions. Some of these new forms of sociality drew upon social principles of the past, while others lacked historical antecedents.

To explain processes of social change, and the emergence of incipient political institutions, archaeologists of the Caribbean (and elsewhere) have relied heavily on neo-evolutionary typologies as conceptual and analytical referents for interpretation. Here the concept of "chiefdom" has been the primary analog for evaluating *levels* of social complexity and determining trajectories of societal development and change resulting in an historical narrative focused on elite individuals. Indeed, the concept of chiefdom is a useful heuristic for identifying cross-cultural organizational features in societies past and present (Drennan 2008). Problematically, an overreliance on the chiefdom concept has hindered an understanding of the historical circumstances, social processes, and variability in the ways in which people construct and negotiate their social and political realities.

In this research I have sought to redress these problems by examining *some* of the underlying conditions and processes that structured pre-contact social groups in ancient Puerto Rico between AD 600 and AD 1200. To study these factors I focused on the concept of community to document societal change, the formation of local corporate social collectives, and how they may have been organized during this time. In this research I discovered that population growth and processes of settlement played a central role in structuring interaction and the formation of social communities. The consequences of these developments resulted in the consolidation of people in particular localities who created new forms of integration and maintained their access to crucial social and natural resources by constructing local identities based on symbolic associations to places through their settlement and ritual practices.

The focus on communities presented in this work examines social organization and change at a different scale than is typically presented in Caribbean archaeology which tends to emphasize single settlements or the region's broader "World System". While investigations at both of these scales are necessary for developing a rich view of the Caribbean's ancient past, both lack the ability to examine the relations between locally situated interacting social groups and the processes responsible for the structuring of community level institutions

To examine these processes, this archaeological study focused on the settlement landscape of south-central Puerto Rico and in particular the region immediately associated with the Ceremonial Center of Tibes, located just north of the modern city of Ponce. Tibes is one of the earliest and most elaborate ceremonial centers on the island, and considered the seat of an incipient polity between AD 600 and AD 1200.

Because of its size and architectural complexity, I anticipated that Tibes served a broader social community heretofore undocumented. Through identification and examination of new residential settlements associated with Tibes, patterns of community organization are contextualized within broader regional social and political transformations.

In this concluding chapter, I present a synthesis and discussion of my research findings. I begin by providing an overview of regional settlement patterns to highlight the socio-historical conditions leading to the emergence of the AD 600 – AD 1200 social and settlement landscapes of the south-central region. Here I focus on the implications of settlement, population increase, and social interaction, to show how these played a role in changes in human sociality. This discussion serves to contextualize the information presented in the rest of this chapter by showing how these shifts influenced and were influenced by changes in community organization.

In the second portion of this chapter, I discuss socio-spatial organization of communities between AD 600 and AD 1200. I first present the archaeological evidence for residential settlements during this time. I then discuss the implications of these patterns on the structure of local social groups. This section also provides an explanation for how these new communities may have formed and the organizational challenges presented as a consequence of their development. The view of community-scale social organization presented in this research also shows what we can learn about the creation and character of social collectives by identifying how and why they emerge in the past.

Following this discussion I explain how these new forms of community were articulated through the construction and use of integrative ritual facilities which served to sediment identities, communal membership, and link people to places in a socially diverse landscape. Drawing on the discussion related to the construction and use stone-lined plazas/*bateys* presented in Chapter 9, I explain how these features formed the symbolic and material referents for the promulgation of community identities and consolidation of local social groups through the authoring of collective biographies. I also show that these new forms of integration and identity building were fluid and regionally variable.

In the final section of this chapter I present an interpretation of the political landscape that emerged between AD 600 and AD 1200 in the south-central region. In this section I examine the dialectical relationships between community and incipient political institutions. Ultimately, I contend that the promotion of communal identity and status served as the foundation for the emergence of regional sociopolitical units in the region. To conclude this section I present a brief comment on how these conditions influenced later transformations and the emergence of *caciques* and the *cacicazgos* in the post-AD 1200 landscape.

By focusing on the interplay between regional settlement history and community formation, this research renders a rich view of the process by which ancient societies form broader social and political collectives. This research highlights the ability of people to transform society, especially during periods when social groups and rules were in flux because of shifts in regional population and settlement. The case presented in this work of the south-central region represents an excellent example of the complexity of intraregional settlement processes and its relationship to community formation, political and ethno genesis, and social change in the past.

Settlement History of the South-Central Region and Contexts of Social Change

Over the course of this work I analyzed a number of parameters to characterize settlement variability among Saladoid and post-Saladoid social groups to show how these factors influenced interaction, community formation, and organization. However, these processes and their subsequent interpretation cannot be understood without reference to and characterization of broader historical trends in settlement and human sociality.

Looking at Period II, the primary form of settlement is large relatively autonomous villages. This pattern appears to be a continuation of social and spatial canons brought to the island by migrants from South America (Heckenberger 2002, 2005; Siegel 2010; Veersteeg 1991). The analysis presented in Chapter 7 supports this with relatively large settlements situated along major river drainages on the coastal plains. Settlements were few in number and dispersed amongst the major regional drainage basins. Examples of this settlement configuration in the south-central region include Tecla, Cañas, and Hernandez Colon.

Current perspectives regarding Saladoid settlements suggests that they are generally circular, oval or horse-shoe shaped with several large extended family houses around a central open plaza area. These open plazas often served as burial grounds and likely as spaces for quotidian and ritual activities alike. It appears that the village formed the primary social and political community of day-to-day social life during this time.

The data presented in this research suggests that regional social networks prior to AD 600 were spatially oriented horizontally among settlements along the coast. This spatial vector of interaction is supported by the paucity of settlement in the foothills predating AD 600. This observation has been documented in other studies (Curet 2005; Curet *et al.* 2004; Lundberg 1985; Rodríguez Lopez 1985; Torres 2001) and is demonstrated in this work where newly identified settlements the Portugués and adjacent drainages yielded evidence of intensive residential settlement *after AD 600* and primarily between *AD 900 and AD 1200*. This is not to say that Saladoid groups did not settle interior portions of the island or interact with extant pre-Arawakan social groups who likely inhabited these areas but, that interior portions of the island were not intensively settled during this time.

Current perspectives suggest that Saladoid settlements were connected over broad geographical areas where long distance trade (by land or water) supplied the foundation for maintaining regional or pan-regional social connections. Decorated ceramics and exotic shell and lithic amulets sharing similar iconographic motifs served to symbolically reinforce ties among widely scattered communities. These similar iconographic motifs are noted across the Antilles from South America to Puerto Rico and are generally referred to as a “veneer” consisting of widely shared ideological and symbolic expressions (Keegan 2004).

The longevity of Saladoid settlements contributed to the maintenance of long distance interactions where persistent habitation sites served as nodes in the pan-regional social network. For instance, radiocarbon dates and pottery assemblages from Tecla suggest that the site was occupied continuously for over a millennium (Chanlatte

Baik 1976). Other settlements with Saladoid components such as Tibes and Hernandez Colon also possess radiocarbon evidence indicating some level of domestic occupation for as long as 600 years. Cañas too, while lacking radiocarbon evidence, demonstrates similarly long term occupation based on size and stratagraphic depth of midden deposits as well continuity in pottery styles from Hacienda Grande through Modified Ostiones pottery styles found at the site (Rainey 1941).

The persistence of Saladoid settlements structured the social landscape in important and meaningful ways. First persistent settlements become points of dispersal from which smaller daughter settlements formed. Second, because of their longevity these settlements became important symbols on the landscape denoting past ownership and land use. Hence, the social landscape that emerged after AD 600 was not only characterized by increasing population densities but also by both persistently occupied and abandoned settlements which became powerfully charged symbols. These places form important symbolic resources that individuals and households drew upon as they developed new settlements and negotiated access to land, labor, and social networks.

Around AD 600 the landscape exploded with new settlements throughout the south-central region that was stimulated by rapid population growth. New settlements pushed further inland into the foothills and uplands following river drainages. Accompanying this increase in settlement was a diversity of settlement types, new pottery traditions, and the proliferation of ritual integrative facilities in the form of stone-lined plazas and *bateys*.

In some cases new settlements formed in close proximity to preexisting Saladoid settlements, while in other cases they developed in areas lacking evidence for prior occupation. In the case of the former, the development of settlements in close proximity to parent sites indicates persistence in the occupation of particular localities, the consolidation of local residential settlements, and continuity in the history of local social groups. This pattern is evident in the western and central watersheds of the region and particularly in the immediate area surrounding Tibes. In the case of the latter, the development of new settlements in areas away from preexisting Saladoid settlements denotes potential avoidance and the formation of new social groups and relations with the landscape. This pattern of settlement is visible in the eastern watershed in the area of Salinas.

While settlement dispersal may have been stimulated by factors associated with village fissioning (*e.g.,* intrasite social conflict, population density,resource depletion or some combination thereof), newly formed settlements *did not replicate* previous Saladoid village organizational patterns. Instead, new settlements consisted of small hamlets/villages made up of several interdependent nuclear family structures. The adoption of these radically new forms of residential settlement represents a dramatic break with nearly 1000 years of prior settlement tradition.

As the number of residential settlements increased, the settlement landscape became increasingly dense and the area of the immediate territories surrounding them decreased. Represented by settlement clusters, these localities of dense settlement became focal points of social interaction. As sites increased in their frequency and distribution across the landscape, so too must have the intensity of interactions between co-present denizens of the region. Increased interaction among contemporaneous residential settlements would have intensified the extension of social and political networks outside of primary village contexts to incorporate members of locally dispersed but proximally related residential settlements.

Two important observations structuring the social landscape and the diversification of regional social groups are worthy of note here. First, as networks along the coast continued through time, east-west interactions were complemented by interior to coast relationships. Coastal populations would have continued to be idea receivers from distant locales based on interactions via water travel. By AD 600 the transmission of ideas being leveled by coastal and seaborne interactions were now complemented through a set of exchanges between interior and coast.

Connections between coast and inland settlements are evident in the Portugués and other river drainages in the region where substantial quantities of marine fauna are located in midden deposits (*e.g.,* PO-29, PO-42, PO-43, Tibes) in the foothills at distances pushing 7 km from the coast. Interestingly these interactions between the coast and interior appear to dwindle with distance as marine fauna becomes increasingly scarce at distances over a day’s walk (about 10 to 11 km) from the coast.

Second, while social groups became increasingly connected by virtue of the densifying landscape, some settlement localities became insulated from others. This is visible not only in the dense settlement clustering, which buffered settlements in cluster cores from other more distant cluster cores, but also in the increased settlement of constricted interior river drainages that constrained horizontal spatial interaction across drainages. *This observation suggests that while social networks may have been expanding regionally, they were contracting locally.*

Supporting this hypothesis is archaeological evidence pointing to the regionalization of social groups and the development of local social identities. First, a wide variety of local pottery styles emerged, and evidence for long-distance trade interactions diminished. Second, creation of ritual integrative facilities emerged which formed markers of local community history and identity writ large on the landscape. Third, the abandonment of central plaza burials, which were markers of community in Saladoid settlements, shifted to burials in domestic contexts representing the emerging localization of social identity (Curet and Oliver 1998; Keegan 2009).

Summary: Oscillating Socialities and the Contexts of Social Change

By AD 600, the social landscape of south-central Puerto Rico was growing rapidly. As the landscape became increasingly packed with the proliferation of new settlements social networks became increasingly complex and interconnected. Regional shifts in population and settlement were likely accompanied by ambiguities in social relationships inherent to large social networks. Similar situations have been documented in the American Bottom and Southwest (Pauketat 2007; Schachner 2007), where drastic shifts in regional populations blur the social order and can cause tension over legitimate claims to natural resources (*e.g.,* land rights) as well as individuals or groups suitable for alliances, exchange, and marriage.

With these shifting regional conditions, social groups clustered in particular localities. This is not to say that these groups did not have interaction with one another, or perhaps, more distant social groups outside the region, but that these social conditions would have fostered the consolidation of proximally related social collectives, an increased focus on *local* affairs, and establishing identities in relation to "others".

In the example presented in this research, when regional social structures are predicated upon the stability and maintenance of long distance social relationships (as evident for the Saladoid), people will employ symbols of identification, which will be widely distributed, to solidify communal bonds. As social groups and regional networks diversified after AD 600, diversification of material culture and local elaboration and similarities of ideology and symbolism become a means for social groups to materialize their identity locally. Through materially differentiating themselves from others, people generate their communal identities within socially diverse landscapes and differentiated spheres of interaction. This process of oscillating sociality is noted in other parts of the world where supra-village community formations emerge from landscapes of plurality and change (Pauketat 2007; Sassaman and Randall 2007).

By AD 600 competition for land and prestige based on access to local social and natural resources turned social focuses inward, highlighting identity formation through apical ancestry to legitimize property rights and the associated symbolic power of such associations. These shifts in sociality during this time were structured through social practices of settlement and rituality. The identification of these broad shifts in sociality allow us to contextualize and interpret changes in community organization and their relation to post-AD 600 social and political landscape of the south-central region.

Spatial Patterns and Community Composition/Organization

I began this research by presenting the results of an archaeological survey I conducted in a small region surrounding the Ceremonial Center of Tibes in the foothills just north of the modern city of Ponce. The purpose of the survey was to characterize the local archaeological landscape through the identification of residential settlements spatially and temporally related to this important site. I had expected the presence of additional residential settlements in the area which formed part of Tibes' local community during the apex of its use. The results of the TASP survey discussed in Chapters 5 and 6 confirmed this through the identification of several settlements occupied during Period III. This archaeological evidence offers a basis for interpreting the organization of local communities in the Tibes locality and as a comparative unit of analysis for other parts of the south-central region during this period.

Before reviewing the results of the survey, it is useful to return to the definition of community used in this study. In this research I defined community as a group of people who live in proximity to one another within a geographically limited area, who have face-to-face interaction on a regular basis and who share access to social and natural resources. Here, group membership is based on relations of kinship, marriage, and economics and founded upon recognizable ideological and symbolic frames of reference. Spatially, the proximity of places of day-to-day dwelling influences the degree to which groups share forms of meaning and behavior as individuals and as members of a group. These frames of reference and the social propinquity inherent in consistent face-to-face interaction can produce inclusive communal relationships above individuals and households that are corporate in nature and structured by similar economic motivations and worldview.

These face-to-face interactions are what Giddens refers to as interactions with others who are physically co-present (1979:64-72). The social interaction in the contexts of co-presence reproduces and transforms social structure in fundamental ways. Settlement clustering has been a primary analytical component in the study of communities and a proxy for developing a model of potential interaction between residential social groups and locales of persistent occupation of portions of the regional landscape. Settlement clustering and concepts related to the spatiality of social interaction also forces archaeologists to move beyond individual sites as the unit of analytical interpretation (Soja 1985).

The habitual practices of local social actors invariably entail the production of *places* that come to have meanings and histories for those that dwell in these areas. As such, *communities are both people and place* (Varien 1999). I think from this perspective it becomes easy to see that rather than viewing settlement patterns as static indicators of human activity in the past, these patterns become a history of the interaction between diverse social actors that define the form of local social networks and landscapes.

Residential Settlements

By AD 600 the settlement landscape of the south-central coast was undergoing rapid and profound changes which entailed the reconfiguration of the socio-spatial organization of basic social groups. Changes in settlement are evident in the dramatic increase in the number of residential settlements throughout the region with the expansion of regional populations into the foothills and mountainous portions of the island. The increase in the number of settlements during Period III, as observed in the south-central region, is congruent with previous studies suggesting an increase in regional population and settlement expansion in other parts of the island during this time (Curet 2005; Rodríguez López 1992:13).

The most dramatic change in settlement organization documented in this study is the shift from large regionally dispersed residential sites, consisting of multi-family domestic structures, to smaller settlements with nuclear family domestic structures. This pattern of small locally dispersed residential settlements became the primary socio-spatial form of organization in the region in the post-AD 600 landscape. This pattern of settlement fostered the creation of multi-settlement social communities in a number of important ways which will be discussed in the following sections.

The results of the TASP survey positively identified seven residential settlements (PO-42, PO-43, PO-47, PO-48, PO-51, PO-52 and PO-53), two potential additional domestic sites (PO-45 and PO-50), and two limited activity areas (PO-46 and PO-49). *All of the newly identified sites indicate evidence of post-Saladoid occupation* based on the presence of Elenan and Ostionan Ostionoid and Chican Ostionoid pottery styles. Radiometric dating from Tibes, PO-42, and PO-43 suggest that they were potentially coeval with one another and Tibes for at least for a short period during the latter half of Period III (ca. 900-1200). Additional radiometric dates and pottery from other settlements in the surrounding region indicate similar timing in the expansion of residential settlements and the intensive settlement of the foothills.

Based on the results of the survey, the post-AD 600 the settlement pattern of the Portugués drainage appears to consist of small dispersed residential settlements. (typically under 2.5 ha.), situated along river terraces and available flat expanses of land in the topographically diverse foothills. Larger settlements (generally > 3 ha.) appear to be confined to coastal settings (*e.g.,* Carmen, Los Indios, Caracoles) although these are generally limited in number and small dispersed residential settlements predominate throughout the region during this time.

Based on the available data, the rapid development of new settlements was not a result of fissioning in the formal sense but rather appears to have entailed the *dispersal* and expansion of local populations. If the proliferation of settlements was the result of fissioning I would expect a *replication* of the socio-spatial organizational patterns of the parent settlements in new ones. However, the vast majority of residential settlements during Period III are drastically different from previously conceived (albeit under-documented) Saladoid configurations.

One likely scenario for how this dispersal transpired may be explained through ethnographic analogy. As discussed in Chapters 7 and 8, in portions of northern lowland South America and Amazonia, smaller farmhouses or hamlets are often constructed as a result of the "Garden Plot" model of settlement expansion (Butt 1971; Heckenberger 2005). In this model, smaller settlements are created at moderate (3-7 km) distances away from the parent settlement to establish new lands for cultivation. These plots and associated field houses are typically created in situations where available space for crop cultivation in the immediate proximity to the parent settlement is limited. Due to the distance from the parent settlement small farm houses are constructed and are often small huts which are the property of particular households. In time, these garden plots develop into separate hamlet type settlements as households managing these lands come to spend more and more time at them.

The data in this research shows that the settlement dispersal and expansion, while similar in its outcome (*i.e.* smaller settlements and residential structures), was regionally variable with differential rates of growth and patterns of dispersal throughout the south-central region. In the central and western watersheds, many of the new settlements were developed a short distances from existing Saladoid settlements--often within 5 km. In this case the occupation of areas proximal to parent settlements indicates continuity in the social and settlement history of particular locales. In contrast, in the eastern portion of the study region settlements occupy areas further way (> 5 km) from parent settlements indicating possible avoidance.

This all is not to say that the catalyst for settlement dispersal evident during Period III was not tied to some of the underlying conditions that typically trigger fissioning such as intravillage conflict. Indeed this may have likely been the case. However, I emphasize that the outcome does not indicate a process of fissioning in the traditional sense of replication.

The consequences of this dispersal and fragmentation of larger Saladoid settlements are important in several ways. First, the shifting pattern of settlement suggests that households were moving because it was a better option than aggregating in large settlements or that institutional mechanisms fostering aggregation beyond certain population levels were not supported (Tuzin 2001). Second, the dispersal of households indicates *that people were free to make choices to establish their own settlements.* Third, settlement dispersal would have been a mechanism to decentralize power and expand the overall footprint of the social community. Fourth, the placement of residential settlements appears to have been a means by which *households were free to claim land* and begin to develop personal property rights independent of the parent settlement. Finally, settlement dispersion was a means by which individuals and households gained access to social resources by placing residential settlements in close proximity to other dispersed households to bolster productive interdependent relationships. Through time, such relationships formed the basis for corporate social groups and the founding of political institutions and positions of authority.

Households and Co-resident Social Groups

The smaller size of residential settlements during Period III was coincident with the development of smaller domestic structures associated indicating a reorganization of basic co-residential corporate groups, households and/or social “houses” from earlier Saladoid village patterns. This spatial shift represents a fundamental transformation in the organization of village life and local co-residential corporate groups during Period III.

Smaller nuclear family domestic dwellings and smaller dispersed settlements replaced large co-residential corporate groups, previously represented by extended family domestic dwellings within the larger Saladoid community settlement. Based on the data presented in this research, residential structures in the post AD 600 landscape appear to be small nuclear family structures of approximately 8 m in diameter. This size of structure falls within a range previously noted in several studies to be primarily associated with nuclear households (Curet 1992b; Kolb 1985). As discussed in Chapter 8, several settlements with evidence for occupation after AD 600 throughout the south-central region (and the island in general) support the presences these smaller structures indicating these structures were likely the primary form of residential socio-spatial organization during this time.

Based on an analysis of the size of settlements, accumulations studies for PO-42 and PO-43, and evidence from other well documented sites throughout the region, it appears that these small residential settlements were composed of less than 10 of these domestic structures at any one point in time. Further, while strong evidence for the longevity of particular domestic structures is not demonstrable with the evidence at hand (as that presented in Samson 2010), settlement persistence *is* evident at many of those sites documented in the Portugués and Cerrillos drainages and throughout the south-central region in general.

Settlement longevity is impossible to attain in small confined settlements based on demographic constraints. Hence the persistence of the small settlements documented throughout the south-central region that are occupied for more than 100 years (*e.g.,* PO-42, PO-43, El Bronce, PO-23, PO-21, Hernandez Colon, Caracoles *etc.*) is important to note. Specifically, this indicates that residential settlements were not isolated and that residential mobility between settlements and community clusters was likely fluid.

The question here becomes: Why do people live in separate houses? Why not replicate the larger *maloca* style houses purportedly the predominate form for Saladoid social groups? One explanation is that the founding of new settlements began with smaller garden huts which eventually became residences. The outcome of this process would have promoted a means for households to manage their own resources. This would also have the consequence of redefining power, access to origins, ancestors and territory/resources. This practice of settlement, in time, may have been replicated at new hamlet/settlement locations through the birth of children and the establishment of their own households or through incoming households. Importantly, through their nucleation, households become more clearly defined as did their wealth, status, and position within the local community and broader social landscape.

The persistence of settlements over long periods of time, and particularly Saladoid parent settlements that continued to be occupied during Period III influenced the social landscape in important ways. First, persistent settlements provided the basis for long lived corporate groupings and would have provided a labor base for the construction of houses, organization of fishing and hunting trips, clearing garden plots and constructing of large community ceremonial facilities like Tibes, Las Flores, and Villon. Second, such fixity in place promoted the concretization of history and the legitimization of land and heritable property rights.

I view these factors, of persistence, heritability, and land tenure as an important part of the local *rules* or part of the *structure* that came to enable and constrain households in their new relations with others and an important historical element in the formation of social and political communities in south-central Puerto Rico after AD 600.

Summary: Community Formation and the AD 600 Landscape

Settlement of fertile and somewhat secluded river drainages would have provided ideal spaces for the development and growth of small groups of related families and the emergence of multi-village communities. These areas while susceptible to flooding in lower portions of the valleys would have provided some sheltering from frequent tropical storms and allowed for interdependent residential corporate groups to control resources within them based on their settlement longevity and linear configuration in the constricted topography of the drainages.

The shift to smaller residential settlements and domestic structures represents a fundamental reorganization of basic social groups of the post AD 600 landscape. Implied in these changes are the fragmentation of Saladoid social “houses” and the reconfiguration of residential corporate groups. Individuals and households used the practice of residential movement through dispersion to gain access to productive resources—both natural and social. This access became negotiated at larger social scales because individuals and households lived close to many others who sought access to the same resources. In the larger region, individuals and households not only negotiated among themselves for access to local resources, but also as communities they acted to perpetuate their collective land use rights in the larger regional landscape composed of many communities.

The survey and settlement data from the Tibes locality were used to refine the geographical, demographical, and socio-historical composition of south-central region communities, producing a model of settlement patterns and organization heretofore undocumented for this period. Here social and settlement communities can be viewed as areas of dense residential settlement and public architecture. These densely settled localities form residential *neighborhoods* or *communities* (perhaps analogous to *barrios*) that were likely the means by which land use rights of individuals and households were ensured at a social scale larger than that of the individual residential settlement. Further, the continuous use of particular settlements and the persistence of habitation in particular locales imply continuity in ownership and social history of the community.

Social fluidity and variability are evident in the longevity of small residential settlements and the spatial organization of settlement in the south-central region. Based on the available data, it appears that social groups were relatively free to create new settlements and experiment with new forms of organization at the level of the residential settlement. Although settlement clusters can be defined quantitatively, and appear to have been meaningful socially, they should not be viewed as completely bounded or static entities. While there is evidence that distance between clusters influenced the creation of regularized and locally intense social engagements, the distances between the clusters could have easily been traversed in a day. This is particularly true for settlements at the margins of the clusters but perhaps more difficult between settlements in the heart of them.

In the case of the Tibes community cluster, fluidity of social interaction is clearly seen based on the distribution of pottery from eastern and western Puerto Rico in mixed contexts at many sites. Similarly, these differences are more clearly defined between the western and eastern clusters with pottery in each primarily associated with Ostionan Ostionoid and Elenan Ostionoid pottery respectively. Here, the formation of the community cluster associated with Tibes formed a point of articulation on the landscape between social groups developing in increasingly differentiated spheres of interaction between the east and western sides of the island as well as emerging interior to coastal interactions.

The dispersion of settlements and the increased complexity of social networks required new forms of integration and social arenas for engagements between burgeoning social collectives. The need for these mechanisms of integration and identity creation were perhaps especially necessary in the region surrounding Tibes, where population movements and the emerging regional diversity of the south-central region contributed to the ambiguity of social relations between the Tibes locality and its neighboring communities to the east and west. Hence, new institutions would have been necessary to maintain relationships with other settlements for marriage exchanges, land tenure, negotiate disputes and maintain reciprocal corporate labor arrangements at local and regional levels. These new forms of integration required people to develop new rules which became formalized in these new settlement configurations through the construction and use of stone-lined plazas/*bateys*.

Rituality, Land, and Local Identities

Traditionally, plaza/*batey* features have been viewed as areas for playing of the ballgame documented at the time of European contact, as static representations of the sociopolitical landscape, and indicators of chiefdom type political organization *ipso facto.* The degree to which these interpretations are true and relevant to archaeological interpretation I argue varies upon the research context. However, what is clear is that plaza/*batey* features, whether explicitly or implicitly recognized, were much more. Here I would add to current interpretations that plazas/*bateys* became a primary medium for the creation of community identity through ritual practices, the formalization of land rights, and arenas negotiations of power. Here I agree with most interpretations that these features formed the material metaphors between the living, the dead, and the landscape (Siegel 1999; Curet and Oliver 1998; Keegan 2009). However, I believe that plazas/*bateys* served different functions at different scales of social and mythical interaction which served to structure these interrelationships.

The varying functional uses of these features for different types of interaction are most evident in their range of sizes which, as I have argued, directly relates to the number of people associated with their construction and use. These differential functions served social groups at different scales from the residential settlement to the local community to the broader multi-community social landscape. Hence, these features formed the primary arena for community interactions which likely mirrored the scalar nature of local kin based and supra-local “imagined” or virtual relationships.

One way to contextualize the differences in function and articulation of these features can be viewed in terms of their function as high-level and low-level ritual facilities. In the case of lower-level integrative facilities, these spaces served individual settlement and perhaps immediately adjacent neighbors in village level ritual capacities. The smaller sizes of residential settlements no longer meant that large social gatherings could be conducted within all individual settlements and large social engagements required new venues. At the same time settlements would still require spaces for the performance of ritual activities perhaps related to marriage, puberty, or ancestor veneration rites. Based on their size, these spaces were suitable for conveying messages to a small number of people in more intimate settings

For example, in addition to Tibes three newly documented *batey* sites to the north (El Colmado Perez, La Mineral and Los Gongolones) indicate local use of these spaces due to their relatively small size and inability to physically accommodate large numbers of people at any one time. Their close proximity to one another appears to suggest some level of symbolic interdependence. Conversely, their close proximity to one another indicates little authoritative control over ritual activity and a weak administrative hierarchy.

In contrast, larger more elaborate facilities (such as Tibes and Villon) would have promoted the communication of social and ideological messages to larger groups in higher level capacities. Messages conveyed at these larger facilities were likely grander, performance oriented public spectacles (Inomata and Coben 2006). In these contexts, broader community or inter-community engagements could take place. Yet while the variation in the size of these facilities denotes different levels of communication, it is likely that they were underwritten by a broader set of historically situated ideologies, symbols, and social relationships that extended beyond particular localities.

As group identity was strongly tied to the community's ceremonial facilities wealth and prestige would have been manifested in the performative ritual activities associated with them and in particular feasts and social events at the larger, high-level communal centers. A common way worldwide for leaders to maintain social cohesion in contexts where political roles are not institutionalized is by sponsoring feasts in public places (Dietler 2001:66; Hayden 2001; Whalen and Minnis 2000:177). Assuming that feasting activities took place at larger ceremonial sites like Tibes (Curet 2010), it would have been a communal event that negotiated group identities and established symbolic social order.

Such feasts would have also promoted the prestige of the *community* and/or certain segments of it (Rossman and Rubel 1986) in juxtaposition to others. The use of these spaces for events sponsored by an individual or group would be consistent with a situation in which new political roles were being negotiated. Regardless, whether the events that took place at the higher level facilities like Tibes were communal, sponsored, or some combination of the two, the analysis presented in Chapter 9 indicates that these were places where communitywide social negotiations took place *during and after* their construction.

The presence of burials in association with the plazas at Tibes is important in three ways. First, I would agree that the centralized burials represent the "community" of the founding ancestors (Keegan 2009). Demonstrable associations between the living and the dead, materialized in these spaces, would have legitimized group membership and the rights and responsibilities thereof including access to land and labor.

Second the construction of the plazas over these burial clusters suggests some degree of institutional memory of the location of these burials and continuity in the social history of the local group. A suite of radiocarbon dates acquired from recent research at the site (Pestle 2010) indicates that the majority of the burials at Tibes were interred prior to AD 800 and the construction of these features. While many plazas/ball courts in the region do not have evidence of human interments beneath their central surfaces the physical act of their construction represented social practices associated with the collective memory of the community.

Third, and by extensions these features likely became associated with particular lineages or ancestral "houses" stemming from earlier Saladoid settlements (*e.g.,* Heckenberger 2005; also see Oliver 1998, 2007). In this context, the proliferation of these features and their various sizes represent a nesting of community history and power within particular localities. Here I break from previous pyramidal or strictly vertical hierarchical conceptualizations of these features within the landscape and broader arena of social relationships. I believe that these features are not independent hierarchical parts but form part of a nested network of history and symbolic power which constitutes community identity and order of social and political life (*e.g.,* Leach 1964).

The labor necessary to construct the features at Tibes, although not requiring substantial investments, would have drawn on the small local population for labor. This contrasts with smaller plaza/*batey* features (*e.g.,* El Bronce, PO-42 and, PO-27) that could have been constructed by the households of the residential settlement in which it is located within a few days or less. The use of labor for higher-level facilities such as Tibes and Villon indicates the bringing together of different households from dispersed settlements in the construction of these spaces. These projects were likely considered cooperative “festive” communal projects entailing donated labor intended for the benefit of the broader social community. Labor in this case emphasizes cooperative engagement of the community that promoted the status of the group rather than particular individuals per se. Here it is also possible to see how solidarity was created through the construction of these features as much as ritual activities conducted at them.

While individuals within the social landscape had interaction with others from dispersed settlements in the local area, the construction of Tibes and other higher-level integrative facilities would have provided a venue for exchange of information, marriage partners and ideas. These places would have also served as arenas for the negotiation of power relationships at the local and regional levels. *Hence, these became areas of negotiation to demark community claims to land and social networks*.

Several villages registered with Saladoid and Ostionoid ceramic assemblages in the region surrounding Tibes including Cañas, Collores and, Tecla all possess evidence of long-term occupation but do not show evidence for the development of ceremonial architecture. Why is this? Here it is likely that some “progressive” settlements adopted the new forms of plaza construction to facilitate continuity of the now dispersed Saladoid social community. This is evident at early manifestations of these features at Tibes and Las Flores and on the north side of the island at Maisabel. These progressives emphasized their priority in the regional social and settlement system by building stone-lined enclosures around their burial grounds. Other Saladoid settlements and settlement localities that persisted into the AD 600 may have been more conservative and did not adapt these new forms of organization such as at Tecla, and the western watershed of the south-central region where these features are generally absent.

All of this runs counter to previous conceptualizations of these spaces that strictly focus on the increase in the centralization of political power in which the loci of political decision-making and the decision-makers themselves independently come to control the broader community (Anderson 1994:120, 1999:220; Siegel 1999). While leadership roles existed, their perpetuation and legitimacy required the community's support and consent. Hence, the high-level ritual integrative facilities at Tibes and within other settlements during Period III were built at a time when there was not an exclusive association between these distinctions and public architecture.

The Political Landscape of South-Central Puerto Rico (AD 600 – AD 1200)

As demonstrated throughout this work, the political landscape of south-central Puerto Rico was fueled by the creation of social identities and the authoring of collective biographies. While aspects of this process has been implicitly suggested in current conceptualizations of sociopolitical development on the island (Siegel 1999; Curet 1996), the underlying conditions and process are what require further elaboration and has been the primary goal in this work. As cogently noted by Pauketat "People construct such things, but it was the construction itself—considered in terms of population movements, community identities, political theater, and cultural pluralism—that requires, explanation" (Pauketat 2007:205).

The data presented in this work strongly suggest that settlement and ritual practices facilitated the development of symbolically constructed identities linking proximally situated residential settlements into an imagined or *virtual* community is central to the establishment of the polity. The multi-village communities that developed in the post AD 600 landscape primarily comprised small proximally related dispersed residential settlements and their accompanying ritual integrative facilities. Residential settlement clusters became consolidated into ritual districts articulated through the presence of high-level integrative facilities in the form of community ceremonial religious nodes as seen in the Portugués, Cerrillos, and Coamo river drainages. These localities likely had their own internal power structures-- articulated to suit local conditions as seen in the network analysis in Chapter 7 and rank size analysis in Chapter 9.

Regional clusters were separated by about 1 days walk with few intervening settlements and appear to conform to the spatiality of incipient political units noted in other parts of the world and as discussed in Chapter 4. The spacing of these units is generally attributed to the area local leaders could travel to establish their authority *through the maintenance of face-to-face social relationships* in pedestrian societies (Roscoe 1993:117; Spencer 1998).

Through the analyses presented in this work we can begin to see how the development of particular localities became the social and geographical basis for emergent political institutions. The internal cohesiveness of these political communities, while influenced by the social frictions of distance and propinquity, was molded by kin and marriage relations, as well as material/symbolic reminders of the internal social order reflecting access to social, supernatural, and natural resources.

The longevity of settlements and continuity in the use of public spaces like at Tibes suggests that patterns of authority within the broader community took on an institutional role of transmitting wealth and power between successive generations. Here the sedimentation of particular groups within portions of the landscape would have created tangible social institutions within the boarder regional landscape through which the prestige of the community and its relationship to its neighbors became politicized (Pauketat 2007).

The similarities in the timing of all of these changes points to some type of situation characterized by symbiotic relations and or competitive emulation between peer communities or polities (*sensu* Renfrew 1986). Social practices associated with the symbolic construction of community, as people and place, and the construction of identities that enabled land rights became emergent political projects that escalated through interactions with other similarly constructed community collectives and other more distant localities. The strategic role of the community comes into play here because of the potential for relieving the ambiguity associated with conflict, contradictory claims of resources, and overall risks that individuals and households suffer as a result of changes in their social or natural settings. In this scenario I argue that politics were founded on establishing local identities that promoted *access to land and control over networks of relationships.*

Like many incipient political institutions in the new world these formations were likely unstable, particularly during their inception when social and political roles and the landscape itself was being redefined. Yet, as in many situations documented throughout the Americas, these small peer polities shared, to some degree, similarity in cultural values and traits that gave the region and the island in general an enduring social and material character.

The most salient characteristic of these polities is the importance placed on ritual performance. In the case of Tibes and other settlements with ritual integrative facilities, these sites may have been the residence of important community members that had varying roles and positions of power within the community based on their demonstrated “closeness” to apical ancestors (Heckenberger 2007; Oliver 2009; Siegel 1999). The rise of Tibes and the production of ritual space at the site likely denote community activities related to the settlement of the initial ancestral line and their sedimentation within Río Portugués locality.

The political landscape of this time likely consisted of a loose hegemony with a principle ceremonial axis mundi surrounded by a constellation of smaller settlements that constituted the political community. However, unlike previous conceptualizations of leadership in traditional models of political development in the region, I would argue that the south-central region appears to be comprised of a system that lacked direct control by local rulers over daily life. The household heads/*caciques* sought to dramatize power and order rather than administer it (*e.g.,* Geertz 1980:49; Oliver 2007).

The residents of villages had reasons for participating in practices that helped create the polity even though some of these practices may have also legitimated social inequalities. Motivations for participation likely included the negotiation of strategic alliances that enabled access to land and other resources as well as satisfying familial (or community) obligations. The differences marked by various material domains were overlapping and not coterminous, which indicates that social differentiation was not a simple structural difference between the elite and non-elite but was a complicated emergent product negotiated and continually recreated in daily practice.

The emergence and organization of political communities during this time were also tied to social practices at local levels in which individuals and groups sought to sediment themselves to particular places on the landscape. The consolidation of property to particular households or social "houses" likely set the foundation for negotiation of power within and between communities. Here the power relationships within communities were between dispersed heads of households who did not dictate the actions of people in their day to day activities. The contexts of political power were likely situational and exercised during times of duress as well as formal ritual events at both the local and broader community scales. Hence, it is likely that while there were certainly hierarchical power relationships within locales and regions, local and regional politics were dominated by heterarchical relationships yet to be fully understood.

Concluding Remarks

This research reveals how the idea of community constitutes both a physical reality of interacting people and an elastic symbolic construct that holds a variety of contradictory meanings around which diverse social practices occur. In this increasingly connected modern world, exploring the idea of communities is of considerable benefit for anthropologists seeking to understand social group formation through the negotiation of identity and border networks of sociality. No longer seen as naturally occurring, apolitical spaces, communities are and always have been socially constructed networks and *places* (real, imagined, or *virtual*) of political engagement and contestation.

In this research I examined how transformations in social communities were tied to the emergence of incipient political formations in ancient societies typologically associated with chiefdoms or as they are known in the Antilles—*cacicazgos.* As a political construct notions of community are useful for rethinking roles of history, sociality, and landscape that are routinely characterized as "political" but not engaged in the traditional anthropological or archaeological discourse of the region.

In the south-central region of Puerto Rico, post AD 600 communities were the outcome of actions of local social actors residing in dispersed settlements but situated in broader histories, socialities, and ideologies. To understand the emergence of incipient political institutions it is necessary to develop an understanding of the formation of social communities based on "more localized, contingent, and historical factors: the interplay of multi-dimensional social, cultural and ecological factors that interact variably under contingent socio-historical conditions" (Heckenberger 2001:39). Future research regarding the development and organization of sociopolitical landscape of Puerto Rico, would benefit from refining regional chronology and history of landscapes to understand *how* social groups were organized and interrelated at finer scales (Curet 2003; Keegan 2001). However, this requires filling important gaps in current knowledge of the region.

Specifically, there is a need for more systematic survey with testing and dating of as many sites as possible. This research is imperative in Puerto Rico (and other parts of the Caribbean) where modern development is rapidly erasing the archaeological record at an alarming rate. Without this data, it is impossible to determine how many settlements existed, when they were occupied as well as how they may have been articulated. Further, it is necessary to expand investigations to consider comparative inter-site analyses between proximally related sites to establish variability in particular artifact assemblages that would give clues to interrelationships between sites and indicators of power and identity through material culture. Such studies also permit for the creation of local histories and the contexts for studying regional social and cultural change.

There is also a need to develop a better understanding about ritual integrative facilities in the region. Clearly, our conceptions about what is “monumental” architecture should be reevaluated. In this context, it is necessary to elucidate the varying roles of these features at different social scales. Both of these avenues of inquiry require detailed documentation of extant plaza/*batey* features in terms of their size and material composition. Analysis of certain material classes associated with these features may also provide clues to different types of activities performed at different level integrative facilities and the temporal and geographical range from which the people that used them were associated.

Most critically, there is a need to reevaluate how we think of politics, human sociality, and social change in the past. Confined to neo-evolutionary paradigms it is presumed that the *cacicazgos* and complex regional political formations evident at the time of European contact requires simple origins, social homogeneity, or single monocausal trajectories of development. Rather than perpetuate past descriptions of bands, tribes, and chiefdoms it is necessary to think about how and why social groups were organized the way they were and the underlying social and historical conditions responsible for their emergence. To characterize this variability and move archaeology in the region ahead requires the development of nuanced regional histories that underscore the complexities of incipient political institutions as living communities in the regions ancient past. Such efforts promise to yield new insights to the histories and socialites of the *people* and communities who lived there.

APPENDIX A

RADIOCARBON DATES FOR THE SOUTH-CENTRAL REGION

The following appendix lists all of the radiocarbon dates for the south-central region that have been associated with particular pottery styles.[1] The table contains the following fields:

- SITE: Site the date is associated with.
- STYLE: Pottery style associated with the date.
- PERIOD: Period (based on Rouse) associated with the DATE.
- RAD. AGE: Uncalibrated radiocarbon age.
- 2σL: Calibrated 2 sigma low date.
- 2σH: Calibrated 2 sigma high date.
- 2σ MEDIAN: Calibrated 2 sigma median date.
- SAMPLE: Sample number:
- MATERIAL: Material on which the radiocarbon determination was made.
- SOURCE: Source of the date

[1] A suite of additional dates are available from Tibes that are not associated with pottery (Pestle 2010).

Table A-1. Radiocarbon dates for the south-central region.

Site	Style	Period	Rad. Age	2SL	2SH	Median 2S	Sample	Material	Source
Aguilita	Capa/Esperanza	IV	630±90	1226	1440	1333	Beta-106918	Charcoal	Gonzalez 1997
Aguilita	Capa/Esperanza	IV	540±50	1300	1445	1373	Beta-106919	Charcoal	Gonzalez 1997
Cayito	Boca Chica	IV	700±80	1178	1413	1296	Y-1243	Charcoal	Rouse and Alegría 1979
Collores	Ostiones P	IIIA	1205±85	665	986	826	I-6896	Charcoal	Veloz (1973) cited in Rodríguez (1983)
Collores	Ostiones P	IIIA	1125±85	681	1115	898	I-6894	Charcoal	Veloz (1973) cited in Rodríguez (1983)
Collores	Ostiones P	IIIB	1065±85	772	1164	968	I-6895	Charcoal	Veloz (1973) cited in Rodríguez (1983)
Diego Hernandez	Ostiones P	IIIA	1330±60	909	1196	1053	Beta 30356	Strombus	Maíz 2002
El Bronce	Ostiones/S. Elena	IIIB	1320±100	545	962	754	Beta-10383	Charcoal	Robinson *et al.* 1985
El Bronce	Ostiones/S. Elena	IIIB	1190±80	673	988	831	Beta-10388	Charcoal	Robinson *et al.* 1985
El Bronce	Ostiones/S. Elena	IIIB	1180±90	672	1013	843	Beta-10382	Charcoal	Robinson *et al.* 1985
El Bronce	Ostiones/S. Elena	IIIB	770±50	1161	1376	1269	Beta-10387	Charcoal	Robinson *et al.* 1985
El Bronce	Ostiones/S. Elena	IIIB	770±50	1161	1376	1269	Beta-10387	Charcoal	Robinson *et al.* 1985
El Parking (PO 38)	Cuevas	IIB	1780±130	-41	543	251	Beta-33260	Charcoal	Weaver *et al.* 1992
El Parking (PO 38)	Ostiones P	IIIA	1430±90	424	773	599	Beta-45290	Charcoal	Weaver *et al.* 1992
El Parking (PO 38)	Ostiones P	IIIA	1290±80	607	942	775	Beta-45291	Charcoal	Weaver *et al.* 1992
El Parking (PO 38)	Ostiones P	IIIA	1280±80	615	948	782	Beta-45292	Charcoal	Weaver *et al.* 1992
El Parking (PO 38)	Ostiones P	IIIA	1000±70	890	1207	1049	Beta-45293	Charcoal	Weaver *et al.* 1992
Hernandez Colon	Hacienda Grande	IIA	1420±110	409	869	639	Beta 23902	Charcoal	Maíz 2002
La Florida	Ostiones m	IIIB	1110±40	783	1018	901	Beta-171304	Charcoal	Maíz p.c. 2005
Las Flores	Ostiones mod./S. Elena	IIIB	1060±45	884	1115	1000	P-2729	Charcoal	Aguílu cited in Wilson 1991

Table A-1. continued

Site	Style	Period	Rad. Age	2SL	2SH	Median 2S	Sample	Material	Source
Las Flores	Ostiones mod./S. Elena	IIIB	1000±45	903	1158	1031	P-2598	Charcoal	Agúilu cited in Wilson 1991
Las Flores	Ostiones mod./S. Elena	IIIB	990±50	902	1168	1035	P-2595	Charcoal	Agúilu cited in Wilson 1991
Las Flores	Ostiones mod./S. Elena	IIIB	600±45	1291	1414	1353	P-2599	Charcoal	Agúilu cited in Wilson 1991
PO-21	Ostiones P	IIIA	1360±90	445	890	668	Beta-18191	Charcoal	Espenshade 2000
PO-23	Ostiones P	IIIA	1610±70	258	597	428	Beta-23282	Charcoal	Krause 1989
PO-23	Ostiones P	IIIA	1360±90	445	890	668	Beta-23283	Charcoal	Krause 1989
PO-23	Ostiones P	IIIA	1100±110	687	1155	921	Beta-23284	Charcoal	Krause 1989
PO-27	Esperanza/Capa	IV	940±60	995	1216	1106	Beta-41467	Charcoal	Krause 1989
PO-27	Esperanza/Capa	IV	930±50	1021	1210	1116	Beta-41478	Charcoal	Krause 1989
PO-27	Esperanza/Capa	IV	550±60	1296	1443	1370	Beta-41477	Charcoal	Krause 1989
PO-29	Cuevas/Monserrate	IIB	1550±40	420	610	515	Beta - 272032	Charcoal	Espenshade and Young 2011
PO-29	Monserrate/Pure Ostiones	IIIA	1310±40	650	780	715	Beta - 272023	Charcoal	Espenshade and Young 2011
PO-29	Monserrate/Pure Ostiones	IIIA	1300±40	660	810	735	Beta - 272028	Charcoal	Espenshade and Young 2011
PO-29	Monserrate/Pure Ostiones	IIIA	1240±40	660	880	770	Beta - 272030	Charcoal	Espenshade and Young 2011
PO-29	Monserrate/Pure Ostiones	IIIA	1250±40	670	880	775	Beta - 272025	Charcoal	Espenshade and Young 2011
PO-29	Monserrate/Pure Ostiones	IIIA	1190±40	690	950	820	Beta - 272026	Charcoal	Espenshade and Young 2011
PO-29	Monserrate/Pure Ostiones	IIIA	1220±40	690	950	820	Beta - 272027	Charcoal	Espenshade and Young 2011
PO-29	Capá/Boca Chica/Esperanza	IV	710±40	1260	1390	1325	Beta - 272031	Charcoal	Espenshade and Young 2011
PO-29	Capá/Boca Chica/Esperanza	IV	540±40	1310	1360	1335	Beta - 247736	Charcoal	Espenshade and Young 2011
PO-29	Capá/Boca Chica/Esperanza	IV	580±40	1300	1430	1365	Beta - 272024	Charcoal	Espenshade and Young 2011
PO-29	Capá/Boca Chica/Esperanza	IV	550±40	1320	1440	1380	Beta - 272033	Charcoal	Espenshade and Young 2011
PO-29	Capá/Boca Chica/Esperanza	IV	440±60	1400	1620	1510	Beta - 247737	Charcoal	Espenshade and Young 2011

Table A-1. continued

Site	Style	Period	Rad. Age	2SL	2SH	Median 2S	Sample	Material	Source
PO-39	S. Elena/Ostiones M	IIIB	1040±70	783	1163	973	Beta-45286	Charcoal	Weaver *et al.* 1992
PO-39	S. Elena/Ostiones M	IIIB	1040±70	783	1163	973	Beta-45286	Charcoal	Weaver *et al.* 1992
PO-39	S. Elena/Ostiones M	IIIB	1020±80	784	1212	998	Beta-45288	Charcoal	Weaver *et al.* 1992
PO-39	S. Elena/Ostiones M	IIIB	990±60	898	1205	1052	Beta-36518	Charcoal	Weaver *et al.* 1992
PO-39	S. Elena/Ostiones M	IIIB	970±90	893	1252	1073	Beta-31038	Charcoal	Weaver *et al.* 1992
PO-39	S. Elena/Ostiones M	IIIB	950±50	998	1208	1103	Beta-36519	Charcoal	Weaver *et al.* 1992
PO-39	S. Elena/Ostiones M	IIIB	890±70	1023	1260	1142	Beta-31039	Charcoal	Weaver *et al.* 1992
PO-42	Ostiones M/Capá	III	1240±25	940	1290	1115	UGAMS-6279 (FS116)	Shell	Torres 2009
PO-42	Modified Ostiones/Capá	IIIB-IV	950±25	1290	1600	1445	UGAMS-6279 (FS112)	Shell	DuChemin 2011
PO-43	Ostiones M	III	1310±25	960	1300	1130	UGAMS 6280 (FS289	Shell	Torres 2009
PO-43	Modified Ostiones	IIIB-IV	1160±25	1080	1420	1250	UGAMS 6280 (FS292	Shell	DuChemin 2011
Tecla 1	Hacienda Grande	IIA	2380±80	-769	-234	-502	I 13856	Charcoal	Narganes 1989
Tecla 1	Hacienda Grande	IIA	2050±80	-354	125	-115	I 13867	Charcoal	Narganes 1989
Tecla 1	Hacienda Grande	IIA	2020±80	-351	207	-72	I 13855	Charcoal	Narganes 1989
Tecla 1	Hacienda Grande	IIA	2020±80	-351	207	-72	I 13921	Charcoal	Narganes 1989
Tecla 1	Hacienda Grande	IIA	1950±80	-164	238	37	I 13820	Charcoal	Narganes 1989
Tecla 1	Hacienda Grande	IIA	1950±80	-164	238	37	I 13930	Charcoal	Narganes 1989
Tecla 1	Hacienda Grande	IIA	1920±80	-149	320	86	I 13929	Charcoal	Narganes 1989
Tecla 1	Hacienda Grande	IIA	1900±80	-89	331	121	I 13866	Charcoal	Narganes 1989
Tecla 1	Hacienda Grande	IIA	1780±85	34	429	232	I 13922	Charcoal	Narganes 1989
Tecla 1	Hacienda Grande	IIA	1780±80	69	421	245	I 10914	Charcoal	Narganes 1989
Tecla 1	Hacienda Grande	IIA	1775±80	70	424	247	I 9680	Charcoal	Narganes 1989
Tecla 1	Hacienda Grande	IIA	1720±80	128	533	331	I 10916	Charcoal	Narganes 1989
Tecla 1	Hacienda Grande	IIA	1600±150	82	685	384	I 14428	Charcoal	Narganes 1989
Tecla 1	Hacienda Grande	IIA	1650±80	223	592	408	I 14361	Charcoal	Narganes 1989
Tecla 1	Hacienda Grande	IIA	1650±80	223	592	408	I 14431	Charcoal	Narganes 1989
Tecla 1	Hacienda Grande	IIA	1610±80	255	604	430	I 14427	Charcoal	Narganes 1989
Tecla 1	Hacienda Grande	IIA	1610±80	255	604	430	I 14430	Charcoal	Narganes 1989
Tecla 1	Hacienda Grande	IIA	1600±80	256	614	435	I 14483	Charcoal	Narganes 1989
Tecla 1	Hacienda Grande	IIA	1560±80	268	648	458	I 14362	Charcoal	Narganes 1989
Tecla 1	Hacienda Grande	IIA	1550±80	344	649	497	I 14429	Charcoal	Narganes 1989
Tecla 1	Hacienda Grande	IIA	1530±80	354	657	506	I 14382	Charcoal	Narganes 1989
Tecla 1	Hacienda Grande	IIA	1515±80	388	661	525	I 9677	Charcoal	Narganes 1989

Table A-1. continued

Site	Style	Period	Rad. Age	2SL	2SH	Median 2S	Sample	Material	Source
Tecla 1	Ostiones P	IIIA	1490±85	389	680	535	I 13923	Charcoal	Narganes 1989
Tecla 1	Ostiones P	IIIA	1480±80	409	676	543	I 13924	Charcoal	Narganes 1989
Tecla 1	Hacienda Grande	IIA	1480±95	355	767	561	I 9108	Charcoal	Narganes 1989
Tecla 1	Hacienda Grande	IIA	1460±80	415	761	588	I 14360	Charcoal	Narganes 1989
Tecla 1	Ostiones P	IIIA	1460±80	415	761	588	I 9873	Charcoal	Narganes 1989
Tecla 1	Ostiones P	IIIA	1390±85	434	860	647	I 10915	Charcoal	Narganes 1989
Tecla 1	Ostiones P	IIIA	1400±150	343	972	658	I 13854	Charcoal	Narganes 1989
Tecla 1	Ostiones P	IIIA	1370±80	538	872	705	I 13853	Charcoal	Narganes 1989
Tecla 1	Ostiones P	IIIA	1360±80	544	870	707	I 13931	Charcoal	Narganes 1989
Tecla 1	Ostiones P	IIIA	1315±85	570	935	753	I 10913	Charcoal	Narganes 1989
Tecla 1	Ostiones P	IIIA	1295±85	598	949	774	I 10912	Charcoal	Narganes 1989
Tecla 1	Ostiones P	IIIA	1285±95	599	970	785	I 9107	Charcoal	Narganes 1989
Tecla 1	Ostiones P	IIIA	1220±80	663	972	818	I 9679	Charcoal	Narganes 1989
Tecla 1	Ostiones P	IIIA	1055±80	779	1158	969	I 9678	Charcoal	Narganes 1989
Tecla II	Hacienda Grande	IIA	1850±60	26	331	179	I 13868	Charcoal	Narganes 1989
Tecla II	Hacienda Grande	IIA	1705±85	133	536	335	I 10921	Charcoal	Narganes 1989
Tecla II	Hacienda Grande	IIA	1500±80	399	665	532	I 13932	Charcoal	Narganes 1989
Tecla II	Hacienda Grande	IIA	1410±85	430	777	604	I 10920	Charcoal	Narganes 1989
Tecla II	Ostiones P	IIIA	1350±110	434	948	691	I 13933	Charcoal	Narganes 1989
Tibes	S. Elena	IIIB	1210±80	666	978	822	I 13713		Gonzalez 1984
Tibes	S. Elena	IIIB	1080±60	778	1117	948	136326	Charcoal	Newsom and Curet 2000
Tibes	S. Elena	IIIB	1040±50	888	1152	1020	136325	Charcoal	Newsom and Curet 2000
Tibes	S. Elena	III	1010±40	901	1155	1028	136327	Charcoal	Newsom and Curet 2000
Tibes	S. Elena	IIIB	950±40	1016	1179	1098	136324	Charcoal	Newsom and Curet 2000
Tibes	S. Elena	IIIB	930±40	1023	1206	1115	136328	Charcoal	Newsom and Curet 2000
Tibes			890±40	1035	1245	1140	109679	Charcoal	Curet 2010
Tibes	S. Elena	IIIB-IV	750±40	1220	1300	1260	198876	Charcoal	Curet 2010
Tibes	S. Elena	IIIB	660±90	1210	1438	1324	I 13714		Gonzalez 1984

APPENDIX B
THE TIBES ARCHAEOLGICAL SURVEY SHOVEL TEST LOG

This appendix presented the data collected as relevant for each shovel test excavated during the Tibes Archaeological Survey Project. The table associated with the log contains the following fields:

- NORTHING: Arbitrary grid northing coordinates.
- EASTING: Arbitrary grid easting coordinates.
- POS/NEG: Positive or negative shovel test (1= positive, 0=negative).
- PREHIST: Prehistoric cultural material present or not.
- COMMENT: General comments related to the shovel test or surrounding environ.
- X: UTM NAD 83 ZN 19 Easting coordinate.
- Y: UTM NAD 83 ZN 19 Northing coordinates

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Table B-1. Tibes Archaeological Survey shovel test log

Northing	Easting	Pos/Neg	Prehist	Comment	X	Y
525	4250	0	FALSE	Possibly disturbed	752288	1996027
550	4200	0	FALSE	Disturbed	752238	1996052
550	4225	0	FALSE		752263	1996052
550	4250	1	TRUE	PR-10 @ 100 m S	752288	1996052
550	4275	0	FALSE	Rocks	752313	1996052
560	3985	1	TRUE	Possibly disturbed	752023	1996062
560	3990	1	TRUE	Possibly disturbed	752028	1996062
560	3995	0	FALSE	Possibly disturbed	752033	1996062
560	4000	1	TRUE	Possibly disturbed	752038	1996062
560	4005	1	TRUE	Possibly disturbed	752043	1996062
562	3985	1	TRUE	Column Sample 6	752023	1996065
562	4005	1	TRUE	Possibly disturbed	752043	1996065
562.5	4000	0	FALSE	Bedrock near surface	752038	1996065
562.5	4010	0	FALSE	Possibly disturbed	752048	1996065
565	3980	0	FALSE	Possibly disturbed	752018	1996067
565	3985	0	FALSE	Possibly disturbed	752023	1996067
565	3990	0	FALSE	Possibly disturbed	752028	1996067
565	3995	0	FALSE	Possibly disturbed	752033	1996067
565	4000	0	FALSE	Possibly disturbed	752038	1996067
565	4005	0	FALSE	PR-10 @ 30 m S	752043	1996067
570	3985	0	FALSE		752023	1996072
570	3990	0	FALSE		752028	1996072
570	4000	0	FALSE		752038	1996072
575	4250	0	FALSE		752288	1996077
580	3975	0	FALSE		752013	1996082
580	3985	0	FALSE		752023	1996082
580	4000	1	TRUE		752038	1996082
580	4010	0	FALSE		752048	1996082
590	4000	0	FALSE		752038	1996092
600	2350	0	FALSE	Modern trash in unit 0-40	750388	1996102
600	4000	0	FALSE		752038	1996102
600	4150	0	FALSE		752188	1996102
600	4200	0	FALSE	Auger in bottom of unit	752238	1996102
600	4250	0	FALSE		752288	1996102
625	4000	0	FALSE		752038	1996127
625	4150	0	FALSE	Auger in bottom of unit	752188	1996127
625	4300	0	FALSE		752338	1996127
650	2350	0	FALSE		750388	1996152
650	3600	0	FALSE	Auger in bottom of unit	751638	1996152
650	3650	0	FALSE	Ridge top	751688	1996152
650	3750	0	FALSE		751788	1996152
650	3800	0	FALSE		751838	1996152
650	3850	0	FALSE	Auger in bottom of unit	751888	1996152
650	3900	0	FALSE	Ridge top S of Tibes	751938	1996152

Table B-1. continued

Northing	Easting	Pos/Neg	Prehist	Comment	X	Y
650	3950	0	FALSE	Bedrock near surface	751988	1996152
650	4000	0	FALSE		752038	1996152
650	4050	0	FALSE		752088	1996152
650	4100	0	FALSE	Auger in bottom of unit	752138	1996152
650	4125	0	FALSE		752163	1996152
650	4150	1	TRUE	Auger in bottom of unit	752188	1996152
650	4175	0	FALSE		752213	1996152
650	4200	0	FALSE	Trash/Fence 10 m north	752238	1996152
650	4250	0	FALSE		752288	1996152
650	4275	0	FALSE		752313	1996152
650	4300	1	TRUE	Auger in bottom of unit	752338	1996152
650	4325	0	FALSE	Rocks	752363	1996152
650	4350	0	FALSE	Auger in bottom of unit	752388	1996152
650	4400	0	FALSE	Modern trash in the area	752438	1996152
650	4450	0	FALSE	Parent material in bottom	752488	1996152
675	4150	0	FALSE	Rock and Asphalt in area	752188	1996177
675	4300	0	FALSE		752338	1996177
700	3600	0	FALSE		751638	1996202
700	3650	0	FALSE	Auger in bottom of unit	751688	1996202
700	4050	0	FALSE	Bedrock near surface	752088	1996202
700	4100	0	FALSE		752138	1996202
700	4150	0	FALSE		752188	1996202
725	4100	0	FALSE	Bedrock near surface	752138	1996227
725	4150	0	FALSE	Concrete @ 30 cmbs	752188	1996227
750	3600	0	FALSE	Auger in bottom of unit	751638	1996252
750	3650	1	FALSE		751688	1996252
750	3675	0	FALSE		751713	1996252
750	4050	0	FALSE	Auger in bottom of unit	752088	1996252
750	4075	0	FALSE		752113	1996252
750	4100	1	FALSE		752138	1996252
750	4125	0	FALSE	Steep slope	752163	1996252
750	4150	0	FALSE		752188	1996252
750	4175	0	FALSE	Modern trash and trails	752213	1996252
775	4100	0	FALSE		752138	1996277
775	4150	0	FALSE		752188	1996277
800	3600	0	FALSE		751638	1996302
800	3650	1	FALSE	Auger in bottom of unit	751688	1996302
875	3625	0	FALSE		751663	1996377
900	3600	0	FALSE	Road to the northeast.	751638	1996402
925	3575	0	FALSE		751613	1996427
950	3525	0	FALSE		751563	1996452
950	3550	1	FALSE	Abandoned house to the W	751588	1996452
950	3575	0	FALSE		751613	1996452
950	3600	0	FALSE		751638	1996452

Table B-1. continued

Northing	Easting	Pos/Neg	Prehist	Comment	X	Y
950	4050	0	FALSE	Fence 10 m S	752088	1996452
950	4075	0	FALSE		752113	1996452
950	4100	0	FALSE	Boulders and steep slope	752138	1996452
950	4125	0	FALSE	Boulders and steep slope	752163	1996452
950	4150	0	FALSE	Fill. Disturbed soils	752188	1996452
950	4175	0	FALSE	Fill. Modern trash @ 40cm	752213	1996452
950	4200	0	FALSE	Fill. Concrete and plastic	752238	1996452
950	4250	0	FALSE	Fill. Modern trash @ 65cm	752288	1996452
950	4300	0	FALSE	Fill. Cement and trash	752338	1996452
962.5	5262.5	0	FALSE		753300	1996465
975	3500	1	TRUE		751588	1996477
975	3525	0	FALSE	Abandoned house to the W	751563	1996477
975	3550	0	FALSE		751588	1996477
975	3575	0	FALSE	Brick fragments in unit,	751613	1996477
975	4275	0	FALSE		752313	1996477
975	4475	0	FALSE		752513	1996477
1000	3550	0	FALSE		751588	1996502
1000	4050	0	FALSE	Gravel	752088	1996502
1000	4075	0	FALSE	Steep Slope	752113	1996502
1000	4100	0	FALSE	Gravel	752138	1996502
1000	4125	0	FALSE	Disturbed soils	752163	1996502
1000	4275	0	FALSE		752313	1996502
1000	4475	0	FALSE		752513	1996502
1025	3500	0	FALSE		751538	1996527
1025	3525	0	FALSE		751563	1996527
1025	4125	0	FALSE		752163	1996527
1025	4350	0	FALSE		752388	1996527
1025	5125	0	FALSE	Bedrock near surface	753163	1996527
1025	5150	0	FALSE		753188	1996527
1025	5175	0	FALSE		753213	1996527
1025	5175	0	FALSE		753213	1996527
1025	5175	0	FALSE		753213	1996527
1025	5200	1	FALSE		753238	1996527
1050	3475	0	FALSE		751513	1996552
1050	3500	0	FALSE	Modern trails	751538	1996552
1050	4350	0	FALSE		752388	1996552
1050	5175	0	FALSE	Area has been scraped	753213	1996552
1075	5125	0	FALSE	Bedrock near the surface	753163	1996577
1075	5150	0	FALSE		753188	1996577
1075	5175	0	FALSE		753213	1996577
1075	5200	0	FALSE		753238	1996577
1100	5175	0	FALSE		753213	1996602
1125	3150	0	FALSE		751188	1996627
1125	3175	0	FALSE		751213	1996627

Table B-1. continued

Northing	Easting	Pos/Neg	Prehist	Comment	X	Y
1125	3200	0	FALSE		751238	1996627
1125	3225	0	FALSE		751263	1996627
1125	5125	0	FALSE		753163	1996627
1125	5150	0	FALSE		753188	1996627
1125	5162.5	0	FALSE		753200	1996627
1125	5175	0	FALSE		753213	1996627
1137.5	5162.5	1	FALSE		753200	1996640
1150	3150	0	FALSE		751188	1996652
1150	3175	0	FALSE		751213	1996652
1150	3200	1	TRUE		751238	1996652
1150	3225	0	FALSE		751263	1996652
1150	3250	0	FALSE		751288	1996652
1150	3275	0	FALSE		751313	1996652
1150	3300	1	TRUE		751338	1996652
1150	4425	0	FALSE	Fill? Mottled soils	752463	1996652
1150	5100	0	FALSE		753138	1996652
1150	5125	1	TRUE		753163	1996652
1150	5150	1	FALSE		753188	1996652
1150	5150	0	FALSE		753188	1996652
1150	5150	0	FALSE		753188	1996652
1150	5162.5	1	FALSE		753200	1996652
1150	5175	0	FALSE		753213	1996652
1175	3150	0	FALSE		751188	1996677
1175	3175	0	FALSE		751213	1996677
1175	3200	0	FALSE		751238	1996677
1175	3225	1	TRUE		751263	1996677
1175	3250	0	FALSE		751288	1996677
1175	3275	0	FALSE		751313	1996677
1175	3300	1	FALSE		751338	1996677
1175	3325	0	FALSE	Ditch	751363	1996677
1175	5162.5	0	FALSE		753200	1996677
1200	3150	0	FALSE		751188	1996702
1200	3175	0	FALSE		751213	1996702
1200	3225	0	FALSE		751263	1996702
1200	3275	0	FALSE		751313	1996702
1200	3300	0	FALSE		751338	1996702
1200	5100	0	FALSE	Cliff edge	753138	1996702
1200	5125	0	FALSE		753163	1996702
1200	5150	0	FALSE		753188	1996702
1225	3262.5	0	FALSE		751300	1996727
1225	3275	0	FALSE	Livestock/Pasture	751313	1996727
1225	3300	0	FALSE		751338	1996727
1225	3312.5	0	FALSE		751350	1996727
1250	3250	0	FALSE		751288	1996752

Table B-1. continued

Northing	Easting	Pos/Neg	Prehist	Comment	X	Y
1250	3260	0	FALSE		751298	1996752
1250	3262.5	1	TRUE	Auger in bottom of unit	751300	1996752
1250	3275	0	FALSE		751313	1996752
1250	3287.5	1	TRUE		751325	1996752
1250	3300	1	TRUE	Modern trash dump 10 m E	751338	1996752
1250	3312.5	1	TRUE		751350	1996752
1250	3325	0	FALSE	On fence line	751363	1996752
1250	5150	0	FALSE		753188	1996752
1251	3300	1	TRUE		751338	1996753
1262.5	3262.5	0	FALSE	Clay Sample	751300	1996765
1262.5	3287.5	0	FALSE		751325	1996765
1262.5	3300	1	TRUE		751338	1996765
1262.5	3312.5	1	TRUE		751350	1996765
1262.5	3325	0	FALSE		751363	1996765
1275	3250	0	FALSE		751288	1996777
1275	3275	0	FALSE		751313	1996777
1275	3287.5	1	FALSE		751325	1996777
1275	3300	1	TRUE		751338	1996777
1275	3312.5	1	TRUE		751350	1996777
1275	3325	0	FALSE		751363	1996777
1275	4625	0	FALSE		752663	1996777
1287.5	3262.5	0	FALSE		751300	1996790
1287.5	3287.5	0	FALSE		751325	1996790
1287.5	3312.5	0	FALSE		751350	1996790
1300	3250	0	FALSE		751288	1996802
1300	3275	0	FALSE		751313	1996802
1300	3300	1	TRUE		751338	1996802
1300	3325	0	FALSE		751363	1996802
1300	5150	0	FALSE		753188	1996802
1312.5	3262.5	0	FALSE		751300	1996815
1312.5	3287.5	0	FALSE		751325	1996815
1312.5	3312.5	0	FALSE		751350	1996815
1325	3250	0	FALSE		751288	1996827
1325	3275	0	FALSE		751313	1996827
1325	3300	0	FALSE		751338	1996827
1325	5050	0	FALSE		753088	1996827
1325	5075	0	FALSE		753113	1996827
1325	5100	0	FALSE		753138	1996827
1400	3275	0	FALSE	Bedrock near surface	751313	1996902
1425	1450	0	FALSE		749488	1996927
1425	1475	0	FALSE		749513	1996927
1450	1450	0	FALSE		749488	1996952
1450	1475	0	FALSE		749513	1996952
1475	1450	0	FALSE	Mottled soils and bedrock	749488	1996977

Table B-1. continued

Northing	Easting	Pos/Neg	Prehist	Comment	X	Y
1475	1475	1	FALSE		749513	1996977
1475	1500	0	FALSE		749538	1996977
1475	1525	0	FALSE		749563	1996977
1475	1550	0	FALSE	Adjacent to existing road	749588	1996977
1500	1450	0	FALSE		749488	1997002
1500	1475	0	FALSE	Borrow pit/pond construct	749513	1997002
1500	1500	0	FALSE		749538	1997002
1500	1525	1	FALSE		749563	1997002
1500	1550	1	TRUE		749588	1997002
1525	1450	0	FALSE		749488	1997027
1525	1475	0	FALSE		749513	1997027
1525	1500	0	FALSE		749538	1997027
1525	1525	0	FALSE	Area graded	749563	1997027
1525	1550	1	TRUE		749588	1997027
1550	1450	0	FALSE	In drainage	749488	1997052
1550	1475	0	FALSE		749513	1997052
1550	1525	0	FALSE	Slope	749563	1997052
1550	1550	0	FALSE		749588	1997052
1575	1450	0	FALSE	Boulders	749488	1997077
1575	1475	0	FALSE		749513	1997077
1575	1500	0	FALSE		749538	1997077
1575	3475	0	FALSE	Bedrock near surface	751513	1997077
1600	1450	0	FALSE		749488	1997102
1600	1475	1	TRUE		749513	1997102
1600	1500	0	FALSE		749538	1997102
1600	1525	0	FALSE		749563	1997102
1600	3400	0	FALSE	Bedrock near surface	751438	1997102
1600	3425	0	FALSE	Bedrock near surface	751463	1997102
1600	3450	0	FALSE	Steep slope	751488	1997102
1612.5	3450	0	FALSE		751488	1997115
1625	1475	0	FALSE		749513	1997127
1625	1500	0	FALSE		749538	1997127
1625	1525	0	FALSE		749563	1997127
1625	1525	0	FALSE		749563	1997127
1625	3400	0	FALSE	Bedrock near surface	751438	1997127
1625	3425	0	FALSE	Bedrock near surface	751463	1997127
1625	3437.5	0	FALSE		751475	1997127
1625	3450	0	FALSE		751488	1997127
1625	3475	0	FALSE		751513	1997127
1650	1475	1	FALSE	Nail and bottle glass	749513	1997152
1650	1500	1	FALSE		749538	1997152
1650	1525	1	FALSE		749563	1997152
1650	1550	1	FALSE	Graded?	749588	1997152
1650	3400	0	FALSE	Bedrock near surface	751438	1997152

Talble B-1. continued

Northing	Easting	Pos/Neg	Prehist	Comment	X	Y
1650	3425	0	FALSE	Bedrock near surface	751463	1997152
1650	3450	0	FALSE	Modern trash throughout	751488	1997152
1650	3475	0	FALSE	Unit 2 m north of trail a	751513	1997152
1675	1475	1	FALSE		749513	1997177
1675	1500	0	FALSE		749538	1997177
1675	1525	0	FALSE		749563	1997177
1675	1550	0	FALSE		749588	1997177
1675	3400	0	FALSE		751438	1997177
1687.5	3050	0	FALSE		751088	1997190
1687.5	3062.5	0	FALSE		751100	1997190
1687.5	3075	1	TRUE		751113	1997190
1687.5	3087.5	1	TRUE		751125	1997190
1687.5	3100	0	FALSE		751138	1997190
1687.5	3112.5	0	FALSE		751150	1997190
1700	1475	0	FALSE		749513	1997202
1700	3000	0	FALSE		751038	1997202
1700	3012.5	1	FALSE		751050	1997202
1700	3025	1	FALSE		751063	1997202
1700	3037.5	0	FALSE		751075	1997202
1700	3037.5	0	FALSE		751075	1997202
1700	3050	1	FALSE		751088	1997202
1700	3062.5	0	FALSE		751100	1997202
1700	3075	0	FALSE		751113	1997202
1700	3087.5	0	FALSE		751125	1997202
1700	3400	0	FALSE	Bedrock near surface	751438	1997202
1700	3425	0	FALSE		751463	1997202
1700	3450	0	FALSE	Bedrock near surface	751488	1997202
1712.5	3025	0	FALSE		751063	1997215
1712.5	3037.5	1	TRUE		751075	1997215
1712.5	3050	0	FALSE		751088	1997214
1712.5	3062.5	0	FALSE		751100	1997214
1712.5	3075	0	FALSE		751113	1997214
1712.5	3087.5	0	FALSE		751125	1997214
1725	3037.5	0	FALSE	Area leveled	751075	1997227
1750	3400	0	FALSE	Bedrock near surface	751438	1997252
1750	3425	0	FALSE	Land Modification.	751463	1997252
1750	3450	0	FALSE		751488	1997252
1750	3475	0	FALSE	Bedrock @ 40 cmbs	751513	1997252
1800	2825	0	FALSE		750863	1997302
1800	2850	0	FALSE		750888	1997302
1800	3400	0	FALSE	Bedrock near surface	751438	1997302
1800	3450	0	FALSE	Graded	751488	1997302
1805	2837.5	1	TRUE		750875	1997307
1805	2850	1	TRUE		750888	1997307

Table B-1. continued

Northing	Easting	Pos/Neg	Prehist	Comment	X	Y
1820	2837.5	1	TRUE		750875	1997322
1825	2800	1	FALSE		750838	1997327
1825	2825	1	FALSE	7m S of conchero	750863	1997327
1825	2837.5	1	TRUE	Charcoal noted @ 20-40 cm	750875	1997327
1825	2840	1	TRUE		750878	1997327
1825	2850	1	TRUE		750888	1997327
1825	2875	0	FALSE	Standing water	750913	1997327
1825	3175	1	TRUE		751213	1997327
1835	2825	1	TRUE	8 m SE of conchero.	750863	1997337
1837	2850	0	FALSE	Boulders/Bedrock @ 35cm	750888	1997340
1837.5	2800	0	FALSE		750838	1997340
1837.5	2837.5	1	TRUE		750875	1997340
1837.5	2875	0	FALSE		750913	1997340
1837.5	2875	0	FALSE	Mottled soils.	750913	1997340
1850	2775	0	FALSE		750813	1997352
1850	2800	1	FALSE	Historic disturbance	750838	1997352
1850	2825	1	FALSE		750863	1997352
1850	2836	1	TRUE		750874	1997352
1850	2850	1	TRUE		750888	1997352
1850	2875	0	FALSE		750913	1997352
1850	3175	0	FALSE		751213	1997352
1853	2845	1	TRUE	Surface collection only	750883	1997355
1862.5	2825	0	FALSE		750863	1997365
1862.5	3175	0	FALSE		751213	1997365
1875	2775	0	FALSE		750813	1997377
1875	2800	0	FALSE		750838	1997377
1875	2825	0	FALSE		750863	1997377
1875	2850	0	FALSE		750888	1997377
1875	2875	0	FALSE		750913	1997377
1875	3050	0	FALSE	Slope	751088	1997377
1875	3075	0	FALSE	In drainage	751113	1997377
1875	3125	0	FALSE		751163	1997377
1875	3175	0	FALSE	Fill. Gravel	751213	1997377
1900	2725	0	FALSE		750763	1997402
1900	2750	0	FALSE	Steep slope	750788	1997402
1900	2775	0	FALSE		750813	1997402
1900	2800	1	TRUE		750838	1997402
1900	2825	0	FALSE	Auger in bottom of unit	750863	1997402
1900	2850	0	FALSE		750888	1997402
1900	2875	0	FALSE		750913	1997402
1900	3050	0	FALSE	Area artificially	751088	1997402
1900	3075	0	FALSE		751113	1997402
1900	3100	0	FALSE	JU1-GPS verified.	751138	1997402
1900	3125	0	FALSE		751163	1997402

Table B-1. continued

Northing	Easting	Pos/Neg	Prehist	Comment	X	Y
1900	3150	0	FALSE	Construction of PR-10	751188	1997402
1900	3175	1	TRUE		751213	1997402
1900	3200	0	FALSE	Graded trail	751238	1997402
1900	3400	0	FALSE		751438	1997402
1925	2725	0	FALSE		750763	1997427
1925	2725	0	FALSE	Area scraped	750763	1997427
1925	2750	0	FALSE		750788	1997427
1925	2775	0	FALSE		750813	1997427
1925	2800	0	FALSE		750838	1997427
1925	2825	0	FALSE	Land Modification.	750863	1997427
1925	2850	0	FALSE	Land Modification.	750888	1997427
1925	3025	0	FALSE	Power pole	751063	1997427
1925	3050	0	FALSE	Bedrock @ the surface	751088	1997427
1925	3075	0	FALSE		751113	1997427
1925	3150	0	FALSE	Fill from construction	751188	1997427
1925	3175	0	FALSE		751213	1997427
1950	2725	0	FALSE	Judgmental near test unit	750763	1997452
1950	2750	0	FALSE		750788	1997452
1950	2775	0	FALSE	Unit in drainage.	750813	1997452
1950	2800	0	FALSE		750838	1997452
1950	2825	0	FALSE	Modern trash throughout t	750863	1997452
1950	2850	0	FALSE	Land modification.	750888	1997452
1950	3000	0	FALSE		751038	1997452
1950	3075	0	FALSE		751113	1997452
1950	3175	0	FALSE		751213	1997452
1975	2725	0	FALSE		750763	1997477
1975	2750	0	FALSE		750788	1997477
1975	2775	0	FALSE	Historic building remain	750813	1997477
1975	2800	0	FALSE	Bedrock near surface	750838	1997477
1975	2825	0	FALSE		750863	1997477
2000	2725	0	FALSE		750763	1997502
2000	2750	0	FALSE	Steep slope	750788	1997502
2000	2775	0	FALSE	Steep slope	750813	1997502
2000	2800	0	FALSE		750838	1997502
2025	2725	0	FALSE		750763	1997527
2025	2750	0	FALSE	Boulders	750788	1997527
2025	2775	0	FALSE	Steep slope	750813	1997527
2050	2412.5	0	FALSE	Area leveled?	750450	1997552
2050	2425	0	FALSE	Area leveled?	750463	1997552
2050	2437.5	0	FALSE	Area leveled?	750475	1997552
2062.5	2412.5	0	FALSE	Area leveled?	750450	1997565
2062.5	2425	0	FALSE	Area leveled? Bedrock	750463	1997565
2062.5	2437.5	0	FALSE	Area leveled?	750475	1997565
2062.5	2450	0	FALSE	Area leveled?	750488	1997565

Table B-1. continued

Northing	Easting	Pos/Neg	Prehist	Comment	X	Y
2075	2412.5	0	FALSE	Area leveled?	750450	1997577
2075	2425	0	FALSE	Area leveled?	750463	1997577
2075	2437.5	0	FALSE	Area leveled? Bedrock	750475	1997577
2075	2450	0	FALSE	Area leveled?	750488	1997577
2075	2725	0	FALSE	Steep slope	750763	1997577
2075	2750	0	FALSE		750788	1997577
2087.5	2412.5	0	FALSE	Area leveled?	750450	1997590
2087.5	2425	0	FALSE	Area leveled?	750463	1997590
2087.5	2437.5	0	FALSE		750475	1997590
2087.5	2450	0	FALSE		750488	1997590
2100	2412.5	1	TRUE	Area leveled?	750450	1997602
2100	2425	1	TRUE	Area leveled?	750463	1997602
2100	2437.5	1	TRUE		750475	1997602
2100	2450	0	FALSE	Area leveled?	750488	1997602
2100	2462.5	0	FALSE		750500	1997602
2100	3550	0	FALSE		751588	1997602
2112.5	2412.5	0	FALSE		750450	1997615
2112.5	2425	1	TRUE	Area leveled?	750463	1997615
2112.5	2437.5	1	TRUE		750475	1997615
2112.5	2450	0	FALSE	Boulders	750488	1997615
2150	2725	0	FALSE		750763	1997652
2150	2750	0	FALSE		750788	1997652
2150	2775	0	FALSE		750813	1997652
2150	2800	0	FALSE	Steep slope	750838	1997652
2175	2700	1	TRUE		750738	1997677
2175	2725	1	TRUE		750763	1997677
2175	2750	1	TRUE		750788	1997677
2175	2775	0	FALSE	Bedrock @ 40cm	750813	1997677
2175	2800	0	FALSE	Steep slope	750838	1997677
2175	3200	0	FALSE	Auger in bottom of unit	751238	1997677
2187.5	3200	0	FALSE	Rubble and trash throughout	751238	1997690
2200	2675	1	TRUE		750713	1997702
2200	2700	1	TRUE		750738	1997702
2200	2725	1	TRUE		750763	1997702
2200	2750	1	TRUE		750788	1997702
2200	2775	0	FALSE	Large boulder 10 m N	750813	1997677
2200	2800	0	FALSE	Steep slope	750838	1997702
2212.5	2675	1	TRUE		750713	1997715
2212.5	2712.5	0	FALSE		750750	1997714
2220	2662.5	1	TRUE		750700	1997722
2225	2650	1	TRUE		750688	1997727
2225	2657.25	1	TRUE		750695	1997727
2225	2662.5	1	TRUE		750700	1997727
2225	2675	1	TRUE		750713	1997727

Table B-1. continued

Northing	Easting	Pos/Neg	Prehist	Comment	X	Y
2225	2687.5	1	FALSE		750725	1997727
2225	2700	1	TRUE		750738	1997727
2225	2725	1	FALSE		750763	1997727
2225	2750	0	FALSE		750788	1997727
2225	2775	0	FALSE	Unit follows base of slop	750813	1997727
2225	2800	0	FALSE		750838	1997727
2226	2657.5	1	TRUE	CS2 located 30 CM. north	750695	1997728
2237.5	2675	1	TRUE		750713	1997740
2240	2706.5	1	TRUE		750744	1997742
2245	2690	1	TRUE		750728	1997747
2245	2705	1	TRUE		750743	1997747
2245	2709.5	1	TRUE		750748	1997747
2250	2625	0	FALSE	In drainage	750663	1997752
2250	2640	0	FALSE		750678	1997752
2250	2650	0	FALSE		750688	1997752
2250	2662.5	0	FALSE		750700	1997752
2250	2675	1	TRUE		750713	1997752
2250	2687.5	1	TRUE		750738	1997749
2250	2700	1	TRUE		750738	1997752
2250	2712.5	1	TRUE		750750	1997752
2250	2725	1	TRUE		750763	1997752
2250	2750	0	FALSE	Large boulder to the S	750788	1997727
2250	2775	0	FALSE		750813	1997752
2252	2705	1	TRUE		750743	1997755
2262	2662.5	1	TRUE		750700	1997765
2275	2600	0	FALSE	In drainage	750638	1997777
2275	2625	1	TRUE	Rocks encountered @ 40cm	750663	1997777
2275	2650	0	FALSE		750688	1997777
2275	2675	0	FALSE		750713	1997777
2275	2700	1	TRUE		750738	1997777
2275	2725	0	FALSE		750763	1997777
2275	2750	0	FALSE		750788	1997777
2275	2775	0	FALSE		750813	1997777
2275	2800	0	FALSE		750838	1997777
2300	2650	1	TRUE	Old foundation to the south	750688	1997802
2300	2675	1	TRUE		750713	1997802
2300	2700	0	FALSE	Bedrock encountered @ 50	750738	1997802
2300	2725	0	FALSE	In drainage	750763	1997802
2300	2750	0	FALSE	Hard rocky soils	750788	1997802
2325	2575	0	FALSE		750613	1997827
2325	2600	0	FALSE		750638	1997827
2325	2625	0	FALSE		750663	1997827
2325	2650	0	FALSE	Bedrock @ 40cm	750688	1997827
2325	2675	0	FALSE		750713	1997827

Table B-1. continued

Northing	Easting	Pos/Neg	Prehist	Comment	X	Y
2325	2700	0	FALSE		750738	1997827
2325	2725	0	FALSE		750763	1997827
2325	2750	0	FALSE		750788	1997827
2325	2750	0	FALSE	In drainage	750788	1997827
2337.5	2562.4	1	TRUE	CS-1 located 10 cm west	750600	1997840
2337.5	2562.5	1	TRUE		750600	1997840
2337.5	2575	1	TRUE		750613	1997840
2337.5	2600	1	TRUE		750638	1997840
2350	2562.5	1	TRUE		750600	1997852
2350	2575	0	FALSE		750613	1997852
2350	2600	0	FALSE		750638	1997852
2350	2625	0	FALSE		750663	1997852
2350	2625	0	FALSE		750663	1997852
2350	2650	0	FALSE		750688	1997852
2350	2675	0	FALSE		750713	1997852
2350	2750	0	FALSE	Rocks @ 40 cm	750788	1997852
2375	2537.5	0	FALSE		750575	1997877
2375	2575	0	FALSE		750613	1997877
2375	2575	0	FALSE		750613	1997877
2400	2525	0	FALSE		750563	1997902
2400	2575	0	FALSE		750613	1997902
2400	2750	0	FALSE		750788	1997902
2425	2550	0	FALSE		750588	1997927
2425	2575	0	FALSE		750613	1997927
2450	2550	0	FALSE		750588	1997952
2450	2575	0	FALSE		750613	1997952
2475	2550	0	FALSE		750588	1997977
2475	2575	0	FALSE		750613	1997977
2475	3700	0	FALSE		751738	1997977
2475	3725	0	FALSE	Auger in bottom of unit	751763	1997977
2500	2550	0	FALSE		750588	1998002
2500	2575	0	FALSE		750613	1998002
2500	3700	0	FALSE	Area has been scraped	751738	1998002
2500	3725	1	TRUE	Bedrock near surface	751763	1998002
2500	3750	0	FALSE	Area has been scraped	751788	1998002
2500	3800	0	FALSE		751838	1998002
2525	2550	0	FALSE		750588	1998027
2525	2575	0	FALSE		750613	1998027
2525	3725	0	FALSE		751763	1998027
2525	3725	0	FALSE	Area has been scraped	751763	1998027
2525	3775	0	FALSE		751813	1998027
2525	3800	0	FALSE	Area has been scraped	751838	1998027
2550	2550	0	FALSE		750588	1998052
2550	2575	0	FALSE		750613	1998052

Table B-1. continued

Northing	Easting	Pos/Neg	Prehist	Comment	X	Y
2550	3725	0	FALSE		751763	1998052
2550	3775	0	FALSE	Area has been scraped	751813	1998052
2550	3800	0	FALSE		751838	1998052
2550	3850	0	FALSE		751888	1998052
2575	2550	0	FALSE		750588	1998077
2575	2575	0	FALSE		750613	1998077
2575	3775	0	FALSE		751813	1998077
2575	3800	0	FALSE		751838	1998077
2575	3825	0	FALSE		751863	1998077
2575	3850	0	FALSE	Modern trash in first 10cm	751888	1998077
2600	2550	0	FALSE		750588	1998102
2600	2575	0	FALSE		750613	1998102
2600	3700	0	FALSE	Push pile to the W	751738	1998102
2600	3725	0	FALSE		751763	1998102
2600	3750	0	FALSE	Eroding bedrock in unit	751788	1998102
2600	3800	0	FALSE		751838	1998102
2600	3850	1	FALSE		751888	1998102
2625	2550	0	FALSE		750588	1998127
2625	2575	0	FALSE		750613	1998127
2625	3700	0	FALSE	Area has been scraped	751738	1998127
2625	3725	1	TRUE		751763	1998127
2625	3750	0	FALSE		751788	1998127
2625	3825	0	FALSE		751863	1998127
2625	3850	0	FALSE		751888	1998127
2650	1075	0	FALSE		749113	1998152
2650	1100	1	FALSE		749138	1998152
2650	1125	0	FALSE	Berm/push pile	749163	1998152
2650	2500	0	FALSE		750538	1998152
2650	2512.5	0	FALSE		750550	1998152
2650	2525	0	FALSE		750563	1998152
2650	2550	1	TRUE		750588	1998152
2650	2575	0	FALSE		750613	1998152
2650	3675	0	FALSE	Area has been scraped	751713	1998152
2650	3700	1	TRUE	Trail 1 m N	751738	1998152
2650	3725	0	FALSE		751763	1998152
2650	3750	0	FALSE		751788	1998152
2662.5	2512.5	0	FALSE		750550	1998165
2662.5	2525	1	TRUE		750563	1998164
2662.5	2537.5	0	FALSE		750575	1998165
2675	1075	0	FALSE	Brick fragments	749113	1998177
2675	1100	1	TRUE		749138	1998177
2675	1120	1	FALSE	Brick fragments	749158	1998177
2675	1125	1	FALSE	Brick fragments	749163	1998177
2675	2475	0	FALSE	Slope to the west	750513	1998177

Table B-1. continued

Northing	Easting	Pos/Neg	Prehist	Comment	X	Y
2675	2500	1	TRUE		750538	1998177
2675	2512.5	1	TRUE		750550	1998177
2675	2525	0	FALSE		750563	1998177
2675	2537.5	1	TRUE		750575	1998177
2675	2550	1	TRUE		750588	1998177
2675	2575	0	FALSE		750613	1998177
2675	3700	0	FALSE	Pasture	751738	1998177
2675	3725	0	FALSE		751763	1998177
2675	3775	0	FALSE	Area has been scraped	751813	1998177
2687.5	2512.5	1	TRUE	CS-4	750550	1998190
2687.5	2518	1	TRUE		750555	1998190
2687.5	2525	1	TRUE		750563	1998190
2687.5	2537.5	1	TRUE		750575	1998190
2687.85	2512.5	1	TRUE		750550	1998190
2700	1100	0	FALSE	Bricks and wall fall	749138	1998202
2700	1125	1	FALSE	Brick fragments	749163	1998202
2700	2475	0	FALSE	Slope to the W	750513	1998202
2700	2500	1	TRUE		750538	1998202
2700	2512.5	1	TRUE		750550	1998202
2700	2525	1	TRUE		750563	1998202
2700	2537.5	1	TRUE		750575	1998202
2700	2550	1	TRUE		750588	1998202
2700	2575	0	FALSE		750613	1998202
2703	2512.5	1	TRUE	CS-3	750550	1998205
2712.5	2512.5	1	TRUE		750550	1998215
2712.5	2525	1	TRUE		750563	1998215
2712.5	2537.5	1	TRUE		750576	1998215
2720	2555	1	TRUE		750593	1998222
2722	2555	1	TRUE	CS-5	750593	1998225
2725	1075	0	FALSE		749113	1998227
2725	1100	1	TRUE		749138	1998227
2725	1125	0	FALSE		749163	1998227
2725	2475	0	FALSE	Steep slope	750513	1998227
2725	2500	1	TRUE		750538	1998227
2725	2512.5	1	TRUE		750550	1998227
2725	2525	0	FALSE		750563	1998227
2725	2537.5	1	TRUE		750575	1998227
2725	2550	1	TRUE		750588	1998227
2725	2575	0	FALSE		750613	1998227
2737.5	2512.5	1	TRUE		750550	1998240
2737.5	2525	1	TRUE		750563	1998240
2737.5	2537.5	1	TRUE		750575	1998240
2750	1075	0	FALSE		749113	1998252
2750	1100	1	TRUE	Full of bricks.	749138	1998252

Table B-1. continued

Northing	Easting	Pos/Neg	Prehist	Comment	X	Y
2750	1125	0	FALSE		749163	1998252
2750	2475	0	FALSE		750513	1998252
2750	2500	1	TRUE		750538	1998252
2750	2512.5	0	FALSE		750550	1998252
2750	2525	0	FALSE		750563	1998252
2750	2537.5	0	FALSE		750575	1998252
2750	2550	1	TRUE		750588	1998252
2750	2575	1	TRUE		750613	1998252
2750	2600	0	FALSE		750638	1998252
2762.5	2512.5	1	TRUE		750550	1998265
2762.5	2525	1	TRUE		750563	1998265
2762.5	2537.5	0	FALSE		750575	1998265
2775	2500	0	FALSE		750538	1998277
2775	2512.5	0	FALSE		750551	1998277
2775	2525	0	FALSE		750563	1998277
2775	2550	1	TRUE		750588	1998277
2775	2575	0	FALSE		750613	1998277
2775	2575	0	FALSE		750613	1998277
2775	4250	0	FALSE		752288	1998277
2800	2550	0	FALSE		750588	1998302
2850	3625	0	FALSE		751663	1998352
2875	900	0	FALSE	In drainage.	748938	1998377
2875	950	0	FALSE	In drainage	748988	1998377
2875	1000	0	FALSE	In drainage	749038	1998377
2875	1025	0	FALSE	In drainage	749063	1998377
2900	950	0	FALSE		748988	1998402
2900	1025	0	FALSE	In river	749063	1998402
2925	875	0	FALSE	On slope.	748913	1998427
2925	900	0	FALSE	In drainage	748938	1998427
2925	925	0	FALSE	In drainage	748963	1998427
2925	950	1	FALSE	Slope	748988	1998427
2925	975	0	FALSE		749013	1998427
2925	1000	1	FALSE	Bedrock near surface.	749038	1998427
2925	1025	0	FALSE		749063	1998427
2950	875	0	FALSE	Slope.	748913	1998452
2950	925	0	FALSE	Bedrock near surface.	748963	1998452
2950	950	1	TRUE		748988	1998452
2950	975	0	FALSE		749013	1998452
2950	1000	0	FALSE		749038	1998452
2950	1025	1	FALSE	Modern trash in unit	749063	1998452
2950	1050	0	FALSE	Berm/push pile	749088	1998452
2950	1100	0	FALSE		749138	1998452
2975	875	0	FALSE		748913	1998477
2975	900	0	FALSE		748938	1998477

Table B-1. continued

Northing	Easting	Pos/Neg	Prehist	Comment	X	Y
2975	925	0	FALSE	Bedrock near surface.	748963	1998477
2975	950	0	FALSE		748988	1998477
2975	975	0	FALSE		749013	1998477
2975	1000	1	FALSE		749038	1998477
2975	1025	0	FALSE		749063	1998477
3000	875	0	FALSE	Slope	748913	1998502
3000	900	0	FALSE		748938	1998502
3000	925	0	FALSE		748963	1998502
3000	950	0	FALSE		748988	1998502
3000	975	0	FALSE		749013	1998502
3000	1000	0	FALSE		749038	1998502
3000	1025	0	FALSE		749063	1998502
3025	925	0	FALSE	S of fence line.	748963	1998527
3025	950	0	FALSE		748988	1998527
3025	975	0	FALSE	Eroding parent material	749013	1998527
3025	1000	0	FALSE		749038	1998527
3025	1025	0	FALSE		749063	1998527
3050	875	0	FALSE	Slope	748913	1998552
3050	900	0	FALSE		748938	1998552
3050	925	0	FALSE		748963	1998552
3050	950	0	FALSE		748988	1998552
3050	975	0	FALSE		749013	1998552
3050	1000	0	FALSE		749038	1998552
3050	1025	0	FALSE		749063	1998552
3050	1050	0	FALSE		749088	1998552
3075	925	0	FALSE		748963	1998577
3075	950	0	FALSE		748988	1998577
3075	975	0	FALSE		749013	1998577
3075	1000	1	FALSE	Adjacent to a trail/road	749038	1998577
3075	1025	0	FALSE		749063	1998577
3075	1037.5	0	FALSE		749075	1998577
3075	1050	0	FALSE		749088	1998577
3087.5	1012.5	0	FALSE	Building materials	749050	1998590
3100	875	0	FALSE	Slope	748913	1998602
3100	900	0	FALSE	Eroding bedrock	748938	1998602
3100	925	0	FALSE		748963	1998602
3100	950	0	FALSE	Dense gravel pockets	748988	1998602
3100	975	0	FALSE	Bedrock near surface.	749013	1998602
3100	1000	0	FALSE		749038	1998602
3100	1025	1	TRUE	Augered @ 80 cmbs	749063	1998602
3100	1037.5	1	TRUE		749075	1998602
3100	1050	1	TRUE		749088	1998602
3112.5	1000	0	FALSE		749038	1998615
3125	950	0	FALSE		748988	1998627
3125	975	0	FALSE		749013	1998627

Table B-1. continued

Northing	Easting	Pos/Neg	Prehist	Comment	X	Y
3125	1000	0	FALSE		749038	1998627
3125	1025	1	TRUE		749063	1998627
3125	1037.5	1	TRUE		749075	1998627
3150	875	0	FALSE		748913	1998652
3150	900	0	FALSE		748938	1998652
3150	950	0	FALSE		748988	1998652
3150	975	0	FALSE		749013	1998652
3150	1000	0	FALSE		749038	1998652
3150	1025	0	FALSE		749063	1998652
3155	950	0	FALSE		748988	1998657
3175	975	0	FALSE		749013	1998677
3175	1000	1	FALSE		749038	1998677
3200	1000	0	FALSE		749038	1998702
3400	2550	0	FALSE		750588	1998902
3400	2600	0	FALSE		750638	1998902
3475	2425	0	FALSE		750463	1998977
3500	2550	0	FALSE		750588	1999002
3600	2400	0	FALSE		750438	1999102
3800	4245	0	FALSE	Basketball court	752283	1999302
3805	4215	0	FALSE		752253	1999307
3805	4220	1	TRUE	Adjacent to abandoned school	752258	1999307
3820	4215	0	FALSE	Well and water pump	752253	1999322
3820	4220	1	TRUE		752258	1999322
3820	4225	1	TRUE		752263	1999322
3820	4245	1	TRUE	Adjacent to abandoned school	752283	1999322
3820	4255	1	TRUE		752293	1999322
3825	4245	0	FALSE		752283	1999327
3830	4245	1	TRUE		752283	1999332
3835	4210	0	FALSE		752248	1999337
3835	4220	1	TRUE	Adjacent to abandoned school	752258	1999337
3835	4230	0	FALSE		752268	1999337
3835	4245	0	FALSE		752283	1999337

APPENDIX C
FIELD SPECIMEN LOG

This appendix provides the field specimen log for the artifacts recovered during the TASP. Due to formatting limitations, the columns of the log are abbreviated. Columns for each row in the table are:

- FS: Unique Field Specimen Number identifying provenience.
- SITE: Site specific number.
- NORTH: Arbitrary Northing Coordinate.
- EAST: Arbitrary Easting Coordinate.
- SURFACE COLLECT: Indicates whether or not surface collection was made that that location.
- LVL: Level at which the material was collected.
- TOP DPT(CM): Top depth of level cmbs.
- BOTTOM DPT (CM): Bottom depth of level cmbs.
- POT (CT): Count of pottery sherds collected.
- POT (WT): Weight of sherds in grams.
- RESID (CT): Count of sherds under 1 cm collected.
- RESID (WT): Weight of sherds under 1 cm collected grams.
- LITHIC (CT): Count of lithics collected.
- LITHIC (WT): Weight of lithics collected in grams.
- SHELL (CT): Count of shell collected.*
- SHELL (WT): Weight of shell collected* in grams.
- BONE (CT): Count of bone collected.*
- BONE (WT) Weight of bone collected.*

* Analysis of material collected from column samples in progress DuChemin n.d.

Table C-1. Field Specimen Log

FS	Site PO-	North	East	Surface Collect	Lvl.	Top DPT. (cm)	Bot. DPT (cm)	Pot ct	Pot wt	Resid. ct	Resid. wt	Lithic ct	Lithic wt	Shell ct	Shell wt	Bone ct	Bone wt
1	52	1825	2840	TRUE	1	0	0	0	0	0	0	0	0	24	448	0	0
2	52	1825	2837.5	TRUE	1	0	0	0	0	0	0	0	0	46	628	0	0
4	52	1820	2837.5	TRUE	1	0	0	0	0	0	0	2	218	0	0	0	0
5	52	1825	2837.5	TRUE	1	0	0	0	0	0	0	2	500	0	0	0	0
9	52	1825	2837.5	FALSE	1	0	20	0	0	0	0	0	0	24	15.5	0	0
10	52	1825	2840	FALSE	2	20	40	0	0	0	0	0	0	13	10.8	0	0
11	52	1825	2837.5	FALSE	2	20	40	3	12.3	0	0	0	0	0	0	0	0
12	52	1820	2837.5	FALSE	2	20	40	0	0	0	0	5	10	0	0	0	0
13	52	1825	2837.5	FALSE	3	40	60	1	1.7	0	0	0	0	0	0	0	0
14	52	1825	2837.5	FALSE	3	40	60	1	2.1	0	0	1	12	0	0	0	0
16	52	1837.5	2837.5	FALSE	1	0	20	2	7.5	0	0	0	0	0	0	0	0
18	52	1837.5	2837.5	FALSE	3	40	60	1	1.7	0	0	1	21	0	0	0	0
22	IF	650	4300	FALSE	1	0	20	1	5	0	0	0	0	0	0	0	0
23	IF	650	4150	FALSE	1	0	20	0	0	0	0	1	385	0	0	0	0
25	IF	550	4250	FALSE	1	0	20	1	1.9	0	0	2	3	0	0	0	0
30	2	1825	3175	TRUE	1	0	0	0	0	0	0	0	0	1	45.6	0	0
31	42	2337.5	2562.4	TRUE	1	0	0	0	0	0	0	0	0	13	294	0	0
32	42	2337.5	2562.5	TRUE	1	0	0	1	1.2	0	0	0	0	10	30.5	0	0
33	42	2350	2562.5	TRUE	1	0	0	0	0	0	0	0	0	13	27.1	0	0
34	53	560	4005	TRUE	1	0	0	6	63.6	0	0	0	0	0	0	0	0
35	53	562	4005	FALSE	1	0	20	1	3.3	0	0	0	0	0	0	0	0
36	IF	975	3500	TRUE	1	0	0	2	17.4	1	1.4	0	0	0	0	0	0
37	43	2720	2555	FALSE	1	0	20	7	39.1	0	0	0	0	0	0	0	0
38	53	562	4005	TRUE	1	0	0	2	9.8	0	0	0	0	0	0	0	0
39	53	580	4000	TRUE	1	0	0	0	0	0	0	1	2	0	0	0	0
42	47	3125	1037.5	TRUE	1	0	20	2	40.2	0	0	1	10	0	0	0	0
44	42	2200	2675	FALSE	1	0	20	4	33.5	0	0	0	0	35	9.3	0	0

Table C-1. continued

FS	Site PO-	North	East	Surface Collect	Lvl.	Top DPT. (cm)	Bot. DPT (cm)	Pot ct	Pot wt	Resid. ct	Resid. wt	Lithic ct	Lithic wt	Shell ct	Shell wt	Bone ct	Bone wt
46	42	2225	2675	FALSE	1	0	20	8	182.2	2	1.9	0	0	0	0	0	0
47	42	2225	2675	FALSE	2	20	40	2	19.8	0	0	0	0	0	0	0	0
48	42	2250	2675	FALSE	1	0	20	6	95.8	4	3	0	0	0	0	0	0
49	42	2250	2675	FALSE	2	20	40	1	2.7	0	0	0	0	0	0	0	0
50	42	2175	2700	FALSE	1	0	20	2	13.3	0	0	0	0	0	0	0	0
51	42	2200	2700	FALSE	2	20	40	1	2.7	0	0	0	0	0	0	0	0
52	42	2200	2725	FALSE	1	0	20	6	26.2	2	1.5	0	0	0	0	0	0
53	42	2225	2700	FALSE	1	0	20	4	27.1	1	1.3	0	0	0	0	0	0
54	42	2250	2700	FALSE	1	0	20	11	61.8	4	2	6	49	0	0	0	0
55	42	2275	2700	FALSE	1	0	20	2	4.5	1	0.7	1	6	0	0	0	0
56	42	2252	2705	FALSE	1	0	20	9	31	0	0	2	2	0	0	0	0
57	42	2252	2705	FALSE	2	20	40	4	19.3	2	0.5	0	0	0	0	0	0
58	42	2250	2712.5	FALSE	1	0	20	4	16.4	0	0	0	0	0	0	0	0
59	42	2250	2712.5	FALSE	2	20	40	1	3.7	0	0	1	5	0	0	0	0
60	42	2245	2709.5	FALSE	1	0	20	1	5.6	1	0.5	0	0	0	0	0	0
61	42	2245	2709.5	FALSE	2	20	40	0	0	0	0	1	1	0	0	0	0
62	42	2240	2706.5	FALSE	1	0	20	2	7.2	0	0	1	22	0	0	0	0
63	42	2245	2709.5	TRUE	1	0	0	2	8.7	0	0	1	223	0	0	0	0
65	42	2245	2709.5	TRUE	1	0	0	5	112.9	0	0	1	410	0	0	0	0
66	42	2252	2705	TRUE	1	0	0	2	19.4	0	0	1	36	0	0	0	0
67	42	2337.5	2562.5	FALSE	1	0	20	0	0	0	0	0	0	30	3	0	0
68	42	2337.5	2562.5	FALSE	2	20	40	0	0	0	0	0	0	0	0	10	4
69	42	2337.5	2562.5	FALSE	1	0	20	24	132.3	15	18.2	4	68	1539	1820	1	2
70	42	2337.5	2562.5	FALSE	2	20	40	15	79.6	3	2	4	22	302	343	0	0
71	42	2350	2562.5	FALSE	1	0	20	5	23.5	0	0	0	0	103	114	0	0
72	42	2350	2562.5	FALSE	2	20	40	5	28.8	0	0	0	0	116	120	0	0
73	42	2337.5	2562.5	FALSE	3	40	60	0	0	0	0	0	0	3	2.3	0	0

Table C-1. continued

FS	Site PO-	North	East	Surface Collect	Lvl.	Top DPT. (cm)	Bot. DPT (cm)	Pot ct	Pot wt	Resid. ct	Resid. wt	Lithic ct	Lithic wt	Shell ct	Shell wt	Bone ct	Bone wt
74	42	2262	2662.5	FALSE	1	0	20	8	34.3	4	1.5	0	0	59	73	0	0
75	42	2225	2657.3	TRUE	1	0	0	5	72.3	0	0	1	69	0	0	0	0
76	42	2225	2657.3	FALSE	1	0	20	110	392.6	0	0	6	52	497	672	4	2
77	42	2225	2657.3	FALSE	2	20	40	4	55.7	1	0.5	0	0	26	18.7	0	0
78	42	2237.5	2675	FALSE	2	20	40	1	2.5	0	0	1	8	0	0	0	0
79	42	2237.5	2675	FALSE	3	40	60	0	0	3	2.5	0	0	0	0		
80	42	2212.5	2675	FALSE	1	0	20	5	17	0	0	0	0	0	0	0	0
81	42	2337.5	2575	FALSE	1	0	20	2	22.1	0	0	0	0	10	20	0	0
82	42	2337.5	2575	FALSE	2	20	40	0	0	0	0	0	0	6	3.5	0	0
83	42	2337.5	2575	FALSE	3	40	60	0	0	0	0	0	0	1	0.25	0	0
84	42	2300	2650	FALSE	1	0	20	1	4.1	0	0	0	0	1	0.3	0	0
85	42	2175	2725	FALSE	1	0	20	2	12.2	2	2	0	0	0	0	0	0
86	42	2175	2750	FALSE	1	0	20	7	24	2	2.5	2	2	0	0	0	0
87	42	2200	2750	FALSE	1	0	20	2	25.1	2	1.3	0	0	0	0	0	0
88	42	2250	2725	FALSE	2	20	40	1	1.7	0	0	0	0	0	0	0	0
89	42	2250	2725	FALSE	1	0	20	2	5.4	0	0	0	0	0	0	0	0
90	42	2225	2650	TRUE	1	0	0	0	0	0	0	0	0	14	386	0	0
91	42	2225	2650	FALSE	1	0	20	43	232.6	16	18.5	2	137	567	1318	1	1
92	42	2225	2650	FALSE	3	40	60	4	16.4	2	2.4	1	11	30	37.6	0	0
93	42	2225	2662.5	FALSE	1	0	20	1	3.2	0	0	0	0	0	0	0	0
94	42	2337.5	2562.5	TRUE	1	0	0	1	12.8	0	0	0	0	0	0	0	0
95	42	2337.5	2562.4	FALSE	1	10	20	0	0	0	0	0	0	1	40	0	0
96	42	2226	2657.5	FALSE	1	0	20	2	13.2	0	0	0	0	0	0	0	0
97	42	2225	2650	FALSE	2	20	40	10	43.6	6	2	0	0	460	310	0	0
98	42	2250	2687.5	FALSE	1	0	20	10	89	2	2.9	0	0	0	0	0	0
100	42	2275	2625	FALSE	1	0	20	0	0	0	0	3	9	0	0	0	0

Table C-1. continued

FS	Site PO-	North	East	Surface Collect	Lvl.	Top DPT. (cm)	Bot. DPT (cm)	Pot ct	Pot wt	Resid. ct	Resid. wt	Lithic ct	Lithic wt	Shell ct	Shell wt	Bone ct	Bone wt
101	42	2337.5	2600	FALSE	2	20	40	1	2.9	0	0	0	0	0	0	0	0
103	42	2300	2675	FALSE	1	0	20	0	0	0	0	1	39	0	0	0	0
107	52	1825	2850	FALSE	1	0	20	1	9.2	0	0	0	0	0	0	0	0
108	52	1825	2850	FALSE	2	20	40	3	20.2	3	3	0	0	0	0	0	0
109	52	1825	2850	FALSE	3	40	60	5	50.8	8	6	0	0	0	0	0	0
110	42	2337.5	2562.4	FALSE	1	0	10	0	0	0	0	0	0	421	1270	0	0
111	42	2337.5	2562.4	FALSE	1	10	20	9	33.1	5	6	0	0	549	1092	0	0
112	42	2337.5	2562.4	FALSE	2	20	30	13	61.7	8	7	2	11	159	133	0	0
113	42	2226	2657.5	FALSE	1	0	10	41	171.1	3	2	0	0	147	201	0	0
114	42	2226	2657.5	FALSE	1	10	20	41	148.2	16	15	0	0	196	212	0	0
115	42	2226	2657.5	FALSE	2	20	30	46	296.9	17	15	7	17	301	422	0	0
116	42	2226	2657.5	FALSE	2	30	36	10	93.7	4	4	1	5	91	69	0	0
117	52	1835	2825	TRUE	1	0	0	0	0	0	0	0	0	1	109	0	0
118	52	1835	2825	FALSE	1	0	20	3	20.3	0	0	0	0	101	236	0	0
119	52	1835	2825	FALSE	2	20	40	1	6.9	0	0	0	0	22	37.1	0	0
120	52	1835	2825	FALSE	3	40	60	0	0	0	0	0	0	11	19.2	0	0
121	52	1835	2825	FALSE	4	60	80	0	0	0	0	0	0	3	1	0	0
122	52	1853	2845	TRUE	1	0	0	5	29.4	0	0	0	0	91	296	0	0
123	52	1850	2836	FALSE	1	0	20	12	45.9	4	5	2	10	106	72.9	0	0
124	52	1850	2836	FALSE	2	20	40	0	0	0	0	0	0	7	6.2	0	0
125	52	1850	2850	FALSE	1	0	20	2	16.7	0	0	0	0	0	0	0	0
126	52	1805	2850	TRUE	1	0	0	0	0	0	0	0	0	6	6.2	0	0
129	52	1805	2837.5	TRUE	1	0	0	17	1268	0	0	13	3049	51	445	0	0
132	44	2100	2412.5	TRUE	1	0	0	0	0	0	0	0	0	1	45.4	0	0
133	44	2100	2425	FALSE	1	0	20	0	0	0	0	0	0	1	2.4	0	0
134	44	2100	2437.5	FALSE	2	20	40	0	0	0	0	0	0	4	2.1	0	0

Table C-1. continued

FS	Site PO-	North	East	Surface Collect	Lvl.	Top DPT. (cm)	Bot. DPT (cm)	Pot ct	Pot wt	Resid. ct	Resid. wt	Lithic ct	Lithic wt	Shell ct	Shell wt	Bone ct	Bone wt
135	44	2112.5	2437.5	FALSE	1	0	20	0	0	0	0	0	0	1	0.5	0	0
136	44	2100	2412.5	FALSE	2	20	40	0	0	0	0	0	0	1	0.2	0	0
137	44	2112.5	2425	FALSE	1	0	20	0	0	0	0	0	0	2	1	0	0
140	47	3100	1025	FALSE	1	0	20	6	33.1	5	3	0	0	0	0	0	0
141	47	3100	1025	FALSE	2	20	40	4	9.9	0	0	0	0	0	0	0	0
142	47	3100	1025	FALSE	3	40	60	13	57.3	14	10	0	0	0	0	0	0
143	47	3100	1025	FALSE	4	60	80	0	0	2	2	0	0	0	0	0	0
144	47	3100	1037.5	FALSE	1	0	20	1	2.5	0	0	0	0	0	0	0	0
145	47	3100	1050	FALSE	1	0	20	2	17.5	0	0	0	0	0	0	0	0
146	47	3125	1025	FALSE	1	0	20	4	22.6	0	0	1	2	0	0	0	0
147	53	560	3985	TRUE	1	0	0	0	0	0	0	0	0	87	117	0	0
148	53	560	3985	FALSE	1	0	20	0	0	0	0	0	0	75	189	1	3
149	53	560	3990	FALSE	1	0	20	1	1.6	0	0	0	0	0	0	0	0
150	53	560	3985	FALSE	2	20	40	0	0	0	0	0	0	16	30.2	0	0
152	53	560	4000	FALSE	1	0	20	4	13.1	0	0	1	5	13	4.1	0	0
153	53	560	4000	FALSE	2	20	40	1	5.6	2	2.3	0	0	8	5.7	0	0
154	53	560	4005	TRUE	1	0	0	0	0	0	0	0	0	4	8.5	0	0
155	53	560	4005	FALSE	1	0	20	1	13.2	0	0	0	0	0	0	0	0
156	53	562	3985	FALSE	3	20	30	3	89.6	0	0	0	0	0	0	0	0
157	50	1250	3262.5	TRUE	1	0	20	0	0	0	0	0	0	3	3	0	0
159	50	1250	3300	FALSE	1	0	20	3	25.3	0	0	0	0	0	0	0	0
160	50	1250	3312.5	FALSE	1	0	20	1	8.6	0	0	0	0	0	0	0	0
161	50	1250	3312.5	FALSE	2	20	40	3	14.4	0	0	0	0	0	0	0	0
162	50	1262.5	3300	FALSE	1	0	20	3	39.4	2	3	0	0	0	0	5	5
163	50	1262.5	3312.5	FALSE	1	0	20	2	29.7	0	0	0	0	0	0	0	0
164	50	1150	3300	FALSE	1	0	20	2	5.4	1	1.4	0	0	0	0	0	0

Table C-1. continued

FS	Site PO-	North	East	Surface Collect	Lvl.	Top DPT. (cm)	Bot. DPT (cm)	Pot ct	Pot wt	Resid. ct	Resid. wt	Lithic ct	Lithic wt	Shell ct	Shell wt	Bone ct	Bone wt
165	50	1251	3300	TRUE	1	0	0	2	83.1	0	0	0	0	0	0	0	0
166	52	1900	2800	FALSE	1	0	20	1	3.5	0	0	0	0	0	0	0	0
167	42	2226	2657.5	TRUE	1	0	0	0	0	0	0	1	635	0	0	0	0
168	50	1262.5	3300	TRUE	1	0	0	10	159.8	5	4.6	1	255	3	19.9	0	0
169	50	1300	3300	TRUE	1	0	0	17	1582	0	0	0	0	0	0	0	0
170	50	1150	3200	FALSE	2	20	40	0	0	0	0	1	2	0	0	0	0
171	50	1175	3225	FALSE	1	0	20	1	2.4	0	0	0	0	0	0	0	0
173	50	1175	3300	FALSE	2	20	40	0	0	0	0	0	0	0	0	1	1
174	50	1275	3300	FALSE	1	0	20	1	7.2	0	0	0	0	5	3	0	0
175	50	1275	3312.5	FALSE	1	0	20	1	12.3	0	0	0	0	0	0	5	5
176	50	1275	3312.5	FALSE	2	20	40	0	0	0	0	0	0	0	0	1	3
178	47	2950	950	FALSE	1	0	20	1	7.5	0	0	0	0	0	0	0	0
182	42	2220	2662.5	TRUE	1	0	0	4	6.9	0	0	0	0	0	0	0	0
183	42	2250	2712.5	TRUE	1	0	0	3	8.7	2	2	1	52	0	0	0	0
184	42	2245	2705	FALSE	1	0	10	10	41	0	0	0	0	0	0	0	0
185	42	2245	2705	FALSE	1	10	20	3	10.6	0	0	0	0	0	0	0	0
186	42	2245	2705	FALSE	2	10	20	5	11.7	0	0	0	0	0	0	0	0
187	42	2252	2705	TRUE	1	0	0	0	0	0	0	0	0	1	0.5	0	0
188	42	2245	2690	FALSE	1	0	20	2	7.1	0	0	0	0	0	0	0	0
189	42	2245	2690	FALSE	2	20	40	2	4.8	0	0	0	0	0	0	0	0
190	53	562	3985	FALSE	1	0	10	6	64.4	0	0	1	12	9	7	0	0
191	53	562	3985	FALSE	1	10	20	1	1	0	0	0	0	0	0	0	0
192	53	562	3985	FALSE	2	20	30	4	22.2	0	0	13	175	0	0	0	0
193	45	1712.5	3037.5	FALSE	1	0	20	4	9.6	2	1	1	58	94	67.7	0	0
194	45	1712.5	3037.5	FALSE	2	20	40	0	0	0	0	0	0	3	2.8	0	0
195	43	2703	2512.5	FALSE	2	20	40	1	4.1	0	0	0	0	1	0.1	0	0

Table C-1. continued

FS	Site PO-	North	East	Surface Collect	Lvl.	Top DPT. (cm)	Bot. DPT (cm)	Pot ct	Pot wt	Resid. ct	Resid. wt	Lithic ct	Lithic wt	Shell ct	Shell wt	Bone ct	Bone wt
196	43	2703	2512.5	FALSE	1	0	20	4	11.8	4	2	16	163	0	0	0	0
198	45	1687.5	3075	FALSE	3	40	60	1	10.1	0	0	0	0	0	0	0	0
199	45	1687.5	3075	FALSE	4	60	80	2	11.3	0	0	0	0	0	0	0	0
200	45	1687.5	3087.5	FALSE	1	0	20	1	2	0	0	0	0	2	8	0	0
201	43	2675	2500	FALSE	2	20	40	12	46.8	0	0	0	0	0	0	0	0
202	43	2700	2500	FALSE	1	0	20	8	26.7	0	0	0	0	0	0	0	0
203	43	2725	2500	FALSE	2	20	40	3	15.5	0	0	0	0	0	0	0	0
204	43	2725	2500	FALSE	3	40	60	2	5.1	0	0	0	0	0	0	0	0
205	43	2750	2500	FALSE	1	0	20	1	5.4	0	0	0	0	0	0	0	0
206	43	2712.5	2512.5	FALSE	1	0	20	17	100.4	0	0	1	8	3	1	0	0
207	43	2725	2512.5	FALSE	1	0	20	4	30.5	0	0	1	14	0	0	0	0
208	43	2737.5	2512.5	FALSE	1	0	20	2	13.3	0	0	0	0	0	0	0	0
209	43	2762.5	2512.5	FALSE	1	0	20	1	4.1	1	1	0	0	0	0	0	0
210	43	2762.5	2512.5	FALSE	3	40	60	3	11.1	0	0	0	0	0	0	0	0
211	43	2662.5	2525	FALSE	1	0	20	1	2.2	0	0	0	0	0	0	0	0
212	43	2687.5	2525	FALSE	1	0	20	9	73.3	4	6	0	0	0	0	0	0
213	43	2687.5	2525	FALSE	2	20	40	1	8.8	0	0	0	0	0	0	0	0
214	43	2700	2525	FALSE	1	0	20	3	10.4	0	0	0	0	0	0	0	0
215	43	2700	2525	FALSE	3	40	60	0	0	0	0	0	0	0	0	40	35
216	43	2712.5	2525	FALSE	1	0	20	19	82.9	5	7	1	8	0	0	0	0
217	43	2737.5	2525	FALSE	1	0	20	3	26.8	0	0	0	0	0	0	0	0
218	43	2737.5	2525	FALSE	2	20	40	4	33	0	0	0	0	0	0	0	0
219	43	2650	2550	FALSE	1	0	20	1	3.7	0	0	0	0	0	0	0	0
220	43	2675	2550	FALSE	1	0	20	15	97.3	1	1	0	0	8	16.3	0	0
221	43	2675	2550	FALSE	2	20	40	8	23.6	0	0	1	5	4	0.9	0	0
222	43	2700	2550	FALSE	1	0	20	24	122.8	7	10	7	129	2	0.4	0	0

Table C-1. continued

FS	Site PO-	North	East	Surface Collect	Lvl.	Top DPT. (cm)	Bot. DPT (cm)	Pot ct	Pot wt	Resid. ct	Resid. wt	Lithic ct	Lithic wt	Shell ct	Shell wt	Bone ct	Bone wt
223	43	2725	2550	FALSE	1	0	20	12	43.4	3	2	6	14	49	47	0	0
224	43	2750	2550	FALSE	1	0	20	1	4.7	0	0	2	6	0	0	0	0
225	43	2775	2550	FALSE	1	0	20	1	3	0	0	0	0	0	0	0	0
226	43	2750	2575	FALSE	1	0	20	1	1.8	0	0	1	1	0	0	0	0
227	43	2687.5	2518	FALSE	1	0	20	14	44	9	14	3	19	592	1344	0	0
228	43	2687.5	2518	FALSE	2	20	40	3	9.3	0	0	0	0	175	332	0	0
229	43	2675	2512.5	FALSE	1	0	20	14	91.2	4	4	0	0	27	27.2	0	0
230	43	2687.5	2512.5	FALSE	1	0	20	10	30.1	0	0	0	0	72	330	9	4
231	43	2700	2512.5	FALSE	1	0	20	17	49.5	11	15	4	4	623	1588	0	0
232	43	2675	2537.5	FALSE	1	0	20	10	86.5	0	0	0	0	0	0	0	0
233	43	2687.5	2537.5	FALSE	1	0	20	0	0	0	0	1	23	0	0	0	0
234	43	2700	2537.5	FALSE	1	0	20	5	14.3	0	0	0	0	0	0	0	0
235	43	2700	2537.5	FALSE	1	0	20	8	31.5	0	0	0	0	4	0.75	0	0
236	43	2712.5	2537.5	FALSE	1	0	20	5	33.1	3	2.1	0	0	0	0	0	0
237	43	2725	2537.5	FALSE	1	0	20	6	22.8	0	0	0	0	0	0	0	0
238	43	2737.5	2537.5	FALSE	1	0	20	7	31.4	3	3	0	0	0	0	0	0
239	43	2762.5	2525	FALSE	1	0	20	2	9.4	0	0	0	0	0	0	0	0
240	43	2762.5	2525	FALSE	2	20	40	1	3.5	0	0	0	0	0	0	0	0
241	43	2722	2555	FALSE	1	0	10	1	2.9	0	0	0	0	12	8.3	0	0
242	49	2625	3725	FALSE	2	20	40	2	25	0	0	0	0	0	0	0	0
243	49	2500	3725	FALSE	1	0	20	3	9	0	0	0	0	0	0	0	0
244	43	2703	2512.5	FALSE	1	0	10	47	126.5	9	6	5	14	489	1214	0	0
245	43	2703	2512.5	FALSE	1	10	20	27	136.1	17	10.8	0	0	745	1085	0	0
246	43	2703	2512.5	FALSE	2	10	20	23	143	20	13.5	1	2	729	1029	0	0
247	43	2703	2512.5	FALSE	2	30	40	4	9.7	4	2.9	0	0	132	256	0	0
250	49	2650	3700	FALSE	1	0	20	0	0	0	0	4	200	0	0	0	0

Table C-1. continued

FS	Site PO-	North	East	Surface Collect	Lvl.	Top DPT. (cm)	Bot. DPT (cm)	Pot ct	Pot wt	Resid. ct	Resid. wt	Lithic ct	Lithic wt	Shell ct	Shell wt	Bone ct	Bone wt
251	48	3820	4255	TRUE	1	0	0	5	28.3	0	0	0	0	0	0	0	0
252	48	3820	4225	FALSE	1	0	20	3	13.2	3	3	0	0	0	0	0	0
253	48	3820	4245	FALSE	1	0	20	14	48.3	0	0	11	39	0	0	0	0
254	48	3820	4245	FALSE	2	20	40	12	41	0	0	8	13	0	0	0	0
255	48	3830	4245	FALSE	2	20	40	1	24.2	0	0	0	0	0	0	0	0
256	48	3820	4220	FALSE	3	40	60	2	23.2	0	0	0	0	0	0	0	0
257	48	3835	4220	FALSE	1	0	20	2	20.9	1	1	0	0	0	0	0	0
258	48	3835	4220	FALSE	2	20	40	3	39	0	0	0	0	0	0	0	0
259	48	3835	4220	FALSE	3	40	60	4	6.8	1	1	0	0	0	0	0	0
260	48	3830	4245	FALSE	1	0	20	4	19.3	1	1	6	87	0	0	0	0
261	48	3805	4220	FALSE	2	20	40	4	47.4	0	0	1	6	0	0	0	0
262	48	3805	4220	FALSE	3	40	60	1	5.2	1	1	0	0	0	0	0	0
263	48	3820	4255	FALSE	1	0	20	9	80.2	1	1	8	371	0	0	0	0
264	48	3820	4255	FALSE	2	20	40	2	19.2	0	0	0	0	0	0	0	0
267	57	1150	5125	FALSE	1	0	20	1	4.5	0	0	0	0	0	0	0	0
272	54	2675	1100	FALSE	2	20	40	0	0	0	0	0	0	1	5.6	0	0
274	54	2725	1100	FALSE	1	0	20	1	3.6	0	0	0	0	0	0	0	0
275	54	2750	1100	FALSE	1	0	20	0	0	0	0	1	8	0	0	0	0
276	46	1525	1550	TRUE	1	0	0	3	23.5	0	0	0	0	1	3	2	13
277	46	1650	1525	TRUE	1	0	0	0	0	0	0	0	0	0	0	5	1
279	46	1500	1550	FALSE	1	0	20	0	0	0	0	0	0	1	1	1	1
282	51	0	0	TRUE	1	0	0	0	0	0	0	0	0	3	91.6	0	0
283	51	0	0	TRUE	1	0	0	59	406.8	0	0	0	0	59	185	0	0
285	2	1900	3175	FALSE	1	0	20	2	3.2	0	0	0	0	1	2.2	0	0
287	43	2687.9	2512.5	FALSE	1	0	10	14	42.9	24	13	5	13	0	0	0	0
288	43	2687.9	2512.5	FALSE	1	10	20	22	71.6	4	3	4	13	2510	2174	0	0
289	43	2687.9	2512.5	FALSE	3	20	30	7	23.4	4	4	5	6	825	738	0	0

Table C-1. continued

FS	Site PO-	North	East	Surface Collect	Lvl.	Top DPT. (cm)	Bot. DPT (cm)	Pot ct	Pot wt	Resid. ct	Resid. wt	Lithic ct	Lithic wt	Shell ct	Shell wt	Bone ct	Bone wt
290	43	2722	2555	FALSE	1	0	10	23	90	0	0	11	13	746	584	0	0
291	43	2722	2555	FALSE	1	10	20	29	133.5	15	11	5	4	248	518	0	0
292	43	2722	2555	FALSE	2	20	30	18	130.7	9	21	6	24	185	177	0	0
293	46	1500	1550	FALSE	2	20	40	0	0	0	0	0	0	1	0.1	0	0
294	46	1600	1475	FALSE	1	0	20	1	1.9	0	0	0	0	0	0	0	0
TOTAL								1340	10049.9	348	321.7	227	7827	14788	23693	86	80

APPENDIX D
ARTIFACT CATALOG

This appendix represents all prehistoric cultural material recovered during the Tibes Archaeological Project Survey. Columns for each row in the table are:

- FS: Unique Field Specimen Number identifying provenience.
- NORTH: Arbitrary Northing Coordinate.
- EAST: Arbitrary Easting Coordinate.
- LEVEL: Level at which the material was collected.
- MATERIAL: Artifact material class (*i.e.*, pottery, stone type, shell type)
- DEFINITION: Artifact type
- ct: Count of artifacts.
- wt: Weight artifacts.
- COMMENT: General comments regarding the artifact.

Table D-1. Artifact catalog

FS	North	East	Level	Material	Definition	ct	wt	Comment
4	1820.00	2837.50	1	Metavolcanic	Thinning Flake	1	17.3	Single Platform
4	1820.00	2837.50	1	Greenstone	Thinning Flake	1	200.7	Single Platform
5	1825.00	2837.50	1	Metavolcanic	Core	1	453.1	Single Platform
5	1825.00	2837.50	1	Metavolcanic	Thinning Flake	1	46.5	Retouched
11	1825	2837.5	2	Pottery	Indeterminate	1	3.5	
11	1825	2837.5	2	Pottery	Regular Body Sherd	1	6.3	
11	1825	2837.5	2	Pottery	Rim	1	2.5	
12	1820.00	2837.50	2	Metavolcanic	Shatter	2	3.7	
12	1820.00	2837.50	2	Metavolcanic	Shatter	3	6.2	
13	1825	2837.5	3	Pottery	Regular Body Sherd	1	1.7	
14	1825	2837.5	3	Pottery	Rim	1	2.1	
14	1825.00	2837.50	3	Metavolcanic	Bipolar Flake	1	11.8	
16	1837.5	2837.5	1	Pottery	Regular Body Sherd	2	7.5	
18	1837.5	2837.5	3	Pottery	Regular Body Sherd	1	1.7	
18	1837.50	2837.50	3	Greenstone	Thinning Flake	1	20.5	Single Platform
22	650	4300	1	Pottery	Regular Body Sherd	1	5	
23	650.00	4150.00	1	Metavolcanic	Core	1	384.3	Single Platform-Pyramidal
25	550	4250	1	Pottery	Regular Body Sherd	1	1.9	
25	550.00	4250.00	1	Chert	Shatter	2	2.9	
32	2337.5	2562.5	1	Pottery	Regular Body Sherd	1	1.2	
34	560	4005	1	Pottery	Base Convex	1	7.9	
34	560	4005	1	Pottery	Regular Body Sherd	4	41.1	
34	560	4005	1	Pottery	Rim	1	14.6	
35	562	4005	1	Pottery	Regular Body Sherd	1	3.3	
36	975	3500	1	Pottery	Regular Body Sherd	2	17.4	
37	2720	2555	1	Pottery	Base Flat	1	15.3	
37	2720	2555	1	Pottery	Regular Body Sherd	6	23.8	
38	562	4005	1	Pottery	Regular Body Sherd	1	1.6	
38	562	4005	1	Pottery	Shoulder OUT	1	8.2	
39	580.00	4000.00	1	Metavolcanic	Bipolar Flake	1	2.4	
42	3125	1037.5	1	Pottery	Buren	1	5.3	
42	3125	1037.5	1	Pottery	Regular Body Sherd	1	34.9	
42	3125.00	1037.50	1	Metavolcanic	Bipolar Flake	1	9.7	
44	2200	2675	1	Pottery	Base Flat	1	13.5	
44	2200	2675	1	Pottery	Regular Body Sherd	3	20	
46	2225	2675	1	Pottery	Regular Body Sherd	4	12.4	
46	2225	2675	1	Pottery	Rim	4	169.8	
47	2225	2675	2	Pottery	Regular Body Sherd	2	19.8	

Table D-1. continued

FS	North	East	Level	Material	Definition	ct	wt	Comment
48	2250	2675	1	Pottery	Regular Body Sherd	5	25.9	
48	2250	2675	1	Pottery	Rim	1	69.9	
49	2250	2675	2	Pottery	Regular Body Sherd	1	2.7	
50	2175	2700	1	Pottery	Regular Body Sherd	1	3.9	
50	2175	2700	1	Pottery	Shoulder OUT	1	9.4	
51	2200	2700	2	Pottery	Regular Body Sherd	1	2.7	
52	2200	2725	1	Pottery	Base Flat	1	11.2	
52	2200	2725	1	Pottery	Regular Body Sherd	4	12.5	
52	2200	2725	1	Pottery	Rim	1	2.5	
53	2225	2700	1	Pottery	Regular Body Sherd	4	27.1	
54	2250	2700	1	Pottery	Base Flat	1	10.2	
54	2250	2700	1	Pottery	Handle/strap indeterminate	1	2.7	
54	2250	2700	1	Pottery	Regular Body Sherd	5	13.3	
54	2250	2700	1	Pottery	Rim	4	35.6	
54	2250.00	2700.00	1	Metavolcanic	Thinning Flake	1	6.8	Single Platform
54	2250.00	2700.00	1	Metavolcanic	Thinning Flake	1	9.7	Collapsed Platform
54	2250.00	2700.00	1	Metavolcanic	Thinning Flake	1	6.7	Single Platform
54	2250.00	2700.00	1	Metavolcanic	Shatter	2	2.4	
54	2250.00	2700.00	1	Greenstone	Thinning Flake	1	23.1	Multiple Platforms
55	2275	2700	1	Pottery	Regular Body Sherd	2	4.5	
55	2275.00	2700.00	1	Metavolcanic	Thinning Flake	1	6.3	Single Platform
56	2252	2705	1	Pottery	Regular Body Sherd	8	29.3	
56	2252	2705	1	Pottery	Rim	1	1.7	
56	2252.00	2705.00	1	Greenstone	Shatter	2	1.7	
57	2252	2705	2	Pottery	Regular Body Sherd	4	19.3	
58	2250	2712.5	1	Pottery	Regular Body Sherd	3	14.1	
58	2250	2712.5	1	Pottery	Rim	1	2.3	
59	2250	2712.5	2	Pottery	Handle Lug or Cylindrical	1	3.7	
59	2250.00	2712.50	2	Metavolcanic	Bipolar Flake	1	4.8	
60	2245	2709.5	1	Pottery	Regular Body Sherd	1	5.6	
61	2245.00	2709.50	2	Metavolcanic	Thinning Flake	1	1.4	Trimmed single platform
62	2240	2706.5	1	Pottery	Base Flat	1	4.8	
62	2240	2706.5	1	Pottery	Regular Body Sherd	1	2.4	
62	2240.00	2706.50	1	Metavolcanic	Thinning Flake	1	21.7	Single Platform
63	2245	2709.5	1	Pottery	Regular Body Sherd	2	8.7	
63	2245.00	2709.50	1	Metavolcanic	Core	1	222.7	Secondary Core, Pyramidal
65	2245	2709.5	1	Pottery	Regular Body Sherd	5	112.9	

Table D-1. continued

FS	North	East	Level	Material	Definition	ct	wt	Comment
65	2245.00	2709.50	1	Metavolcanic	Core	1	410.4	Single Platform
66	2252	2705	1	Pottery	Regular Body Sherd	1	17.6	
66	2252	2705	1	Pottery	Rim	1	1.8	
66	2252.00	2705.00	1	Metavolcanic	Bipolar Flake	1	35.4	
69	2337.5	2562	1	Pottery	Buren	1	15.6	
69	2337.5	2562	1	Pottery	Regular Body Sherd	23	116.7	
69	2337.50	2562.50	1	Basalt	Thinning Flake	1	1.4	Feather termination
69	2337.50	2562.50	1	Metavolcanic	Thinning Flake	1	55.7	Multiple Platforms
69	2337.50	2562.50	1	Metavolcanic	Shatter	1	1.4	
69	2337.50	2562.50	1	Metavolcanic	Bipolar Flake	1	9.7	
70	2337.5	2562	2	Pottery	Indeterminate	1	1	
70	2337.5	2562	2	Pottery	Regular Body Sherd	11	57.8	
70	2337.5	2562	2	Pottery	Rim	3	20.8	
70	2337.50	2562.50	2	Greenstone	Thinning Flake	1	4.8	Single Platform
70	2337.50	2562.50	2	Metavolcanic	Thinning Flake	1	12.3	Single Platform
70	2337.50	2562.50	2	Metavolcanic	Shatter	2	4.7	
71	2350	2562.5	1	Pottery	Regular Body Sherd	5	23.5	
72	2350	2562.5	2	Pottery	Regular Body Sherd	4	23.6	
72	2350	2562.5	2	Pottery	Rim	1	5.2	
74	2262	2662.5	1	Pottery	Base Flat	1	15.6	
74	2262	2662.5	1	Pottery	Regular Body Sherd	7	18.7	
75	2225	2657.25	1	Pottery	Regular Body Sherd	4	39.1	
75	2225	2657.25	1	Pottery	Rim	1	33.2	
75	2225.00	2657.25	1	Greenstone	Thinning Flake	1	68.8	Single Platform
76	2225	2657.25	1	Pottery	Base Flat	2	16.5	
76	2225	2657.25	1	Pottery	Handle/Residual w/inc	1	2.7	
76	2225	2657.25	1	Pottery	Indeterminate	1	2.9	
76	2225	2657.25	1	Pottery	Regular Body Sherd	92	304.6	
76	2225	2657.25	1	Pottery	Rim	14	65.9	
76	2225.00	2657.25	1	Metavolcanic	Thinning Flake	1	7.8	Single Platform
76	2225.00	2657.25	1	Metavolcanic	Thinning Flake	1	7.6	Single Platform
76	2225.00	2657.25	1	Metavolcanic	Thinning Flake	1	1.9	Single Platform
76	2225.00	2657.25	1	Metavolcanic	Grader	1	9.7	
76	2225.00	2657.25	1	Metavolcanic	Thinning Flake	1	14.8	Single Platform
76	2225.00	2657.25	1	Metavolcanic	Bipolar Flake	1	11.4	
77	2225	2657.25	2	Pottery	Buren	1	50.2	
77	2225	2657.25	2	Pottery	Regular Body Sherd	3	5.5	
78	2237.5	2675	2	Pottery	Regular Body Sherd	1	2.5	

Table D-1. continued

FS	North	East	Level	Material	Definition	ct	wt	Comment
78	2237.50	2675.00	2	Metavolcanic	Bipolar Flake	1	8.2	
80	2212.5	2675	1	Pottery	Regular Body Sherd	2	4.8	
80	2212.5	2675	1	Pottery	Rim	3	12.2	
81	2337.5	2575	1	Pottery	Regular Body Sherd	1	2	
81	2337.5	2575	1	Pottery	Rim	1	20.1	
84	2300	2650	1	Pottery	Rim	1	4.1	
85	2175	2725	1	Pottery	Base Flat	1	8.5	
85	2175	2725	1	Pottery	Regular Body Sherd	1	3.7	
86	2175	2750	1	Pottery	Regular Body Sherd	6	22.4	
86	2175	2750	1	Pottery	Rim	1	1.6	
86	2175.00	2750.00	1	Metavolcanic	Shatter	1	1.4	Shatter
86	2175.00	2750.00	1	Metavolcanic	Shatter	1	1.3	
87	2200	2750	1	Pottery	Buren	1	17.6	
87	2200	2750	1	Pottery	Regular Body Sherd	1	7.5	
88	2250	2725	2	Pottery	Regular Body Sherd	1	1.7	
89	2250	2725	1	Pottery	Regular Body Sherd	2	5.4	
91	2225	2650	1	Pottery	Buren	1	9.3	
91	2225	2650	1	Pottery	Regular Body Sherd	39	183.5	
91	2225	2650	1	Pottery	Rim	3	39.8	
91	2225.00	2650.00	1	Greenstone	Thinning Flake	1	71.2	primary flake with outer passé termination; chipped platform
91	2225.00	2650.00	1	Metavolcanic	Blade Flake	1	65.6	step termination
92	2225	2650	3	Pottery	Regular Body Sherd	4	16.4	
92	2225.00	2650.00	3	Metavolcanic	Shatter	1	10.7	
93	2225	2662.5	1	Pottery	Regular Body Sherd	1	3.2	
94	2337.5	2562.5	1	Pottery	Regular Body Sherd	1	12.8	
96	2226	2657.5	1	Pottery	Rim	2	13.2	
97	2225	2650	2	Pottery	Handle Lug Residual	1	3.7	
97	2225	2650	2	Pottery	Regular Body Sherd	8	38	
97	2225	2650	2	Pottery	Rim	1	1.9	
98	2250	2687.5	1	Pottery	Regular Body Sherd	9	78.5	
98	2250	2687.5	1	Pottery	Rim	1	10.5	
100	2275.00	2625.00	1	Grey Flint	Thinning Flake	1	2.4	Single Platform and Feather termination
100	2275.00	2625.00	1	Metavolcanic	Thinning Flake	1	4.4	Single Platform
100	2275.00	2625.00	1	Metavolcanic	Thinning Flake	1	2.8	Feather termination
101	2337.5	2600	2	Pottery	Regular Body Sherd	1	2.9	
103	2300.00	2675.00	1	Metavolcanic	Thinning Flake	1	38.7	Single Platform

Table D-1. continued

FS	North	East	Level	Material	Definition	ct	wt	Comment
107	1825	2850	1	Pottery	Regular Body Sherd	1	9.2	
108	1825	2850	2	Pottery	Regular Body Sherd	2	5.4	
108	1825	2850	2	Pottery	Rim	1	14.8	
109	1825	2850	3	Pottery	Buren	2	32.2	
109	1825	2850	3	Pottery	Regular Body Sherd	3	18.6	
111	2337.5	2562.5	1	Pottery	Regular Body Sherd	7	25.8	
111	2337.5	2562.5	1	Pottery	Rim	2	7.3	
112	2337.5	2562.5	3	Pottery	Buren	1	2.2	
112	2337.5	2562.5	3	Pottery	Regular Body Sherd	11	57	
112	2337.5	2562.5	3	Pottery	Rim	1	2.5	
112	2337.50	2562.40	2	Metavolcanic	Core	1	7.7	Single Platform Core
112	2337.50	2562.40	2	Greenstone	Shatter	1	2.8	
113	2226	2657.5	1	Pottery	Regular Body Sherd	36	153.6	
113	2226	2657.5	1	Pottery	Rim	3	6.4	
113	2226	2657.5	1	Pottery	Shoulder OUT	2	11.1	
114	2226	2657.5	1	Pottery	Buren	1	12.1	
114	2226	2657.5	1	Pottery	Regular Body Sherd	35	112.3	
114	2226	2657.5	1	Pottery	Rim	4	7.5	
114	2226	2657.5	1	Pottery	Shoulder OUT	1	16.3	
115	2226	2657.5	2	Pottery	Base Convex	1	19.8	
115	2226	2657.5	2	Pottery	Buren	2	42.2	
115	2226	2657.5	2	Pottery	Handle/strap indeterminate	1	2.3	
115	2226	2657.5	2	Pottery	Regular Body Sherd	34	190.6	
115	2226	2657.5	2	Pottery	Rim	8	42	
115	2226.00	2657.50	2	Metavolcanic	Thinning Flake	1	4.8	Single Platform
115	2226.00	2657.50	2	Metavolcanic	Thinning Flake	1	1.4	Single Platform
115	2226.00	2657.50	2	Metavolcanic	Thinning Flake	1	2.8	Single Platform
115	2226.00	2657.50	2	Greenstone	Thinning Flake	1	2.5	Single Platform
115	2226.00	2657.50	2	Metavolcanic	Thinning Flake	1	2.4	Single Platform
115	2226.00	2657.50	2	Metavolcanic	Thinning Flake	1	2.2	Collapsed Platform
115	2226.00	2657.50	2	Metavolcanic	Thinning Flake	1	2.3	Collapsed Platform
116	2226	2657.5	2	Pottery	Regular Body Sherd	9	90.7	
116	2226	2657.5	2	Pottery	Shoulder OUT	1	3	
116	2226.00	2657.50	2	Flint	Thinning Flake	1	4.8	Single Platform
118	1835	2825	1	Pottery	Buren	1	10.7	
118	1835	2825	1	Pottery	Regular Body Sherd	2	9.6	
119	1835	2825	2	Pottery	Buren	1	6.9	
122	1853	2845	1	Pottery	Regular Body Sherd	5	29.4	

Table D-1. continued

FS	North	East	Level	Material	Definition	ct	wt	Comment
123	1850	2836	1	Pottery	Regular Body Sherd	10	36.8	
123	1850	2836	1	Pottery	Rim	2	9.1	
123	1850.00	2836.00	1	Metavolcanic	Bipolar Flake	1	7.2	
123	1850.00	2836.00	1	Greenstone	Thinning Flake	1	2.9	Single Platform
125	1850	2850	1	Pottery	Buren	1	13.7	
125	1850	2850	1	Pottery	Regular Body Sherd	1	3	
129	1805	2837.5	1	Pottery	Buren	8	1203	
129	1805	2837.5	1	Pottery	Regular Body Sherd	8	60.1	
129	1805	2837.5	1	Pottery	Rim	1	4.2	
129	1805.00	2837.50	1	Metavolcanic	Bipolar Flake	1	82.6	
129	1805.00	2837.50	1	Metavolcanic	Core	1	163.4	Random
129	1805.00	2837.50	1	Metavolcanic	Bipolar Flake	1	131.0	
129	1805.00	2837.50	1	Metavolcanic	Bipolar Flake	1	128.6	
129	1805.00	2837.50	1	Metavolcanic	Blade Flake	1	137.5	step termination
129	1805.00	2837.50	1	Greenstone	Core	1	232.4	Secondary Core, Pyramidal
129	1805.00	2837.50	1	Metavolcanic	Hammer stone	1		Round shaped percutor
129	1805.00	2837.50	1	Greenstone	Thinning Flake	1	66.8	Single Platform
129	1805.00	2837.50	1	Greenstone	Thinning Flake	1	31.5	Single Platform
129	1805.00	2837.50	1	Metavolcanic	Thinning Flake	1	88.7	Multiple Platforms
129	1805.00	2837.50	1	Metavolcanic	Thinning Flake	1	61.9	Multiple Platforms
129	1805.00	2837.50	1	Greenstone	Thinning Flake	1	34.3	Unifacial retouch
129	1805.00	2837.50	1	Metavolcanic	Hammer stone	1	330.2	Percussion tool
140	3100	1025	1	Pottery	Regular Body Sherd	4	23.5	
140	3100	1025	1	Pottery	Rim	2	9.6	
141	3100	1025	2	Pottery	Regular Body Sherd	4	9.9	
142	3100	1025	3	Pottery	Regular Body Sherd	10	52.1	
142	3100	1025	3	Pottery	Rim	3	5.2	
144	3100	1037.5	1	Pottery	Regular Body Sherd	1	2.5	
145	3100	1050	1	Pottery	Base Flat	1	13.1	
145	3100	1050	1	Pottery	Rim	1	4.4	
146	3125	1025	1	Pottery	Regular Body Sherd	3	15.7	
146	3125	1025	1	Pottery	Shoulder OUT	1	6.9	
146	3125.00	1025.00	1	Metavolcanic	Thinning Flake	1	1.8	Multiple Platforms
149	560	3990	1	Pottery	Regular Body Sherd	1	1.6	
152	560	4000	1	Pottery	Regular Body Sherd	3	8.6	
152	560	4000	1	Pottery	Rim	1	4.5	
152	560.00	4000.00	1	Metavolcanic	Ground Stone	1	4.5	
153	560	4000	2	Pottery	Regular Body Sherd	1	5.6	

Table D-1. continued

FS	North	East	Level	Material	Definition	ct	wt	Comment
155	560	4005	1	Pottery	Rim	1	13.2	
156	562	3985	3	Pottery	Regular Body Sherd	3	89.6	
159	1250	3300	1	Pottery	Regular Body Sherd	3	25.3	
160	1250	3312.5	1	Pottery	Regular Body Sherd	1	8.6	
161	1250	3312.5	3	Pottery	Regular Body Sherd	3	14.4	
162	1262.5	3300	1	Pottery	Base Flat	1	20.6	
162	1262.5	3300	1	Pottery	Regular Body Sherd	2	18.8	
163	1262.5	3312.5	1	Pottery	Regular Body Sherd	2	29.7	
164	1150	3300	1	Pottery	Regular Body Sherd	1	2.1	
164	1150	3300	1	Pottery	Rim	1	3.3	
165	1251	3300	1	Pottery	Regular Body Sherd	1	42.9	
165	1251	3300	1	Pottery	Shoulder OUT	1	40.2	
166	1900	2800	1	Pottery	Regular Body Sherd	1	3.5	
167	2226.00	2657.50	1	Metavolcanic	Edge Grinder	1	634.7	
168	1262.5	3300	1	Pottery	Regular Body Sherd	10	159.8	
168	1262.50	3300.00	1	Metavolcanic	Grader	1	254.5	
169	1300	3300	1	Pottery	Base Flat	2	377.5	
169	1300	3300	1	Pottery	Regular Body Sherd	9	643.1	
169	1300	3300	1	Pottery	Rim	6	560.9	
170	1150.00	3200.00	2	Quartz	Shatter	1	1.9	
171	1175	3225	1	Pottery	Rim	1	2.4	
174	1275	3300	1	Pottery	Regular Body Sherd	1	7.2	
175	1275	3312.5	1	Pottery	Regular Body Sherd	1	12.3	
178	2950	950	1	Pottery	Regular Body Sherd	1	7.5	
182	2220	2662.5	1	Pottery	Regular Body Sherd	4	6.9	
183	2250	2712.5	1	Pottery	Handle Lug Residual	1	2.1	
183	2250	2712.5	1	Pottery	Regular Body Sherd	1	3	
183	2250	2712.5	1	Pottery	Rim	1	3.6	
183	2250.00	2712.50	1	Metavolcanic	Bipolar Flake	1	51.5	
184	2245	2705	1	Pottery	Regular Body Sherd	10	41	
185	2245	2705	1	Pottery	Handle Tabular	1	2.9	
185	2245	2705	1	Pottery	Regular Body Sherd	2	7.7	
186	2245	2705	2	Pottery	Regular Body Sherd	4	9.7	
186	2245	2705	2	Pottery	Rim	1	2	
188	2245	2690	1	Pottery	Regular Body Sherd	2	7.1	
189	2245	2690	2	Pottery	Handle/strap indeterminate	1	1.9	
189	2245	2690	2	Pottery	Regular Body Sherd	1	2.9	
190	562	3985	1	Pottery	Buren	1	19.2	

Table D-1. continued

FS	North	East	Level	Material	Definition	ct	wt	Comment
190	562	3985	1	Pottery	Regular Body Sherd	5	45.2	
190	562.00	3985.00	1	Metavolcanic	Thinning Flake	1	11.6	Single Platform
191	562	3985	2	Clay	Clay bead	1	0.5	
191	562	3985	1	Pottery	Indeterminate	1	1	
192	562	3985	2	Pottery	Regular Body Sherd	3	15.2	
192	562	3985	2	Pottery	Rim	1	7	
192	562.00	3985.00	2	Quartz	Shatter	1	72.3	
192	562.00	3985.00	2	Metavolcanic	Shatter	9	9.9	
192	562.00	3985.00	2	Metavolcanic	Abrader	3	91.4	Abraders (pulidores)
193	1712.5	3037.5	1	Pottery	Regular Body Sherd	4	9.6	
193	1712.50	3037.50	1	Metavolcanic	Bipolar Flake	1	57.8	
195	2703	2512.5	2	Pottery	Regular Body Sherd	1	4.1	
196	2703	2512.5	1	Pottery	Regular Body Sherd	2	4.7	
196	2703	2512.5	1	Pottery	Rim	1	1.6	
196	2703	2512.5	1	Pottery	Shoulder OUT	1	5.5	
196	2703.00	2512.50	1	Metavolcanic	Thinning Flake	14	23.6	Single Platform
196	2703.00	2512.50	1	Metavolcanic	Shatter	1	7.9	
196	2703.00	2512.50	1	Metavolcanic	Core	1	130.4	Multiple Platforms
198	1687.5	3075	3	Pottery	Rim	1	10.1	
199	1687.5	3075	4	Pottery	Regular Body Sherd	2	11.3	
200	1687.5	3087.5	1	Pottery	Regular Body Sherd	1	2	
201	2675	2500	2	Pottery	Base Flat	1	4.6	
201	2675	2500	2	Pottery	Regular Body Sherd	6	21.2	
201	2675	2500	2	Pottery	Rim	5	21	
202	2700	2500	1	Pottery	Regular Body Sherd	8	26.7	
203	2725	2500	2	Pottery	Regular Body Sherd	3	15.5	
204	2725	2500	3	Pottery	Regular Body Sherd	2	5.1	
205	2750	2500	1	Pottery	Regular Body Sherd	1	5.4	
206	2712.5	2512.5	1	Pottery	Regular Body Sherd	14	55.7	
206	2712.5	2512.5	1	Pottery	Rim	1	2.6	
206	2712.5	2512.5	1	Pottery	Shoulder OUT	2	42.1	
206	2712.50	2512.50	1	Metavolcanic	Thinning Flake	1	7.7	Single Platform
207	2725	2512.5	1	Pottery	Regular Body Sherd	2	7.4	
207	2725	2512.5	1	Pottery	Rim	2	23.1	
207	2725.00	2512.50	1	Greenstone	Thinning Flake	1	13.7	Multiple Platforms
208	2737.5	2512.5	1	Pottery	Regular Body Sherd	2	13.3	
209	2762.5	2512.5	1	Pottery	Rim	1	4.1	
210	2762.5	2512.5	3	Pottery	Regular Body Sherd	2	5.4	

Table D-1. continued

FS	North	East	Level	Material	Definition	ct	wt	Comment
210	2762.5	2512.5	3	Pottery	Rim	1	5.7	
211	2662.5	2525	1	Pottery	Regular Body Sherd	1	2.2	
212	2687.5	2525	1	Pottery	Buren	2	9.2	
212	2687.5	2525	1	Pottery	Regular Body Sherd	5	44.1	
212	2687.5	2525	1	Pottery	Rim	2	20	
213	2687.5	2525	2	Pottery	Buren	1	8.8	
214	2700	2525	1	Pottery	Regular Body Sherd	3	10.4	
216	2712.5	2525	1	Pottery	Handle/strap indeterminate	1	3.5	
216	2712.5	2525	1	Pottery	Regular Body Sherd	15	52	
216	2712.5	2525	1	Pottery	Rim	3	27.4	
216	2712.50	2525.00	1	Metavolcanic	Thinning Flake	1	8.2	Feather termination and single platform
217	2737.5	2525	1	Pottery	Base Flat	1	19.2	
217	2737.5	2525	1	Pottery	Regular Body Sherd	2	7.6	
218	2737.5	2525	2	Pottery	Base Flat	1	19.5	
218	2737.5	2525	2	Pottery	Regular Body Sherd	3	13.5	
219	2650	2550	1	Pottery	Regular Body Sherd	1	3.7	
220	2675	2550	1	Pottery	Regular Body Sherd	13	70.3	
220	2675	2550	1	Pottery	Rim	2	27	
221	2675	2550	2	Pottery	Regular Body Sherd	8	23.6	
221	2675.00	2550.00	2	Metavolcanic	Thinning Flake	1	4.7	Feather Termination
222	2700	2550	1	Pottery	Base Flat	1	11.6	
222	2700	2550	1	Pottery	Regular Body Sherd	18	84.8	
222	2700	2550	1	Pottery	Rim	4	22	
222	2700	2550	1	Pottery	Shoulder OUT	1	4.4	
222	2700.00	2550.00	1	Metavolcanic	Thinning Flake	2	17.7	Single Platform
222	2700.00	2550.00	1	Metavolcanic	Shatter	4	16.5	
222	2700.00	2550.00	1	Metavolcanic	Ground Stone	1	93.6	Groundstone
223	2725	2550	1	Pottery	Base Flat	1	10.2	
223	2725	2550	1	Pottery	Handle Lug or Cylindrical	1	5.2	
223	2725	2550	1	Pottery	Regular Body Sherd	8	23.8	
223	2725	2550	1	Pottery	Rim	2	4.2	
223	2725.00	2550.00	1	Metavolcanic	Shatter	6	14.3	
224	2750	2550	1	Pottery	Regular Body Sherd	1	4.7	
224	2750.00	2550.00	1	Basalt	Shatter	2	6.3	Calcite and Basalt
225	2775	2550	1	Pottery	Regular Body Sherd	1	3	
226	2750	2575	1	Pottery	Regular Body Sherd	1	1.8	
226	2750.00	2575.00	1	Metavolcanic	Bipolar Flake	1	1.5	

Table D-1. continued

FS	North	East	Level	Material	Definition	ct	wt	Comment
227	2687.5	2518	1	Pottery	Base Flat	1	17	
227	2687.5	2518	1	Pottery	Regular Body Sherd	11	23	
227	2687.5	2518	1	Pottery	Rim	2	4	
227	2687.50	2518.00	1	Metavolcanic	Thinning Flake	1	14.6	Multiple Platforms
227	2687.50	2518.00	1	Metavolcanic	Thinning Flake	1	2.3	Multiple Platforms
227	2687.50	2518.00	1	Metavolcanic	Thinning Flake	1	1.8	Single Platform
228	2687.5	2518	2	Pottery	Regular Body Sherd	2	6	
228	2687.5	2518	2	Pottery	Rim	1	3.3	
229	2675	2512.5	1	Pottery	Regular Body Sherd	9	45.1	
229	2675	2512.5	1	Pottery	Rim	3	10.9	
229	2675	2512.5	1	Pottery	Shoulder OUT	2	35.2	
230	2687.5	2512.5	1	Pottery	Regular Body Sherd	7	19.4	
230	2687.5	2512.5	1	Pottery	Rim	3	10.7	
231	2700	2512.5	1	Pottery	Regular Body Sherd	16	46.9	
231	2700	2512.5	1	Pottery	Rim	1	2.6	
231	2700.00	2512.50	1	Metavolcanic	Thinning Flake	1	1.4	Single Platform
231	2700.00	2512.50	1	Greenstone	Thinning Flake	1	1.4	Single Platform
231	2700.00	2512.50	1	Metavolcanic	Thinning Flake	1	1.4	Single Platform
231	2700.00	2512.50	1	Metavolcanic	Thinning Flake	1	1.2	Collapsed Platform
232	2675	2537.5	1	Pottery	Regular Body Sherd	9	82.8	
232	2675	2537.5	1	Pottery	Rim	1	3.7	
233	2687.50	2537.50	1	Metavolcanic	Thinning Flake	1	22.3	Single Platform
234	2700	2537.5	1	Pottery	Handle/strap above rim	1	4.2	
234	2700	2537.5	1	Pottery	Regular Body Sherd	4	10.1	
235	2700	2537.5	1	Pottery	Regular Body Sherd	7	24.1	
235	2700	2537.5	1	Pottery	Shoulder OUT	1	7.4	
236	2712.5	2537.5	1	Pottery	Regular Body Sherd	4	24.6	
236	2712.5	2537.5	1	Pottery	Rim	1	8.5	
237	2725	2537.5	1	Pottery	Regular Body Sherd	6	22.8	
238	2737.5	2537.5	1	Pottery	Regular Body Sherd	6	29.9	
238	2737.5	2537.5	1	Pottery	Rim	1	1.5	
239	2762.5	2525	1	Pottery	Regular Body Sherd	2	9.4	
240	2762.5	2525	2	Pottery	Rim	1	3.5	
241	2722	2555	1	Pottery	Rim	1	2.9	
244	2703	2512.5	1	Pottery	Handle/strap indeterminate	1	1.6	
244	2703	2512.5	1	Pottery	Regular Body Sherd	39	110.7	
244	2703	2512.5	1	Pottery	Rim	7	14.2	
244	2703.00	2512.50	1	Metavolcanic	Shatter	5	13.7	

Table D-1. continued

FS	North	East	Level	Material	Definition	ct	wt	Comment
245	2703	2512.5	1	Pottery	Buren	1	11.2	
245	2703	2512.5	1	Pottery	Handle/strap with button	2	4.3	
245	2703	2512.5	1	Pottery	Regular Body Sherd	17	52	
245	2703	2512.5	1	Pottery	Rim	5	24.3	
245	2703	2512.5	1	Pottery	Shoulder IN	1	25.9	
245	2703	2512.5	1	Pottery	Shoulder OUT	1	18.4	
246	2703	2512.5	2	Pottery	Buren	1	30.6	
246	2703	2512.5	2	Pottery	Regular Body Sherd	21	77.8	
246	2703	2512.5	2	Pottery	Rim	1	34.6	
246	2703.00	2512.50	2	Metavolcanic	Shatter	1	2.2	
247	2703	2512.5	2	Pottery	Regular Body Sherd	4	9.7	
250	2650.00	3700.00	1	Metavolcanic	Shatter	3	13.1	
250	2650.00	3700.00	1	Metavolcanic	Ground Stone	1	186.3	
251	3820	4255	1	Pottery	Regular Body Sherd	4	27	
251	3820	4255	1	Pottery	Rim	1	1.3	
252	3820	4225	1	Pottery	Regular Body Sherd	3	13.2	
253	3820	4245	1	Pottery	Regular Body Sherd	14	48.3	
253	3820.00	4245.00	1	Metavolcanic	Thinning Flake	7	28.3	Single Platform
253	3820.00	4245.00	1	Metavolcanic	Bipolar Flake	2	8.6	
253	3820.00	4245.00	1	Metavolcanic	Shatter	2	2.3	
254	3820	4245	2	Pottery	Regular Body Sherd	11	37.9	
254	3820	4245	2	Pottery	Rim	1	3.1	
254	3820.00	4245.00	2	Greenstone	Thinning Flake	1	1.4	Single Platform
254	3820.00	4245.00	2	Metavolcanic	Thinning Flake	1	3.1	Single Platform
254	3820.00	4245.00	2	Metavolcanic	Thinning Flake	1	1.4	Single Platform
254	3820.00	4245.00	2	Metavolcanic	Thinning Flake	1	2.2	Single Platform
254	3820.00	4245.00	2	Metavolcanic	Shatter	3	4.2	
254	3820.00	4245.00	2	Metavolcanic	Thinning Flake	1	3.2	Single Platform, Retouched
255	3830	4245	2	Pottery	Regular Body Sherd	1	24.2	
256	3820	4220	3	Pottery	Regular Body Sherd	1	3.7	
256	3820	4220	3	Pottery	Rim	1	19.5	
257	3835	4220	1	Pottery	Regular Body Sherd	1	11.7	
257	3835	4220	1	Pottery	Rim	1	9.2	
258	3835	4220	2	Pottery	Regular Body Sherd	3	39	
259	3835	4220	3	Pottery	Regular Body Sherd	4	6.8	
260	3830	4245	1	Pottery	Regular Body Sherd	3	17	
260	3830	4245	1	Pottery	Rim	1	2.3	
260	3830.00	4245.00	1	Metavolcanic	Thinning Flake	1	2.4	Single Platform

Table D-1. continued

FS	North	East	Level	Material	Definition	ct	wt	Comment
260	3830.00	4245.00	1	Metavolcanic	Thinning Flake	1	4.7	Single Platform
260	3830.00	4245.00	1	Greenstone	Thinning Flake	1	8.8	Multiple Platforms
260	3830.00	4245.00	1	Metavolcanic	Thinning Flake	1	3.1	Single Platform
260	3830.00	4245.00	1	Metavolcanic	Thinning Flake	1	1.4	Multiple Platforms
260	3830.00	4245.00	1	Metavolcanic	Thinning Flake	1	66.8	Multiple Platforms
261	3805	4220	2	Pottery	Buren	1	27.7	
261	3805	4220	2	Pottery	Regular Body Sherd	3	19.7	
261	3805.00	4220.00	2	Metavolcanic	Thinning Flake	1	6.2	Multiple Platforms
262	3805	4220	3	Pottery	Regular Body Sherd	1	5.2	
263	3820	4255	1	Pottery	Handle Tabular, other	1	12.7	
263	3820	4255	1	Pottery	Regular Body Sherd	8	67.5	
263	3820.00	4255.00	1	Metavolcanic	Thinning Flake	1	11.1	Single platform with feather termination and very marked percussion bulb
263	3820.00	4255.00	1	Metavolcanic	Thinning Flake	1	16.2	Single platform flake with wedge termination
263	3820.00	4255.00	1	Metavolcanic	Thinning Flake	1	13.1	Single Platform
263	3820.00	4255.00	1	Metavolcanic	Blade Flake	1	3.8	Collapsed platform; step termination
263	3820.00	4255.00	1	Metavolcanic	Ground Stone	1	323.5	
263	3820.00	4255.00	1	Metavolcanic	Shatter	3	2.9	
264	3820	4255	2	Pottery	Regular Body Sherd	2	19.2	
267	1150	5125	1	Pottery	Regular Body Sherd	1	4.5	
274	2725	1100	1	Pottery	Regular Body Sherd	1	3.6	
275	2750.00	1100.00	1	Metavolcanic	Thinning Flake	1	8.2	Feather termination
276	1525	1550	1	Pottery	Regular Body Sherd	3	23.5	
283	0	0	1	Pottery	Buren	1	10.62	
283	0	0	1	Pottery	Handle/strap indeterminate	2	16.7	
283	0	0	1	Pottery	Regular Body Sherd	47	307	
283	0	0	1	Pottery	Rim	9	72.5	
285	1900	3175	1	Pottery	Regular Body Sherd	2	3.2	
287	2687.85	2512.5	1	Pottery	Buren	1	12.5	
287	2687.85	2512.5	1	Pottery	Regular Body Sherd	11	23.9	
287	2687.85	2512.5	1	Pottery	Rim	2	6.5	
287	2687.85	2512.50	1	Metavolcanic	Shatter	1	1.4	
287	2687.85	2512.50	1	Metavolcanic	Bipolar Flake	1	2.8	
287	2687.85	2512.50	1	Metavolcanic	Bipolar Flake	3	8.9	
288	2687.85	2512.5	1	Pottery	Base Concave	1	3.6	

Table D-1. continued

FS	North	East	Level	Material	Definition	ct	wt	Comment
288	2687.85	2512.5	1	Pottery	Regular Body Sherd	19	63.4	
288	2687.85	2512.5	1	Pottery	Rim	2	4.6	
288	2687.85	2512.50	1	Metavolcanic	Thinning Flake	1	8.7	Single Platform
288	2687.85	2512.50	1	Greenstone	Shatter	2	1.7	
288	2687.85	2512.50	1	Metavolcanic	Bipolar Flake	1	1.8	
289	2687.85	2512.5	3	Pottery	Regular Body Sherd	6	21.6	
289	2687.85	2512.5	3	Pottery	Rim	1	1.8	
289	2687.85	2512.50	3	Metavolcanic	Shatter	4	1.9	
289	2687.85	2512.50	3	Metavolcanic	Bipolar Flake	1	3.8	
290	2722	2555	1	Pottery	Regular Body Sherd	18	75.5	
290	2722	2555	1	Pottery	Rim	5	14.5	
290	2722.00	2555.00	1	Metavolcanic	Bipolar Flake	6	10.2	
290	2722.00	2555.00	1	Metavolcanic	Shatter	5	2.2	
291	2722	2555	1	Pottery	Base Flat	1	32	
291	2722	2555	1	Pottery	Regular Body Sherd	25	92.3	
291	2722	2555	1	Pottery	Rim	3	9.2	
291	2722.00	2555.00	1	Metavolcanic	Shatter	3	1.4	
291	2722.00	2555.00	1	Metavolcanic	Bipolar Flake	1	1.6	
291	2722.00	2555.00	1	Metavolcanic	Bipolar Flake	1	2.3	
292	2722	2555	2	Pottery	Buren	2	69	
292	2722	2555	2	Pottery	Indeterminate	1	8.7	
292	2722	2555	2	Pottery	Regular Body Sherd	13	42	
292	2722	2555	2	Pottery	Rim	2	11	
292	2722.00	2555.00	2	Metavolcanic	Bipolar Flake	3	17.2	
292	2722.00	2555.00	2	Metavolcanic	Bipolar Flake	1	3.2	
292	2722.00	2555.00	2	Metavolcanic	Bipolar Flake	2	4.1	
294	1600	1475	1	Pottery	Regular Body Sherd	1	1.9	
2	1825	2837.5	1	Strombus gigas	Tip	1		
2	1825	2837.5	1	Strombus sp.	Celt	1		
30	1825	3175	1	Strombus sp.	Hammer	1	45.6	
32	2337.5	2562.5	1	Codakia orbicularis	Scraper	1		
69	2337.5	2562.5	1	Anthozoa	Abrader	1		
69	2337.5	2562.5	1	Codakia orbicularis	Scraper	7		
69	2337.5	2562.5	1	Lucinadae	Scraper	3		
69	2337.5	2562.5	1	Strombus pugilis	Hammer	2		
69	2337.5	2562.5	1	Strombus sp.	Tip	8		
69	2337.5	2562.5	1	Tellina fausta	Scraper	1		
70	2337.5	2562.5	2	Strombus gigas	Scraper	1		

Table D-1. continued

FS	North	East	Level	Material	Definition	ct	wt	Comment
70	2337.5	2562.5	2	Strombus sp.	Pick	4		
76	2225	2657.3	1	Strombus sp.	Pick	4		
1	1825	2840	1	Strombus sp.	Tip	4		
76	2225	2657.3	1	Tellina fausta	Planer	3		
91	2225	2650	1	Strombus sp.		4		
91	2225	2650	1	Codakia orbicularis		1		
91	2225	2650	1	Lucinadae		2		
91	2225	2650	1	Strombus pugilis		1		
91	2225	2650	1	Tellina fausta		1		
118	1835	2825	1	Codakia orbicularis		1		
122	1853	2845	1	Strombus pugilis		1		
122	1853	2845	1	Strombus sp.		4		
122	1853	2845	1	Codakia orbicularis		1		
124	1850	2836	2	Strombus sp.		1		
126	1805	2850	1	Strombus sp.		1		
133	2100	2425	1	Strombus sp.		1		
148	560	3985	1	Codakia orbicularis		1		
148	560	3985	1	Strombus sp.		2		
150	560	3985	2	Strombus sp.		1		
152	560	4000	1	Bivalvea		1		
216	2712.5	2525	1	Strombus sp.		1		
227	2687.50	2518.00	1	Anthozoa		1		
227	2687.50	2518.00	1	Codakia orbicularis		2		
227	2687.50	2518.00	1	Lucinadae		4		
227	2687.50	2518.00	1	Phacoides pectinatus		1		
227	2687.50	2518.00	1	Strombus sp.		2		
227	2687.50	2518.00	1	Tellina fausta		2		
228	2687.5	2518	2	Codakia orbicularis		1		
230	2675	2512.5	1	Strombus sp.		2		
230	2675	2512.5	1	Tellina fausta		1		
231	2700	2512.5	1	Anthozoa		2		
231	2700	2512.5	1	Codakia orbicularis		2		
231	2700	2512.5	1	Strombus sp.		5		
283				Strombus sp.		2		

APPENDIX E
VESSEL LOT ANALYSIS

This appendix presents the raw data related to the vessel lot analysis.* The table contains the following fields:

- SITE (PO): Site from which the vessel lot is from
- N: Northing coordinates of the shovel test from which the lot is from.
- E: Easting coordinates of the shovel test from which the lot is from.
- PTXT: Paste texture/size of aplastic inclusions in paste.
- PTYPE: Type of paste determined by the most abundant aplastic constituents.
- SRFTRT: Surface treatment of the vessel.
- INTTRT: Interior treatment of the vessel.
- PNT_SLP: Paint or slip noted on the vessel.
- THK: Average thickness of the sherds in the vessel lot.
- WT: Cumulative weight of the sherds in the vessel lot.
- #: Number of sherds in the vessel lot.
- RIM: Form of rim.
- D.: Orifice diameter inferred from rim.
- ORIENT: Orientation of vessel.
- LIP: Form of lip.
- STYLE: Inferred stylistic association of the vessel.

*Each row in the table is a single vessel lot.

Table E-1. Vessel lot analysis

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
IF	550	4250	Med-Crse.	Felsic	Eroded	Eroded	Org. Brn	N/A	1.9	9.8	N/A	N/A	N/A	0	1	Elenan Ost
IF	650	4300	Med-Crse.	Felsic	Eroded	Eroded	Org	N/A	5	8.0	N/A	N/A	N/A	0	1	UID Ost
IF	975	3500	Med-Crse.	Felsic	Smthd	Smthd	Redsh Brn	N/A	12.7	10.9	N/A	N/A	N/A	0	1	Cuevas/Ost Puro
IF	975	3500	Med-Crse.	Quartz	Smthd	Smthd	Brn	N/A	4.7	7.8	N/A	N/A	N/A	0	1	UID Ost
2	1900	3175	Med.	Felsic	Smthd	Smthd	Buff	N/A	3.2	5.9	N/A	N/A	N/A	0	2	UID Ost
42	2175	2700	Med.	Felsic	Brnshd	Smthd	Brn	N/A	9.4	7.4	N/A	N/A	Convex in	0	1	Cuevas/Ost Puro
42	2175	2700	Med.	Felsic	Smthd	Smthd	Brn	N/A	3.9	8.4	N/A	N/A	N/A	0	1	Snta Elena
42	2175	2725	Med.	Felsic	Smthd	Burnish	Brn	N/A	8.5	7.4	N/A	N/A	N/A	0	1	Cuevas
42	2175	2725	Med.	Felsic	Smthd	Smthd	Org. Brn	N/A	3.7	6.4	N/A	N/A	N/A	0	1	UID Ost
42	2175	2750	Med.	Felsic	Smthd	Smthd	Brn	N/A	9.8	6.9	N/A	N/A	N/A	0	4	UID Ost
42	2175	2750	Med.	Felsic w/ grog	Smthd	Smthd	Redsh Brn	N/A	10.1	8.0	N/A	N/A	N/A	0	1	Monserrate
42	2175	2750	Med.	Quartz	Painted	Smthd	Buff	Red paint	2.5	6.8	N/A	N/A	N/A	0	1	Cuevas
42	2175	2750	Med-Crse.	Felsic	Smthd	Smthd	Redsh Brn	N/A	1.6	5.6	Thinned	Flat	Indet.	0	1	UID Ost
42	2200	2675	Fine	Felsic	Slf. Slip	Smthd	Brn	N/A	13.5	6.4	N/A	N/A	N/A	0	1	Cuevas
42	2200	2675	Med.	Felsic	Slipped	Slipped	Other	Red slip	13.8	8.1	N/A	N/A	N/A	0	1	Ost Puro
42	2200	2675	Med.	Felsic	Slf. Slip	Slf. Slip	Brn	N/A	3.3	8.1	N/A	N/A	N/A	0	1	UID Ost
42	2200	2675	Med.	Vlcanic	Brnshd	Burnish	Brn	N/A	2.9	6.7	N/A	N/A	N/A	0	1	Cuevas
42	2200	2700	Med-Crse.	Felsic	Eroded	Smthd	Org. Brn	N/A	2.7	10.9	N/A	N/A	N/A	0	1	Snta Elena
42	2200	2725	Med.	Felsic	Smthd	Smthd	Brn	N/A	2.5	6.2	Parallel	Round	Indet.	0	1	Ost Mod
42	2200	2725	Med.	Felsic	Smthd	Smthd	Brn	N/A	4	5.6	N/A	N/A	N/A	0	2	UID Ost
42	2200	2725	Med-Crse.	Felsic	Smthd	Smthd	Redsh Brn	N/A	3.5	6.4	N/A	N/A	N/A	0	1	Monserrate
42	2200	2725	Med-Crse.	Felsic	Smthd	Smthd	Redsh Brn	N/A	11.2	6.9	N/A	N/A	N/A	20	1	UID Ost
42	2200	2725	Med-Crse.	Felsic	Smthd	Slf. Slip	Redsh Brn	N/A	5	6.2	N/A	N/A	N/A	0	1	Monserrate
42	2200	2750	Fine	Vlcanic	Smthd	Smthd	Brn	N/A	7.5	6.4	N/A	N/A	N/A	0	1	Cuevas
42	2200	2750	Med-Crse.	Felsic	Eroded	Eroded	Org. Brn	N/A	17.6	15.5	N/A	N/A	Buren	0	1	Indet.

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
42	2212.5	2675	Med.	Felsic	Smthd	Smthd	Org. Brn	N/A	5.9	6.4	Parallel	Round beveled in	Convex out	14	1	Cuevas/Ost Puro
42	2212.5	2675	Med.	Felsic	Smthd	Smthd	Pale Brn	N/A	3.6	4.8	Parallel	Flat	Convex out	0	1	UID Ost
42	2212.5	2675	Med.	Quartz	Painted	Smthd	Buff	Red paint	2.9	5.8	N/A	N/A	N/A	0	1	Cuevas
42	2212.5	2675	Med.	Quartz	Smthd	Smthd	Pale Brn	N/A	1.9	6.5	N/A	N/A	N/A	0	1	Cuevas
42	2212.5	2675	Med-Crse.	Vlcanic	Smthd	Burnish	Redsh Brn	N/A	2.7	5.7	Parallel	Flat	Plate	0	1	UID Ost
42	2220	2662.5	Med.	Felsic	Smthd	Smthd	Brn	N/A	4.7	6.3	N/A	N/A	N/A	0	3	UID Ost
42	2220	2662.5	Med.	Vlcanic	Smthd	Smthd	Brn	N/A	2.2	6.9	N/A	N/A	N/A	0	1	UID Ost
42	2225	2650	Crse.	Felsic	Eroded	Eroded	Redsh Brn	N/A	9.3	17.1	N/A	N/A	Buren	0	1	UID Ost
42	2225	2650	Fine	Felsic	Smthd	Eroded	Pale Brn	N/A	3.7	8.9	N/A	N/A	N/A	0	1	Snta Elena
42	2225	2650	Fine	Felsic	Smthd	Slipped	Buff	Org slip	6.4	7.1	N/A	N/A	N/A	0	1	Cuevas
42	2225	2650	Fine	Felsic	Smthd	Slf. Slip	Brn	N/A	5.4	7.3	N/A	N/A	N/A	0	1	UID Ost
42	2225	2650	Med.	Felsic	Brnshd	Smthd	Dark Brn	N/A	10.2	7.2	N/A	N/A	N/A	0	1	Monserrate
42	2225	2650	Med.	Felsic	Brnshd	Slf. Slip	Brn	N/A	2.5	7.1	N/A	N/A	N/A	0	1	UID Ost
42	2225	2650	Med.	Felsic	Eroded	Eroded	Org. Brn	N/A	2.4	5.8	N/A	N/A	N/A	0	1	UID Ost
42	2225	2650	Med.	Felsic	Painted	Painted	Buff	Red slip	4.3	6.2	N/A	N/A	N/A	0	1	Cuevas/Ost Puro
42	2225	2650	Med.	Felsic	Painted	Smthd	Brn	Pink slip	3.5	7.4	N/A	N/A	N/A	0	1	Ost Mod
42	2225	2650	Med.	Felsic	Slipped	Smthd	Redsh Brn	Red slip	16.3	8.1	N/A	N/A	N/A	0	1	Ost Puro
42	2225	2650	Med.	Felsic	Smthd	Smthd	Redsh Brn	N/A	9.2	5.8	N/A	N/A	N/A	0	2	Monserrate
42	2225	2650	Med.	Felsic	Smthd	Smthd	Brn	N/A	75.1	6.4	Thinned	Round	Straight out	0	15	UID Ost
42	2225	2650	Med.	Felsic	Slf. Slip	Smthd	Brn	N/A	3	6.1	N/A	N/A	N/A	0	1	UID Ost
42	2225	2650	Med.	Felsic	Slf. Slip	Slf. Slip	Pale Brn	N/A	7.5	9.4	N/A	N/A	N/A	0	1	Snta Elena
42	2225	2650	Med.	Felsic	Slf. Slip	Slf. Slip	Redsh Brn	N/A	4.2	6.9	N/A	N/A	N/A	0	1	UID Ost
42	2225	2650	Med.	Felsic w/ grog	Smthd	Smthd	Redsh Brn	N/A	12.8	8.4	N/A	N/A	N/A	0	1	UID Ost
42	2225	2650	Med.	Quartz	Smthd	Smthd	Brn	N/A	5	6.6	N/A	N/A	N/A	0	1	UID Ost
42	2225	2650	Med.	Vlcanic	Brnshd	Burnish	Dark Brn	N/A	14.9	6.0	N/A	N/A	N/A	0	3	UID Ost
42	2225	2650	Med.	Vlcanic	Eroded	Eroded	Org. Brn	N/A	5.4	9.8	N/A	N/A	N/A	0	2	UID Ost

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
42	2225	2650	Med.	Vlcanic	Painted	Smthd	Redsh Brn	Red slip	2.1	6.9	N/A	N/A	N/A	0	1	Ost Puro
42	2225	2650	Med.	Vlcanic	Smthd	Smthd	Org. Brn	N/A	6.9	7.3	N/A	N/A	N/A	0	2	UID Ost
42	2225	2650	Med.	Vlcanic	Smthd	Slf. Slip	Brn	N/A	3.6	6.1	N/A	N/A	N/A	0	1	UID Ost
42	2225	2650	Med-Crse.	Felsic	Brnshd	Burnish	Brn	N/A	8.5	6.5	N/A	N/A	N/A	0	1	UID Ost
42	2225	2650	Med-Crse.	Felsic	Eroded	Eroded	Brn	N/A	5.5	12.0	N/A	N/A	N/A	0	1	Indet.
42	2225	2650	Med-Crse.	Felsic	Eroded	Eroded	Brn	N/A	9.6	9.4	N/A	N/A	N/A	0	2	UID Ost
42	2225	2650	Med-Crse.	Felsic	Smthd	Smthd	Redsh Brn	N/A	4.8	5.2	N/A	N/A	N/A	0	1	Ost Puro
42	2225	2650	Med-Crse.	Felsic	Smthd	Smthd	Org. Brn	N/A	13.2	10.0	N/A	N/A	N/A	0	2	Snta Elena
42	2225	2650	Med-Crse.	Felsic	Smthd	Smthd	Dark Brn	N/A	17.2	8.0	N/A	N/A	N/A	0	3	UID Ost
42	2225	2650	Med-Crse.	Quartz	Smthd	Smthd	Org. Brn	N/A	3.4	9.1	N/A	N/A	N/A	0	1	Snta Elena
42	2225	2650	Med-Crse.	Vlcanic	Brnshd	Burnish	Dark Brn	N/A	1.6	5.4	N/A	N/A	N/A	0	1	UID Ost
42	2225	2650	Med-Crse.	Vlcanic	Painted	Smthd	Buff	Pink slip	6	6.9	N/A	N/A	N/A	0	1	Cuevas/Ost Puro
42	2225	2650	Med-Crse.	Vlcanic	Smthd	Smthd	Brn	N/A	1.6	6.6	N/A	N/A	N/A	0	1	UID Ost
42	2225	2650	Med-Crse.	Vlcanic	Smthd	Slf. Slip	Brn	N/A	3.5	8.2	N/A	N/A	N/A	0	1	UID Ost
42	2225	2650	Med-Crse.	Vlcanic	Slf. Slip	Smthd	Pale Brn	N/A	4	9.2	N/A	N/A	N/A	0	1	UID Ost
42	2225	2657.3	Crse.	Flesic w/ shell	Smthd	Smthd	Redsh Brn	N/A	4.5	8.0	N/A	N/A	N/A	0	1	UID Ost
42	2225	2657.3	Fine	Vlcanic	Eroded	Smthd	Dark Brn	N/A	50.2	21.0	Parallel	Round	Buren	0	1	UID Ost
42	2225	2657.3	Fine	Vlcanic	Slipped	Slipped	Buff	Pink slip	3.2	4.5	Parallel	Flat	Straight vertical	0	1	Cuevas
42	2225	2657.3	Fine	Vlcanic	Slipped	Slipped	Buff	Pink slip	1.7	6.8	Parallel	Round beveled in	Indet.	0	1	Cuevas/Ost Puro
42	2225	2657.3	Med.	Felsic	Brnshd	Burnish	Redsh Brn	N/A	3.5	6.3	Thinned	Round beveled out	Indet.	0	1	UID Ost

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
42	2225	2657.3	Med.	Felsic	Brnshd	Smthd	Brn	N/A	8.2	8.5	N/A	N/A	N/A	0	1	Cuevas/Mo nserrate
42	2225	2657.3	Med.	Felsic	Brnshd	Smthd	Brn	N/A	17	8.8	N/A	N/A	N/A	0	1	Snta Elena
42	2225	2657.3	Med.	Felsic	Brnshd	Slf. Slip	Dark Brn	N/A	3.8	5.8	N/A	N/A	N/A	0	1	Cuevas/Ost Puro
42	2225	2657.3	Med.	Felsic	Eroded	Eroded	Org. Brn	N/A	3.4	6.3	N/A	N/A	N/A	0	1	UID Ost
42	2225	2657.3	Med.	Felsic	Eroded	Smthd	Org. Brn	N/A	6	10. 2	N/A	N/A	N/A	0	1	Snta Elena
42	2225	2657.3	Med.	Felsic	Slipped	Smthd	Redsh Brn	Indet.	3.6	7.6	N/A	N/A	N/A	0	1	Cuevas/Ost Puro
42	2225	2657.3	Med.	Felsic	Slipped	Smthd	Brn	Brn slip	3.6	5.7	N/A	N/A	N/A	0	1	UID Ost
42	2225	2657.3	Med.	Felsic	Smthd	Burnish	Brn	N/A	5.4	7.0	Parallel	Flat	Straight vertical	0	1	UID Ost
42	2225	2657.3	Med.	Felsic	Smthd	Smthd	Brn	N/A	10.9	5.4	N/A	N/A	N/A	0	5	Cuevas
42	2225	2657.3	Med.	Felsic	Smthd	Smthd	Org. Brn	N/A	2.3	8.3	N/A	N/A	N/A	0	1	Elenan Ost
42	2225	2657.3	Med.	Felsic	Smthd	Smthd	Brn	N/A	19.1	9.7	N/A	N/A	N/A	0	2	Esperanza
42	2225	2657.3	Med.	Felsic	Smthd	Smthd	Brn	N/A	5.8	6.2	N/A	N/A	N/A	0	1	Ost Mod
42	2225	2657.3	Med.	Felsic	Smthd	Smthd	Org. Brn	N/A	27.3	9.1	N/A	N/A	N/A	0	5	Snta Elena
42	2225	2657.3	Med.	Felsic	Smthd	Smthd	Org. Brn	N/A	73.7	7.3	N/A	N/A	N/A	0	26	UID Ost
42	2225	2657.3	Med.	Felsic	Smthd	Slf. Slip	Org. Brn	N/A	4.5	8.3	N/A	N/A	N/A	0	1	Snta Elena
42	2225	2657.3	Med.	Felsic	Smthd	Slf. Slip	Brn	N/A	3.2	7.7	N/A	N/A	N/A	0	1	UID Ost
42	2225	2657.3	Med.	Felsic	Slf. Slip	Slf. Slip	Pale Brn	N/A	1.9	6.8	N/A	N/A	N/A	0	1	Cuevas
42	2225	2657.3	Med.	Felsic	Slf. Slip	Slf. Slip	Pale Brn	N/A	3.3	6.4	N/A	N/A	N/A	0	1	Monserrate
42	2225	2657.3	Med.	Felsic	Slf. Slip	Slf. Slip	Brn	N/A	1.4	4.8	N/A	N/A	N/A	0	1	Ost Mod
42	2225	2657.3	Med.	Felsic	Slf. Slip	Slf. Slip	Pale Brn	N/A	5	7.9	N/A	N/A	N/A	0	1	Snta Elena
42	2225	2657.3	Med.	Felsic	Slf. Slip	Slf. Slip	Brn	N/A	7.5	7.3	N/A	N/A	N/A	0	2	UID Ost
42	2225	2657.3	Med.	Limest one	Slipped	Smthd	Brn	Brn slip	1.6	5.6	N/A	N/A	N/A	0	1	UID Ost
42	2225	2657.3	Med.	Quartz	Painted	Smthd	Pale Brn	Org slip	6.3	13. 2	Thicken ed Ext. Round	Round	Indet.	0	1	Snta Elena
42	2225	2657.3	Med.	Quartz	Smthd	Smthd	Brn	N/A	3.2	5.9	N/A	N/A	N/A	0	2	Cuevas
42	2225	2657.3	Med.	Quartz	Smthd	Smthd	Redsh Brn	N/A	6.6	7.1	N/A	N/A	N/A	0	3	UID Ost
42	2225	2657.3	Med.	Vlcanic	Brnshd	Smthd	Brn	N/A	3.6	5.0	N/A	N/A	N/A	0	2	UID Ost
42	2225	2657.3	Med.	Vlcanic	Slipped	Burnish	Redsh Brn	N/A	2.5	3.2	N/A	N/A	N/A	0	1	Ost Puro
42	2225	2657.3	Med.	Vlcanic	Slipped	Slipped	Brn	Brn slip	11.4	5.6	Parallel	Flat	Compos ite	20	1	Cuevas/Mo nserrate

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
42	2225	2657.3	Med.	Vlcanic	Slipped	Smthd	Brn	Pale Brn slip	3.1	7.1	N/A	N/A	N/A	0	1	UID Ost
42	2225	2657.3	Med.	Vlcanic	Slipped	Slf. Slip	Brn	Brn slip	1.5	4.2	N/A	N/A	N/A	0	1	UID Ost
42	2225	2657.3	Med.	Vlcanic	Smthd	Smthd	Dark Brn	N/A	5.5	6.6	N/A	N/A	N/A	0	1	Ost Mod
42	2225	2657.3	Med.	Vlcanic	Smthd	Smthd	Buff	N/A	4.9	9.9	N/A	N/A	N/A	0	1	Snta Elena
42	2225	2657.3	Med.	Vlcanic	Smthd	Smthd	Brn	N/A	36.6	6.5	Parallel	N/A	N/A	0	17	UID Ost
42	2225	2657.3	Med.	Vlcanic	Slf. Slip	Burnish	Brn	N/A	6.3	5.4	N/A	N/A	N/A	0	1	Cuevas
42	2225	2657.3	Med.	Vlcanic	Slf. Slip	Burnish	Brn	N/A	3.3	6.0	N/A	N/A	N/A	0	1	Ost Mod
42	2225	2657.3	Med.	Vlcanic	Slf. Slip	Smthd	Brn	N/A	10.6	7.4	N/A	N/A	N/A	0	2	UID Ost
42	2225	2657.3	Med.	Vlcanic	Slf. Slip	Slf. Slip	Pale Brn	N/A	3.8	6.4	N/A	N/A	N/A	0	1	Cuevas
42	2225	2657.3	Med.	Vlcanic	Slf. Slip	Slf. Slip	Brn	N/A	16.5	6.4	N/A	N/A	N/A	0	4	UID Ost
42	2225	2657.3	Med-Crse.	Felsic	Eroded	Eroded	Redsh Brn	N/A	5.9	8.2	N/A	N/A	N/A	0	1	UID Ost
42	2225	2657.3	Med-Crse.	Felsic	Smthd	Eroded	Org. Brn	N/A	6.7	8.5	N/A	N/A	N/A	0	1	Snta Elena
42	2225	2657.3	Med-Crse.	Felsic	Smthd	Slipped	Redsh Brn	Pale Brn slip	3.8	8.4	N/A	N/A	N/A	0	1	UID Ost
42	2225	2657.3	Med-Crse.	Felsic	Smthd	Smthd	Org. Brn	N/A	6.5	9.7	N/A	N/A	N/A	0	2	Snta Elena
42	2225	2657.3	Med-Crse.	Felsic	Smthd	Smthd	Redsh Brn	N/A	8.9	7.8	Parallel	Round beveled in	Convex out	20	1	UID Ost
42	2225	2657.3	Med-Crse.	Felsic w/ grog	Smthd	Slf. Slip	Brn	N/A	33.2	8.3	Thickened In Round	Round beveled in	Convex out	32	1	Ost Mod
42	2225	2657.3	Med-Crse.	Quartz	Smthd	Slipped	Brn	Red slip	8.8	8.6	N/A	N/A	N/A	0	1	Snta Elena
42	2225	2657.3	Med-Crse.	Quartz	Smthd	Smthd	Brn	N/A	6.7	6.6	Parallel	Flat	Straight vertical	0	1	Cuevas
42	2225	2657.3	Med-Crse.	Quartz	Slf. Slip	Smudged	Pale Brn	N/A	3.1	7.1	N/A	N/A	N/A	0	1	Cuevas
42	2225	2657.3	Med-Crse.	Vlcanic	Slipped	Slipped	Brn	Brn slip	2	8.1	N/A	N/A	N/A	0	1	UID Ost
42	2225	2657.3	Med-Crse.	Vlcanic	Smthd	Smthd	Pale Brn	N/A	9.8	8.2	N/A	N/A	N/A	0	1	UID Ost
42	2225	2657.3	Med-Crse.	Vlcanic	Slf. Slip	Burnish	Brn	N/A	4.9	7.6	N/A	N/A	N/A	0	1	Chican Ost

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
42	2225	2657.3	Med-Crse.	Vlcanic	Slf. Slip	Slf. Slip	Brn	N/A	8.8	7.5	Parallel	Round	Convex in	16	2	UID Ost
42	2225	2662.5	Med-Crse.	Felsic	Smthd	Smthd	Org. Brn	N/A	3.2	6.6	N/A	N/A	N/A	0	1	UID Ost
42	2225	2675	Med.	Felsic	Eroded	Slf. Slip	Brn	N/A	17.2	11.4	N/A	N/A	N/A	0	1	UID Ost
42	2225	2675	Med.	Felsic	Slipped	Smthd	Brn	Brn slip	3.2	6.1	N/A	N/A	N/A	0	1	UID Ost
42	2225	2675	Med.	Felsic	Smthd	Slipped	Redsh Brn	Brn slip	3.1	6.1	N/A	N/A	N/A	0	1	UID Ost
42	2225	2675	Med.	Felsic	Smthd	Smthd	Brn	N/A	17.7	6.7	Parallel	Round	Indet.	0	1	UID Ost
42	2225	2675	Med.	Vlcanic	Smthd	Smthd	Brn	N/A	2.6	6.3	N/A	N/A	N/A	0	1	UID Ost
42	2225	2675	Med-Crse.	Felsic	Brnshd	Smthd	Brn	N/A	132	11.9	Thickened In Angular	Round beveled in	Convex in	34	1	Ost Puro
42	2225	2675	Med-Crse.	Felsic	Slipped	Smthd	Redsh Brn	Red slip	3.6	7.2	N/A	N/A	N/A	0	1	Ost Puro
42	2225	2675	Med-Crse.	Felsic	Smthd	Slipped	Brn	Red slip	7.9	10.6	Parallel	Round beveled in	Convex vertical	0	1	Capa
42	2225	2675	Med-Crse.	Felsic	Smthd	Smthd	Redsh Brn	N/A	14.4	9.2	Thickened In/Ext	N/A	N/A	0	2	UID Ost
42	2225	2700	Med.	Felsic	Smthd	Smthd	Brn	N/A	6.6	7.4	N/A	N/A	N/A	0	1	UID Ost
42	2225	2700	Med-Crse.	Felsic	Smthd	Smthd	Brn	N/A	9.3	8.8	N/A	N/A	N/A	0	1	Monserrate
42	2225	2700	Med-Crse.	Felsic	Smthd	Smthd	Redsh Brn	N/A	11.2	11.0	N/A	N/A	N/A	0	2	UID Ost
42	2226	2657.5	Crse.	Felsic	Eroded	Smthd	Org. Brn	N/A	42.2	21.9	N/A	N/A	Buren	0	2	Indet.
42	2226	2657.5	Fine	Felsic	Brnshd	Slf. Slip	Dark Brn	N/A	2.1	5.3	N/A	N/A	N/A	0	1	UID Ost
42	2226	2657.5	Fine	Felsic	Painted	Smthd	Buff	Org on Buff	3	5.4	N/A	N/A	N/A	0	1	Cuevas
42	2226	2657.5	Fine	Felsic	Slipped	Slipped	Red	Red slip	1.9	5.7	N/A	N/A	N/A	0	1	Cuevas/Ost Puro
42	2226	2657.5	Fine	Felsic	Slipped	Slipped	Red	Red slip	6.4	7.5	Parallel	Flat	Straight vertical	18	1	Ost Puro
42	2226	2657.5	Fine	Felsic	Smthd	Smthd	Buff	N/A	2.1	5.1	N/A	N/A	N/A	0	1	Cuevas
42	2226	2657.5	Fine	Felsic	Smthd	Smthd	Redsh Brn	N/A	15.9	5.5	Parallel	N/A	N/A	18	5	UID Ost

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
42	2226	2657.5	Fine	Felsic	Slf. Slip	Slipped	Brn	White on Red	1.7	5.3	N/A	N/A	N/A	0	1	UID Ost
42	2226	2657.5	Fine	Vlcanic	Slipped	Slipped	Buff	Red slip	2.5	6.2	N/A	N/A	N/A	0	1	Cuevas/Ost Puro
42	2226	2657.5	Fine	Vlcanic	Slipped	Smthd	Brn	Brn slip	2.4	7.2	Parallel	Flat	Indet.	0	1	UID Ost
42	2226	2657.5	Fine	Vlcanic	Smthd	Smthd	Buff	N/A	4.1	6.2	N/A	N/A	N/A	0	1	Cuevas
42	2226	2657.5	Fine	Vlcanic	Smthd	Smthd	Redsh Brn	N/A	9.4	5.8	Thinned	N/A	N/A	0	5	UID Ost
42	2226	2657.5	Fine	Vlcanic	Slf. Slip	Smthd	Brn	N/A	2.4	6.3	N/A	N/A	N/A	0	1	UID Ost
42	2226	2657.5	Fine	Vlcanic	Slf. Slip	Slf. Slip	Pale Brn	N/A	17.9	5.5	N/A	N/A	N/A	0	3	Cuevas
42	2226	2657.5	Fine	Vlcanic	Slf. Slip	Slf. Slip	Dark Brn	N/A	8.9	7.2	N/A	N/A	N/A	0	1	Cuevas/Monserrate
42	2226	2657.5	Med.	Felsic	Brnshd	Burnish	Redsh Brn	N/A	3.9	4.9	Thickened Ext. Angular	Flat	Straight vertical	0	1	Cuevas/Ost Puro
42	2226	2657.5	Med.	Felsic	Brnshd	Burnish	Brn	N/A	4	6.5	Parallel	Flat	Composite	20	1	Ost Mod
42	2226	2657.5	Med.	Felsic	Brnshd	Burnish	Dark Brn	N/A	2.5	5.9	N/A	N/A	N/A	0	2	UID Ost
42	2226	2657.5	Med.	Felsic	Brnshd	Slipped	Redsh Brn	Pale Brn slip	3.4	6.9	N/A	N/A	N/A	0	1	UID Ost
42	2226	2657.5	Med.	Felsic	Brnshd	Smthd	Brn	N/A	1.1	5.0	N/A	N/A	N/A	0	1	UID Ost
42	2226	2657.5	Med.	Felsic	Eroded	Eroded	Org. Brn	N/A	2.1	9.2	N/A	N/A	N/A	0	1	UID Ost
42	2226	2657.5	Med.	Felsic	Eroded	Smthd	Redsh Brn	N/A	3.1	8.9	N/A	N/A	N/A	0	1	Esperanza
42	2226	2657.5	Med.	Felsic	Eroded	Smthd	Org. Brn	N/A	2.9	6.3	N/A	N/A	N/A	0	1	UID Ost
42	2226	2657.5	Med.	Felsic	Slipped	Slipped	Redsh Brn	Red slip	2.6	5.2	N/A	N/A	N/A	0	1	Cuevas
42	2226	2657.5	Med.	Felsic	Slipped	Slipped	Redsh Brn	Brn slip	2.1	5.2	N/A	N/A	N/A	0	1	UID Ost
42	2226	2657.5	Med.	Felsic	Smthd	Burnish	Brn	N/A	20.4	6.9	N/A	N/A	N/A	0	3	UID Ost
42	2226	2657.5	Med.	Felsic	Smthd	Slipped	Org. Brn	Brn slip	2	6.1	N/A	N/A	N/A	0	1	UID Ost
42	2226	2657.5	Med.	Felsic	Smthd	Smthd	Org	N/A	2.7	6.0	Thinned	Tapered	Composite	0	1	Capa
42	2226	2657.5	Med.	Felsic	Smthd	Smthd	Org. Brn	N/A	2.3	3.0	N/A	N/A	N/A	0	1	Elenan Ost
42	2226	2657.5	Med.	Felsic	Smthd	Smthd	Pale Brn	N/A	7.9	13.4	N/A	N/A	N/A	0	1	Snta Elena
42	2226	2657.5	Med.	Felsic	Smthd	Smthd	Brn	N/A	39.6	6.0	Thinned	N/A	N/A	0	19	UID Ost

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
42	2226	2657.5	Med.	Felsic	Slf. Slip	Eroded	Brn	N/A	56.4	7.7	N/A	N/A	N/A	0	1	UID Ost
42	2226	2657.5	Med.	Felsic	Slf. Slip	Smthd	Pale Brn	N/A	3.4	8.3	N/A	N/A	N/A	0	1	Elenan Ost
42	2226	2657.5	Med.	Felsic	Slf. Slip	Smthd	Brn	N/A	36.4	7.2	N/A	N/A	N/A	0	4	UID Ost
42	2226	2657.5	Med.	Felsic	Slf. Slip	Slf. Slip	Brn	N/A	21.2	6.4	Parallel	Round	Indet.	0	6	UID Ost
42	2226	2657.5	Med.	Flesic w/ shell	Slipped	Slipped	Redsh Brn	Red slip	17.2	6.1	Thinned	Round	Straight vertical	22	1	Cuevas/Ost Puro
42	2226	2657.5	Med.	Flesic w/ shell	Smthd	Smthd	Orgish Red	N/A	2.9	5.3	Thinned	Round bevele d in	Indet.	0	2	UID Ost
42	2226	2657.5	Med.	Limest one	Smthd	Smthd	Redsh Brn	N/A	2.8	5.2	N/A	N/A	N/A	0	1	UID Ost
42	2226	2657.5	Med.	Quartz	Brnshd	Smthd	Brn	N/A	6.3	5.1	N/A	N/A	N/A	0	2	UID Ost
42	2226	2657.5	Med.	Quartz	Brnshd	Slf. Slip	Brn	N/A	33.8	7.0	N/A	N/A	N/A	0	1	Cuevas
42	2226	2657.5	Med.	Quartz	Smthd	Eroded	Pale Brn	N/A	0.9	7.1	N/A	N/A	N/A	0	1	UID Ost
42	2226	2657.5	Med.	Quartz	Smthd	Smthd	Pale Brn	N/A	6.7	7.2	Thicken ed Ext. Round	N/A	N/A	0	3	UID Ost
42	2226	2657.5	Med.	Vlcanic	Brnshd	Burnish	Dark Brn	N/A	2.3	4.3	N/A	N/A	N/A	0	1	UID Ost
42	2226	2657.5	Med.	Vlcanic	Brnshd	Smthd	Brn	Brn slip	53.6	7.6	N/A	N/A	N/A	0	1	UID Ost
42	2226	2657.5	Med.	Vlcanic	Brnshd	Slf. Slip	Brn	Brn slip	10.5	6.7	N/A	N/A	N/A	0	1	UID Ost
42	2226	2657.5	Med.	Vlcanic	Eroded	Slf. Slip	Buff	Pink slip	1.9	5.1	N/A	N/A	N/A	0	1	Cuevas/Ost Puro
42	2226	2657.5	Med.	Vlcanic	Slipped	Slipped	Redsh Brn	Red slip	2.9	6.2	N/A	N/A	N/A	0	1	Cuevas/Ost Puro
42	2226	2657.5	Med.	Vlcanic	Slipped	Slipped	Brn	Brn slip	3.6	5.0	N/A	N/A	N/A	0	1	UID Ost
42	2226	2657.5	Med.	Vlcanic	Slipped	Smthd	Brn	Brn slip	2.4	6.2	N/A	N/A	N/A	0	1	UID Ost
42	2226	2657.5	Med.	Vlcanic	Smthd	Burnish	Brn	N/A	7.3	5.9	N/A	N/A	N/A	0	2	UID Ost
42	2226	2657.5	Med.	Vlcanic	Smthd	Smthd	Brn	N/A	11.7	10. 9	N/A	N/A	N/A	0	1	Snta Elena
42	2226	2657.5	Med.	Vlcanic	Smthd	Smthd	Brn	N/A	25.4	6.3	Parallel	N/A	N/A	10	10	UID Ost
42	2226	2657.5	Med.	Vlcanic	Smthd	Slf. Slip	Brn	N/A	8.8	9.5	N/A	N/A	N/A	0	2	UID Ost
42	2226	2657.5	Med.	Vlcanic	Slf. Slip	Smthd	Brn	N/A	4.4	5.4	N/A	N/A	N/A	0	1	UID Ost
42	2226	2657.5	Med-Crse.	Felsic	Brnshd	Burnish	Smudgin g	N/A	7	5.5	Parallel	Flat	Indet.	0	1	UID Ost
42	2226	2657.5	Med-Crse.	Felsic	Brnshd	Smthd	Dark Brn	N/A	3.1	7.1	N/A	N/A	N/A	0	1	UID Ost

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
42	2226	2657.5	Med-Crse.	Felsic	Eroded	Slipped	Redsh Brn	Pale Brn slip	2.3	10.1	N/A	N/A	N/A	0	1	UID Ost
42	2226	2657.5	Med-Crse.	Felsic	Eroded	Smthd	Org. Brn	N/A	11.9	10.0	N/A	N/A	N/A	0	1	Snta Elena
42	2226	2657.5	Med-Crse.	Felsic	Eroded	Smthd	Brn	N/A	14.7	9.6	N/A	N/A	N/A	0	2	UID Ost
42	2226	2657.5	Med-Crse.	Felsic	Slipped	Slipped	Brn	Brn slip	2.7	6.8	N/A	N/A	N/A	0	1	UID Ost
42	2226	2657.5	Med-Crse.	Felsic	Smthd	Eroded	Brn	N/A	7.6	6.3	N/A	N/A	N/A	0	1	UID Ost
42	2226	2657.5	Med-Crse.	Felsic	Smthd	Smthd	Org. Brn	N/A	7.4	10.0	N/A	N/A	N/A	0	2	Snta Elena
42	2226	2657.5	Med-Crse.	Felsic	Smthd	Smthd	Brn	N/A	8.6	7.4	N/A	N/A	N/A	0	4	UID Ost
42	2226	2657.5	Med-Crse.	Felsic	Smthd	Slf. Slip	Brn	N/A	4.6	7.4	N/A	N/A	N/A	0	1	UID Ost
42	2226	2657.5	Med-Crse.	Felsic	Slf. Slip	Smthd	Brn	N/A	25.7	11.3	N/A	N/A	N/A	0	1	Snta Elena
42	2226	2657.5	Med-Crse.	Felsic	Slf. Slip	Smthd	Redsh Brn	N/A	4.9	6.6	N/A	N/A	N/A	0	1	UID Ost
42	2226	2657.5	Med-Crse.	Felsic	Slf. Slip	Slf. Slip	Org. Brn	N/A	2.7	5.9	N/A	N/A	N/A	0	1	UID Ost
42	2226	2657.5	Med-Crse.	Quartz	Brnshd	Slf. Slip	Brn	Brn slip	6	7.4	N/A	N/A	N/A	0	1	UID Ost
42	2226	2657.5	Med-Crse.	Quartz	Smthd	Smthd	Pale Brn	N/A	7.7	6.9	N/A	N/A	N/A	0	3	UID Ost
42	2226	2657.5	Med-Crse.	Vlcanic	Brnshd	Burnish	Dark Brn	N/A	7	5.7	N/A	N/A	N/A	0	2	UID Ost
42	2226	2657.5	Med-Crse.	Vlcanic	Brnshd	Smudged	Brn	N/A	16.3	5.9	N/A	N/A	N/A	0	1	UID Ost
42	2226	2657.5	Med-Crse.	Vlcanic	Slipped	Smthd	Brn	Pale Brn slip	5.1	7.4	N/A	N/A	N/A	0	1	UID Ost
42	2226	2657.5	Med-Crse.	Vlcanic	Smthd	Smthd	Brn	N/A	4.2	5.7	N/A	N/A	N/A	0	2	Cuevas
42	2226	2657.5	Med-Crse.	Vlcanic	Smthd	Smthd	Brn	N/A	25.3	5.5	N/A	N/A	N/A	0	3	UID Ost
42	2237.5	2675	Med.	Vlcanic	Smthd	Smthd	Redsh Brn	N/A	2.5	6.8	N/A	N/A	N/A	0	1	UID Ost

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
42	2240	2706.5	Med-Crse.	Felsic	Smthd	Smthd	Redsh Brn	N/A	2.4	7.6	N/A	N/A	N/A	0	1	UID Ost
42	2240	2706.5	Med-Crse.	Vlcanic	Smthd	Smthd	Brn	N/A	4.8	7.5	N/A	N/A	N/A	0	1	UID Ost
42	2245	2690	Fine	Vlcanic	Smthd	Smthd	Buff	N/A	2.9	5.4	N/A	N/A	N/A	0	1	Cuevas
42	2245	2690	Fine	Vlcanic	Smthd	Smthd	Brn	N/A	1.9	5.3	N/A	N/A	N/A	0	1	UID Ost
42	2245	2690	Med.	Felsic	Smthd	Smthd	Brn	N/A	3.7	5.6	N/A	N/A	N/A	0	1	UID Ost
42	2245	2690	Med.	Vlcanic	Smthd	Smthd	Redsh Brn	N/A	3.4	6.2	N/A	N/A	N/A	0	1	UID Ost
42	2245	2705	Med.	Felsic	Smthd	Burnish	Brn	N/A	2.1	7.1	N/A	N/A	N/A	0	1	UID Ost
42	2245	2705	Med.	Felsic	Smthd	Eroded	Redsh Brn	N/A	1.9	6.0	N/A	N/A	N/A	0	1	UID Ost
42	2245	2705	Med.	Felsic	Smthd	Smthd	Redsh Brn	N/A	8.5	9.5	N/A	N/A	N/A	0	1	Snta Elena
42	2245	2705	Med.	Felsic	Smthd	Smthd	Brn	N/A	18.7	6.5	N/A	N/A	N/A	0	6	UID Ost
42	2245	2705	Med.	Vlcanic	Smthd	Smthd	Redsh Brn	N/A	5.6	8.0	N/A	N/A	N/A	0	1	Monserrate
42	2245	2705	Med.	Vlcanic	Smthd	Smthd	Brn	N/A	6.1	9.1	N/A	N/A	N/A	0	1	Snta Elena
42	2245	2705	Med.	Vlcanic	Smthd	Smthd	Brn	N/A	3.2	5.7	N/A	N/A	N/A	0	1	UID Ost
42	2245	2705	Med-Crse.	Felsic	Eroded	Eroded	Pale Brn	N/A	2.4	8.4	N/A	N/A	N/A	0	1	UID Ost
42	2245	2705	Med-Crse.	Felsic	Smthd	Smthd	Brn	N/A	2	9.7	Indtermi nate	Round	Indet.	12	1	Snta Elena
42	2245	2705	Med-Crse.	Felsic	Smthd	Smthd	Redsh Brn	N/A	12.8	9.0	N/A	N/A	N/A	0	4	UID Ost
42	2245	2709.5	Fine	Felsic	Slf. Slip	Smthd	Redsh Brn	N/A	4.1	5.2	N/A	N/A	N/A	0	1	Cuevas/Ost Puro
42	2245	2709.5	Med.	Felsic	Smthd	Smthd	Redsh Brn	N/A	7.3	7.5	N/A	N/A	N/A	0	1	Monserrate
42	2245	2709.5	Med.	Vlcanic	Slf. Slip	Smthd	Brn	N/A	4.6	6.9	N/A	N/A	N/A	0	1	UID Ost
42	2245	2709.5	Med-Crse.	Felsic	Smthd	Eroded	Redsh Brn	N/A	16.1	6.7	N/A	N/A	N/A	0	1	Monserrate
42	2245	2709.5	Med-Crse.	Felsic	Smthd	Smthd	Brn	N/A	49.8	10.6	N/A	N/A	N/A	0	2	Snta Elena
42	2245	2709.5	Med-Crse.	Quartz	Eroded	Smthd	Brn	N/A	39.7	11.4	N/A	N/A	N/A	0	1	Snta Elena
42	2245	2709.5	Med-Crse.	Vlcanic	Smthd	Smthd	Brn	N/A	5.6	6.0	N/A	N/A	N/A	0	1	UID Ost
42	2250	2675	Med.	Felsic	Brnshd	Smthd	Org. Brn	N/A	13	12.5	N/A	N/A	N/A	0	1	Esperanza
42	2250	2675	Med.	Felsic	Smthd	Smthd	Org. Brn	N/A	6.9	7.3	N/A	N/A	N/A	0	2	UID Ost

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
42	2250	2675	Med.	Vlcanic	Brnshd	Smthd	Brn	N/A	69.9	8.9	Parallel	Round beveled in	Convex in	34	1	Ost Mod
42	2250	2675	Med.	Vlcanic	Slf. Slip	Slf. Slip	Org. Brn	N/A	3.4	8.1	N/A	N/A	N/A	0	1	UID Ost
42	2250	2675	Med-Crse.	Felsic	Smthd	Smthd	Brn	N/A	5.3	7.7	N/A	N/A	N/A	0	2	UID Ost
42	2250	2687.5	Fine	Vlcanic	Painted	Painted	Brn	Red slip	10.5	5.0	Thickened In Round	Round	Convex vertical	22	1	Cuevas
42	2250	2687.5	Med.	Felsic	Eroded	Smthd	Redsh Brn	N/A	27	13.5	Thinned	Round beveled out	Plate	22	1	UID Ost
42	2250	2687.5	Med.	Felsic	Smthd	Smthd	Brn	N/A	4.8	6.7	N/A	N/A	N/A	0	1	UID Ost
42	2250	2687.5	Med.	Vlcanic	Smthd	Burnish	Dark Brn	N/A	5.2	7.6	N/A	N/A	N/A	0	1	UID Ost
42	2250	2687.5	Med.	Vlcanic	Slf. Slip	Slf. Slip	Brn	N/A	7.3	6.2	N/A	N/A	N/A	0	1	Cuevas/Ost Puro
42	2250	2687.5	Med-Crse.	Felsic	Eroded	Smthd	Brn	N/A	9.1	12.2	N/A	N/A	N/A	0	1	UID Ost
42	2250	2687.5	Med-Crse.	Felsic	Smthd	Smthd	Redsh Brn	N/A	10.9	8.4	N/A	N/A	N/A	0	1	Monserrate
42	2250	2687.5	Med-Crse.	Felsic	Smthd	Slf. Slip	Redsh Brn	N/A	7.6	8.8	N/A	N/A	N/A	0	1	Snta Elena
42	2250	2687.5	Med-Crse.	Felsic	Smthd	Slf. Slip	Brn	N/A	1.7	5.6	N/A	N/A	N/A	0	1	UID Ost
42	2250	2687.5	Med-Crse.	Vlcanic	Brnshd	Smthd	Brn	N/A	4.9	6.6	N/A	N/A	N/A	0	1	UID Ost
42	2250	2700	Fine	Vlcanic	Painted	Smthd	Buff	Red on Buff	22.8	6.4	Indterminate	Indet.	Outflaring	22	1	Cuevas
42	2250	2700	Fine	Vlcanic	Smthd	Smthd	Org. Brn	N/A	2.7	6.6	N/A	N/A	N/A	0	1	Cuevas
42	2250	2700	Med.	Felsic	Smthd	Smthd	Brn	N/A	6.9	5.7	Parallel	N/A	N/A	0	3	UID Ost
42	2250	2700	Med-Crse.	Felsic	Eroded	Eroded	Org	N/A	2.3	6.1	Thickened In Round	Round beveled in	Indet.	0	1	Cuevas
42	2250	2700	Med-Crse.	Felsic	Smthd	Smthd	Brn	N/A	15.5	6.7	N/A	Indet.	Plate	0	3	UID Ost
42	2250	2700	Med-Crse.	Felsic	Slf. Slip	Smthd	Brn	N/A	3	6.2	N/A	N/A	N/A	0	1	UID Ost
42	2250	2700	Med-Crse.	Limestone	Smthd	Smthd	Red	N/A	8.6	12.1	Thickened In Angular	Round beveled in	Plate	0	1	UID Ost

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
42	2250	2712.5	Med.	Felsic	Smthd	Smthd	Org. Brn	N/A	5.1	10.8	N/A	N/A	N/A	0	2	Snta Elena
42	2250	2712.5	Med-Crse.	Felsic	Smthd	Smthd	Brn	N/A	2.6	6.2	N/A	N/A	N/A	0	1	UID Ost
42	2250	2712.5	Med-Crse.	Felsic	Slf. Slip	Smthd	Brn	N/A	8.4	6.7	N/A	N/A	N/A	0	1	UID Ost
42	2250	2712.5	Med-Crse.	Vlcanic	Brnshd	Burnish	Dark Brn	N/A	3.7	10.5	N/A	N/A	N/A	0	1	Ost Mod
42	2250	2712.5	Med-Crse.	Vlcanic	Slipped	Smthd	Redsh Brn	Red slip	2.3	7.2	Parallel	Round	Indet.	0	1	Monserrate
42	2250	2712.5	Med-Crse.	Vlcanic	Smthd	Smthd	Dark Brn	N/A	3.6	10.9	Thinned	Round	Indet.	0	1	Snta Elena
42	2250	2712.5	Med-Crse.	Vlcanic	Smthd	Smthd	Brn	N/A	3.1	6.8	N/A	N/A	N/A	0	1	UID Ost
42	2250	2725	Med.	Felsic	Smthd	Smthd	Redsh Brn	N/A	1.7	6.6	N/A	N/A	N/A	0	1	UID Ost
42	2250	2725	Med-Crse.	Felsic	Smthd	Smthd	Brn	N/A	5.4	6.7	N/A	N/A	N/A	0	2	UID Ost
42	2252	2705	Fine	Quartz	Smthd	Smthd	Buff	N/A	2.6	5.8	N/A	N/A	N/A	0	1	Cuevas
42	2252	2705	Med.	Felsic	Smthd	Smthd	Redsh Brn	N/A	10.6	8.9	N/A	N/A	N/A	0	1	Monserate/ Snta Elena
42	2252	2705	Med.	Felsic	Smthd	Smthd	Redsh Brn	N/A	9.3	8.2	Parallel	N/A	N/A	0	3	UID Ost
42	2252	2705	Med.	Felsic	Slf. Slip	Smthd	Brn	N/A	6.7	9.5	N/A	N/A	N/A	0	2	UID Ost
42	2252	2705	Med.	Vlcanic	Brnshd	Smthd	Brn	N/A	17.6	6.6	N/A	N/A	N/A	0	1	UID Ost
42	2252	2705	Med.	Vlcanic	Smthd	Smthd	Brn	N/A	6.6	6.9	N/A	N/A	N/A	0	1	Ost Mod
42	2252	2705	Med.	Vlcanic	Smthd	Smthd	Brn	N/A	3.5	6.4	Parallel	N/A	N/A	0	2	UID Ost
42	2252	2705	Med-Crse.	Felsic	Smthd	Smthd	White/Grey	N/A	12.8	7.1	N/A	N/A	N/A	0	4	UID Ost
42	2262	2662.5	Med.	Quartz	Smthd	Smthd	Pale Brn	N/A	1.5	5.3	N/A	N/A	N/A	0	1	UID Ost
42	2262	2662.5	Med.	Quartz	Slf. Slip	Slf. Slip	Brn	N/A	2.8	6.7	N/A	N/A	N/A	0	1	UID Ost
42	2262	2662.5	Med.	Vlcanic	Smthd	Smthd	Brn	N/A	17.6	7.8	N/A	N/A	N/A	0	2	UID Ost
42	2262	2662.5	Med-Crse.	Felsic	Smthd	Smthd	Org. Brn	N/A	3.7	7.2	N/A	N/A	N/A	0	1	UID Ost
42	2262	2662.5	Med-Crse.	Vlcanic	Smthd	Smthd	Org. Brn	N/A	5	7.3	N/A	N/A	N/A	0	2	UID Ost
42	2262	2662.5	Med-Crse.	Vlcanic	Slf. Slip	Burnish	Brn	N/A	3.7	7.3	N/A	N/A	N/A	0	1	UID Ost
42	2275	2700	Med.	Felsic	Smthd	Smthd	Brn	N/A	2.2	6.3	N/A	N/A	N/A	0	1	UID Ost
42	2275	2700	Med-Crse.	Felsic	Smthd	Smthd	Org. Brn	N/A	2.3	7.4	N/A	N/A	N/A	0	1	UID Ost

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
42	2300	2650	Med.	Felsic	Smthd	Smthd	Brn	N/A	4.1	5.7	Parallel	Flat	Convex in	14	1	UID Ost
42	2337.5	2562	Crse.	Felsic	Brnshd	Smthd	Redsh Brn	N/A	7.7	14.2	N/A	N/A	N/A	0	1	UID Ost
42	2337.5	2562	Crse.	Felsic	Smthd	Smthd	Redsh Brn	N/A	15.6	16.5	N/A	N/A	Buren	0	1	UID Ost
42	2337.5	2562	Med.	Felsic	Eroded	Burnish	Smudging	N/A	17.2	8.4	N/A	N/A	N/A	0	3	UID Ost
42	2337.5	2562	Med.	Felsic	Eroded	Eroded	Redsh Brn	N/A	9	7.9	N/A	N/A	N/A	0	2	UID Ost
42	2337.5	2562	Med.	Felsic	Eroded	Smthd	Org. Brn	N/A	5.7	7.3	N/A	N/A	N/A	0	2	UID Ost
42	2337.5	2562	Med.	Felsic	Painted	Eroded	Org. Brn	N/A	2.5	6.2	N/A	N/A	N/A	0	1	UID Ost
42	2337.5	2562	Med.	Felsic	Slipped	Slipped	Brn	Red slip	2.8	6.0	N/A	N/A	N/A	0	1	Ost Puro
42	2337.5	2562	Med.	Felsic	Smthd	Burnish	Redsh Brn	N/A	2.5	8.7	N/A	N/A	N/A	0	1	Monserrate
42	2337.5	2562	Med.	Felsic	Smthd	Burnish	Redsh Brn	N/A	10.4	9.2	N/A	N/A	N/A	0	1	UID Ost
42	2337.5	2562	Med.	Felsic	Smthd	Eroded	Redsh Brn	N/A	4.7	11.1	N/A	N/A	N/A	0	1	UID Ost
42	2337.5	2562	Med.	Felsic	Smthd	Smthd	Redsh Brn	N/A	7.2	8.7	N/A	N/A	N/A	0	1	Snta Elena
42	2337.5	2562	Med.	Felsic	Smthd	Smthd	Brn	N/A	10.9	7.7	Parallel	N/A	N/A	0	3	UID Ost
42	2337.5	2562	Med.	Felsic	Slf. Slip	Burnish	Brn	N/A	21	8.6	N/A	N/A	N/A	0	1	UID Ost
42	2337.5	2562	Med.	Felsic	Slf. Slip	Slf. Slip	Redsh Brn	N/A	2	6.7	N/A	N/A	N/A	0	1	Elenan Ost
42	2337.5	2562	Med.	Vlcanic	Brnshd	Burnish	Dark Brn	N/A	2	8.1	Thickened In Round	Round beveled in	Indet.	0	1	UID Ost
42	2337.5	2562	Med.	Vlcanic	Eroded	Slf. Slip	Brn	N/A	2	5.9	N/A	N/A	N/A	0	1	UID Ost
42	2337.5	2562	Med.	Vlcanic	Smthd	Smthd	Redsh Brn	N/A	4.1	18.3	N/A	N/A	N/A	0	1	Monserrate
42	2337.5	2562	Med-Crse.	Felsic	Brnshd	Burnish	Brn	N/A	16.2	12.8	Parallel	Round beveled in	Composite	11	1	Capa
42	2337.5	2562	Med-Crse.	Felsic	Brnshd	Burnish	Redsh Brn	N/A	8.5	12.7	N/A	N/A	N/A	0	1	Monserrate
42	2337.5	2562	Med-Crse.	Felsic	Brnshd	Painted	Brn	Red paint	3.3	7.8	N/A	N/A	N/A	0	1	Ost Puro
42	2337.5	2562	Med-Crse.	Felsic	Brnshd	Slipped	Dark Brn	Red paint	3.6	9.5	N/A	N/A	N/A	0	1	Cuevas/Ost Puro

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
42	2337.5	2562	Med-Crse.	Felsic	Eroded	Burnish	Brn	N/A	11.7	9.6	N/A	N/A	N/A	0	1	UID Ost
42	2337.5	2562	Med-Crse.	Felsic	Eroded	Eroded	Org. Brn	N/A	7.5	6.6	N/A	N/A	N/A	0	3	UID Ost
42	2337.5	2562	Med-Crse.	Felsic	Smthd	Eroded	Brn	N/A	6.2	10.4	N/A	N/A	N/A	0	1	Snta Elena
42	2337.5	2562	Med-Crse.	Felsic	Smthd	Eroded	Brn	N/A	4.6	8.0	N/A	N/A	N/A	0	1	UID Ost
42	2337.5	2562	Med-Crse.	Felsic	Smthd	Smthd	Redsh Brn	N/A	5.6	8.4	N/A	N/A	N/A	0	2	Capa
42	2337.5	2562	Med-Crse.	Felsic	Smthd	Smthd	Brn	N/A	4.7	9.7	N/A	N/A	N/A	0	1	Snta Elena
42	2337.5	2562	Med-Crse.	Felsic	Slf. Slip	Burnish	Org. Brn	N/A	3.4	9.0	N/A	N/A	N/A	0	1	Monserrate
42	2337.5	2562	Med-Crse.	Felsic	Slf. Slip	Painted	Org. Brn	Brn slip	2.8	5.8	N/A	N/A	N/A	0	1	UID Ost
42	2337.5	2562	Med-Crse.	Quartz	Slf. Slip	Smthd	Red	N/A	6.5	12.2	N/A	Double beveled	Straight vertical	0	1	Snta Elena
42	2337.5	2562.5	Crse.	Felsic	Eroded	Eroded	Dark Brn	N/A	2.2	13.2	N/A	N/A	Buren	0	1	UID Ost
42	2337.5	2562.5	Med.	Felsic	Brnshd	Burnish	Brn	N/A	1.9	7.7	N/A	N/A	N/A	0	1	UID Ost
42	2337.5	2562.5	Med.	Felsic	Smthd	Smthd	Org	N/A	2.5	8.6	Thickened In Round	Flat	Convex out	0	1	Snta Elena
42	2337.5	2562.5	Med.	Felsic	Smthd	Smthd	Redsh Brn	N/A	3.9	8.2	N/A	N/A	N/A	0	2	UID Ost
42	2337.5	2562.5	Med.	Vlcanic	Brnshd	Burnish	Dark Brn	N/A	3.6	5.9	N/A	N/A	N/A	0	1	UID Ost
42	2337.5	2562.5	Med.	Vlcanic	Smthd	Burnish	Org. Brn	N/A	5.3	6.0	N/A	N/A	N/A	0	1	Snta Elena
42	2337.5	2562.5	Med.	Vlcanic	Slf. Slip	Smthd	Brn	N/A	3.3	8.6	N/A	N/A	N/A	0	1	UID Ost
42	2337.5	2562.5	Med-Crse.	Felsic	Brnshd	Smthd	Brn	N/A	11	8.4	N/A	N/A	N/A	0	1	UID Ost
42	2337.5	2562.5	Med-Crse.	Felsic	Eroded	Eroded	Buff	N/A	5.9	10.2	N/A	N/A	N/A	0	2	UID Ost
42	2337.5	2562.5	Med-Crse.	Felsic	Eroded	Slipped	Dark Brn	Pale Brn slip	14.6	11.4	N/A	N/A	N/A	0	1	UID Ost
42	2337.5	2562.5	Med-Crse.	Felsic	Eroded	Smthd	Dark Brn	N/A	4.3	13.3	N/A	N/A	N/A	0	1	UID Ost
42	2337.5	2562.5	Med-Crse.	Felsic	Slipped	Slipped	Redsh Brn	Red slip	1.2	5.9	N/A	N/A	N/A	0	1	Ost Puro

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
42	2337.5	2562.5	Med-Crse.	Felsic	Slipped	Smthd	Orgish Red	Red slip	12.8	10.2	N/A	N/A	N/A	0	1	Monserrate
42	2337.5	2562.5	Med-Crse.	Felsic	Slipped	Slf. Slip	Brn	Pale Brn slip	2.5	8.8	Thickened In Round	Flat	Indet.	0	1	Capa
42	2337.5	2562.5	Med-Crse.	Felsic	Smthd	Smthd	Dark Brn	N/A	7.2	12.5	N/A	N/A	N/A	0	1	Snta Elena
42	2337.5	2562.5	Med-Crse.	Felsic	Slf. Slip	Slf. Slip	Brn	N/A	3.7	10.7	N/A	N/A	N/A	0	1	UID Ost
42	2337.5	2562.5	Med-Crse.	Limestone	Smthd	Smthd	Brn	N/A	2.3	8.4	N/A	N/A	N/A	0	1	UID Ost
42	2337.5	2562.5	Med-Crse.	Quartz	Brnshd	Eroded	Dark Brn	N/A	2.6	9.8	N/A	N/A	N/A	0	1	UID Ost
42	2337.5	2562.5	Med-Crse.	Quartz	Smthd	Smthd	Dark Brn	N/A	3.2	12.2	N/A	N/A	N/A	0	1	UID Ost
42	2337.5	2562.5	Med-Crse.	Vlcanic	Smthd	Smthd	Dark Brn	N/A	4.8	13.5	Parallel	Round	Indet.	0	1	Boca Chica
42	2337.5	2562.5	Med-Crse.	Vlcanic	Smthd	Smthd	Org	N/A	6.7	10.0	N/A	N/A	N/A	0	1	Snta Elena
42	2337.5	2562.5	Med-Crse.	Vlcanic	Smthd	Smthd	Dark Brn	N/A	3.3	7.7	N/A	N/A	N/A	0	1	UID Ost
42	2337.5	2575	Med-Crse.	Felsic	Brnshd	Smthd	Brn	N/A	20.1	11.0	Parallel	Round beveled in	Convex in	20	1	Capa
42	2337.5	2575	Med-Crse.	Quartz	Smthd	Smthd	Redsh Brn	N/A	2	7.1	N/A	N/A	N/A	0	1	UID Ost
42	2337.5	2600	Med.	Vlcanic	Smthd	Smthd	Org. Brn	N/A	2.9	8.6	N/A	N/A	N/A	0	1	UID Ost
42	2350	2562.5	Fine	Quartz	Smthd	Slf. Slip	White/Grey	N/A	3	5.0	N/A	N/A	N/A	0	1	Cuevas
42	2350	2562.5	Med.	Felsic	Eroded	Eroded	Redsh Brn	N/A	5.4	9.7	N/A	N/A	N/A	0	1	UID Ost
42	2350	2562.5	Med.	Felsic	Smthd	Smthd	Brn	N/A	3	6.5	N/A	N/A	N/A	0	1	Elenan Ost
42	2350	2562.5	Med.	Felsic	Slf. Slip	Slf. Slip	Brn	N/A	6.5	11.1	N/A	N/A	N/A	0	1	Elenan Ost
42	2350	2562.5	Med-Crse.	Felsic	Smthd	Burnish	Brn	N/A	6.7	9.0	N/A	N/A	N/A	0	1	UID Ost
42	2350	2562.5	Med-Crse.	Felsic	Smthd	Smthd	Brn	N/A	4.5	9.5	N/A	N/A	N/A	0	1	Elenan Ost
42	2350	2562.5	Med-Crse.	Felsic	Smthd	Smthd	Brn	N/A	1.9	7.7	N/A	N/A	N/A	0	1	UID Ost

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
42	2350	2562.5	Med-Crse.	Felsic	Slf. Slip	Eroded	Pale Brn	N/A	9.6	7.6	N/A	N/A	N/A	0	1	UID Ost
42	2350	2562.5	Med-Crse.	Quartz	Eroded	Eroded	Brn	N/A	6.5	8.1	N/A	N/A	N/A	0	1	Elenan Ost
42	2350	2562.5	Med-Crse.	Vlcanic	Smthd	Smthd	Brn	N/A	5.2	6.8	Thickened In Round	Round beveled in	Convex out	12	1	UID Ost
43	2650	2550	Fine	Vlcanic	Smthd	Smthd	Brn	N/A	3.7	6.8	N/A	N/A	N/A	0	1	UID Ost
43	2662.5	2525	Med-Crse.	Vlcanic	Slf. Slip	Smthd	Redsh Brn	N/A	2.2	7.1	N/A	N/A	N/A	0	1	UID Ost
43	2675	2500	Fine	Felsic	Eroded	Smthd	Brn	N/A	5.4	9.7	Thickened In/Ext	Flat	Straight vertical	0	1	UID Ost
43	2675	2500	Fine	Felsic	Slf. Slip	Smthd	Buff	N/A	4.1	6.3	N/A	N/A	N/A	0	1	Cuevas
43	2675	2500	Fine	Vlcanic	Smthd	Smthd	Org. Brn	N/A	8.9	6.5	N/A	Tapered	Other	0	2	Cuevas/Ost Puro
43	2675	2500	Fine	Vlcanic	Smudged	Smthd	Smudging	N/A	2.4	6.8	N/A	N/A	N/A	0	1	Monserrate
43	2675	2500	Med.	Felsic	Slipped	Slf. Slip	Dark Brn	N/A	4.7	5.1	Parallel	Round beveled in	Straight out	8	1	Snta Elena
43	2675	2500	Med.	Felsic	Smthd	Smthd	Org. Brn	N/A	4.6	6.0	N/A	N/A	N/A	0	2	UID Ost
43	2675	2500	Med.	Vlcanic	Smthd	Smthd	Org. Brn	N/A	9.7	6.6	Parallel	Round	Indet.	0	2	UID Ost
43	2675	2500	Med.	Vlcanic	Slf. Slip	Smthd	Brn	Other	2.4	5.2	Parallel	Round beveled in	Convex out	12	1	Monserrate
43	2675	2500	Med-Crse.	Vlcanic	Slipped	Smudged	Dark Brn	Brn slip	4.6	5.6	N/A	N/A	N/A	0	1	UID Ost
43	2675	2512.5	Med.	Felsic	Smthd	Smthd	Redsh Brn	N/A	3.9	6.8	N/A	N/A	N/A	0	1	Snta Elena
43	2675	2512.5	Med.	Felsic	Smthd	Smthd	Brn	N/A	4.5	5.0	Parallel	Round	Indet.	0	1	UID Ost
43	2675	2512.5	Med.	Felsic	Slf. Slip	Smthd	Pale Brn	N/A	27.7	6.2	N/A	N/A	N/A	0	2	UID Ost
43	2675	2512.5	Med.	Felsic	Slf. Slip	Slf. Slip	Pale Brn	N/A	3	7.7	Parallel	Flat	Indet.	0	1	UID Ost
43	2675	2512.5	Med.	Limestone	Smthd	Smthd	Brn	N/A	4.3	7.1	N/A	N/A	N/A	0	1	UID Ost
43	2675	2512.5	Med.	Vitrified	Smthd	Smthd	Brn	N/A	5.7	6.2	N/A	N/A	N/A	0	1	UID Ost
43	2675	2512.5	Med.	Vlcanic	Smthd	Smthd	Pale Brn	N/A	9.6	9.2	N/A	N/A	N/A	0	1	UID Ost
43	2675	2512.5	Med.	Vlcanic	Slf. Slip	Burnish	Dark Brn	N/A	5.8	5.0	N/A	N/A	N/A	0	1	UID Ost
43	2675	2512.5	Med.	Vlcanic w/ grog	Smthd	Smthd	Redsh Brn	N/A	2.5	7.1	N/A	N/A	N/A	0	1	UID Ost

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
43	2675	2512.5	Med-Crse.	Felsic	Smthd	Smthd	Redsh Brn	N/A	3.1	9.6	N/A	N/A	N/A	0	1	UID Ost
43	2675	2512.5	Med-Crse.	Felsic	Slf. Slip	N/A	Redsh Brn	N/A	5.4	7.2	N/A	N/A	N/A	0	1	Snta Elena
43	2675	2512.5	Med-Crse.	Felsic	Slf. Slip	Slf. Slip	Org. Brn	N/A	12.3	10.1	N/A	N/A	N/A	0	1	Elenan Ost
43	2675	2512.5	Med-Crse.	Felsic	Slf. Slip	Slf. Slip	Redsh Brn	N/A	3.4	5.5	Thinned	Tapered	Indet.	6	1	Esperanza
43	2675	2537.5	Fine	Vlcanic	Smthd	Smthd	Redsh Brn	N/A	5.5	10.9	N/A	N/A	N/A	0	1	UID Ost
43	2675	2537.5	Fine	Vlcanic	Slf. Slip	Slf. Slip	Brn	N/A	18.8	6.8	N/A	N/A	N/A	0	1	Monserrate
43	2675	2537.5	Med.	Felsic	Smthd	Smthd	Redsh Brn	N/A	7.5	5.9	N/A	N/A	N/A	0	2	UID Ost
43	2675	2537.5	Med.	Felsic	Slf. Slip	Slf. Slip	Redsh Brn	N/A	5.1	8.2	N/A	N/A	N/A	0	1	UID Ost
43	2675	2537.5	Med.	Vlcanic	Smthd	Smthd	Org. Brn	N/A	7.4	7.9	N/A	N/A	N/A	0	2	UID Ost
43	2675	2537.5	Med.	Vlcanic	Slf. Slip	Slf. Slip	Brn	N/A	34.7	8.5	N/A	N/A	N/A	0	1	Monserrate
43	2675	2537.5	Med.	Vlcanic	Slf. Slip	Slf. Slip	Org. Brn	N/A	3.7	8.0	Parallel	Round beveled in	Convex in	16	1	UID Ost
43	2675	2537.5	Med-Crse.	Felsic	Eroded	Eroded	Redsh Brn	N/A	3.8	9.0	N/A	N/A	N/A	0	1	UID Ost
43	2675	2550	Fine	Felsic	Slipped	Slipped	Buff	Other	3.6	5.8	N/A	N/A	N/A	0	1	Cuevas/Ost Puro
43	2675	2550	Fine	Felsic	Slf. Slip	Smthd	Brn	N/A	2.2	8.2	N/A	N/A	N/A	0	1	Snta Elena
43	2675	2550	Fine	Vlcanic	Smthd	Smthd	Brn	N/A	2.6	6.2	N/A	N/A	N/A	0	1	Ost Mod
43	2675	2550	Fine	Vlcanic	Slf. Slip	Smthd	Brn	N/A	3.8	5.9	N/A	N/A	N/A	0	1	UID Ost
43	2675	2550	Med.	Felsic	Smthd	Smthd	Brn	N/A	23.7	9.5	Parallel	Flat	Straight vertical	6	3	Snta Elena
43	2675	2550	Med.	Felsic	Smthd	Smthd	Brn	N/A	1.9	4.9	N/A	N/A	N/A	0	1	UID Ost
43	2675	2550	Med.	Quartz	Slf. Slip	Slf. Slip	Brn	N/A	3.6	6.3	N/A	N/A	N/A	0	1	UID Ost
43	2675	2550	Med.	Vlcanic	Smthd	Smthd	Brn	N/A	1.9	7.1	N/A	N/A	N/A	0	1	Monserrate
43	2675	2550	Med.	Vlcanic	Smthd	Smthd	Brn	N/A	29.1	7.0	Parallel	Round beveled in	Other	0	2	Ost Mod
43	2675	2550	Med.	Vlcanic	Smthd	Smthd	Brn	N/A	11.4	6.4	N/A	N/A	N/A	0	4	UID Ost
43	2675	2550	Med.	Vlcanic	Slf. Slip	Smthd	Dark Brn	N/A	4.4	6.1	N/A	N/A	N/A	0	1	UID Ost
43	2675	2550	Med-Crse.	Felsic	Smthd	Smthd	Brn	N/A	5.3	9.2	N/A	N/A	N/A	0	1	Snta Elena
43	2675	2550	Med-Crse.	Vlcanic	Slipped	Slf. Slip	Brn	Brn slip	4	6.8	N/A	N/A	N/A	0	1	UID Ost

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
43	2675	2550	Med-Crse.	Vlcanic	Smthd	Eroded	Dark Brn	N/A	7.3	9.8	N/A	N/A	N/A	0	1	Snta Elena
43	2675	2550	Med-Crse.	Vlcanic	Smthd	Smthd	Brn	N/A	8.5	6.7	N/A	N/A	N/A	0	1	Ost Mod
43	2675	2550	Med-Crse.	Vlcanic	Smthd	Smthd	Pale Brn	N/A	7.6	6.9	N/A	N/A	N/A	0	2	UID Ost
43	2687.5	2512.5	Fine	Felsic	Smthd	Smthd	Org. Brn	N/A	2.4	5.0	N/A	N/A	N/A	0	1	Monserrate
43	2687.5	2512.5	Fine	Felsic	Slf. Slip	Smthd	Brn	N/A	6.4	7.9	N/A	N/A	N/A	0	1	Monserrate
43	2687.5	2512.5	Fine	Vlcanic	Smthd	Slipped	Red	Red slip	5.6	6.3	Parallel	Flat	Straight vertical	18	1	Cuevas
43	2687.5	2512.5	Fine	Vlcanic	Smthd	Smthd	Buff	Other	3.2	5.0	Thinned	Tapere d	Indet.	0	1	Cuevas/Ost Puro
43	2687.5	2512.5	Med.	Felsic	Smthd	Smthd	Org. Brn	N/A	3.8	7.0	Thicken ed In Round	Round bevele d in	Straight out	0	2	UID Ost
43	2687.5	2512.5	Med.	Vlcanic	Smthd	Burnish	Brn	N/A	2.7	6.2	N/A	N/A	N/A	0	1	UID Ost
43	2687.5	2512.5	Med.	Vlcanic	Smthd	Slf. Slip	Brn	N/A	2.7	4.7	N/A	N/A	N/A	0	1	UID Ost
43	2687.5	2512.5	Med.	Vlcanic	Slf. Slip	Burnish	Brn	N/A	1.7	6.9	N/A	N/A	N/A	0	1	UID Ost
43	2687.5	2512.5	Not-Temper ed	Quartz	Smthd	Smthd	Red	N/A	1.6	7.1	Parallel	N/A	N/A	0	1	UID Ost
43	2687.5	2518	Fine	Vlcanic	Slf. Slip	Slipped	Brn	Pale Brn slip	2	5.6	N/A	N/A	N/A	0	1	UID Ost
43	2687.5	2518	Med.	Felsic	Brnshd	Smthd	Dark Brn	N/A	2	5.1	Thicken ed Ext. Round	Round bevele d in	Convex in	8	1	Ost Mod
43	2687.5	2518	Med.	Felsic	Brnshd	Smthd	Dark Brn	N/A	7	6.6	N/A	N/A	N/A	0	3	UID Ost
43	2687.5	2518	Med.	Felsic	Eroded	Burnish	Redsh Brn	N/A	4	4.8	N/A	N/A	N/A	0	2	UID Ost
43	2687.5	2518	Med.	Felsic	Slipped	Smthd	Dark Brn	Pale Brn slip	4	6.6	N/A	N/A	N/A	0	2	UID Ost
43	2687.5	2518	Med.	Felsic	Smthd	Smthd	Brn	N/A	9.3	6.7	Parallel	Flat	Indet.	0	3	UID Ost
43	2687.5	2518	Med.	Vlcanic	Brnshd	Smthd	Pale Brn	N/A	17	11. 3	N/A	N/A	N/A	0	1	UID Ost
43	2687.5	2518	Med.	Vlcanic	Slf. Slip	Slf. Slip	Brn	N/A	2	4.7	N/A	N/A	N/A	0	1	UID Ost
43	2687.5	2518	Med-Crse.	Felsic	Brnshd	Slf. Slip	Dark Brn	N/A	2	7.1	N/A	N/A	N/A	0	1	UID Ost
43	2687.5	2518	Med-Crse.	Vlcanic	Brnshd	Slf. Slip	Dark Brn	N/A	4	6.2	N/A	N/A	N/A	0	2	UID Ost

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
43	2687.5	2525	Med.	Felsic	Slipped	Slipped	Orgish Red	Pink slip	20	5.6	Thinned	Flat	Indet.	10	2	Ost Puro
43	2687.5	2525	Med.	Indet.	Painted	Painted	Redsh Brn	N/A	2.6	11.1	N/A	N/A	Buren	0	1	Indet.
43	2687.5	2525	Med.	Vlcanic	Slipped	Slf. Slip	Brn	Pale Brn slip	8.4	7.1	N/A	N/A	N/A	0	1	UID Ost
43	2687.5	2525	Med.	Vlcanic	Smthd	Smthd	Redsh Brn	N/A	29.6	7.5	N/A	N/A	N/A	0	2	Snta Elena
43	2687.5	2525	Med.	Vlcanic	Slf. Slip	Slf. Slip	Redsh Brn	N/A	3.1	8.3	N/A	N/A	N/A	0	1	Snta Elena
43	2687.5	2525	Med.	Vlcanic	Slf. Slip	Slf. Slip	Brn	N/A	3	8.7	N/A	N/A	N/A	0	1	UID Ost
43	2687.5	2525	Med-Crse.	Felsic	Eroded	Eroded	Org. Brn	N/A	8.8	32.0	Indterminate	Round	Buren	0	1	Indet.
43	2687.5	2525	Med-Crse.	Felsic	Painted	Painted	Redsh Brn	N/A	6.6	15.1	N/A	N/A	Buren	0	1	UID Ost
43	2687.9	2512.5	Crse.	Felsic	Eroded	Eroded	Redsh Brn	N/A	12.5	16.0	N/A	N/A	Buren	0	1	Indet.
43	2687.9	2512.5	Crse.	Felsic	Eroded	Smthd	Brn	N/A	4.3	7.8	N/A	N/A	N/A	0	1	UID Ost
43	2687.9	2512.5	Fine	Felsic	Smthd	Smthd	Brn	N/A	1.9	5.1	N/A	N/A	N/A	0	1	UID Ost
43	2687.9	2512.5	Fine	Indet.	Slipped	Slipped	Buff	Pink slip	1.8	5.5	Parallel	Flat	Indet.	0	1	Ost Puro
43	2687.9	2512.5	Fine	Vlcanic	Eroded	Slf. Slip	Brn	N/A	1.6	4.9	N/A	N/A	N/A	0	1	UID Ost
43	2687.9	2512.5	Fine	Vlcanic	Slipped	Burnish	Pale Brn	Pale Brn slip	2.4	7.8	N/A	N/A	N/A	0	1	UID Ost
43	2687.9	2512.5	Fine	Vlcanic	Smthd	Burnish	Brn	N/A	2	7.1	N/A	N/A	N/A	0	1	UID Ost
43	2687.9	2512.5	Fine	Vlcanic	Smthd	Eroded	Brn	N/A	1.7	5.6	N/A	N/A	N/A	0	1	UID Ost
43	2687.9	2512.5	Fine	Vlcanic	Smthd	Smthd	Brn	N/A	11.8	5.8	Parallel	Round	N/A	0	4	UID Ost
43	2687.9	2512.5	Fine	Vlcanic	Slf. Slip	Slf. Slip	Brn	N/A	3.8	8.9	N/A	N/A	N/A	0	1	Ost Mod
43	2687.9	2512.5	Fine	Vlcanic	Slf. Slip	Smudged	Brn	N/A	2.7	4.0	N/A	N/A	N/A	0	1	UID Ost
43	2687.9	2512.5	Med.	Felsic	Eroded	Eroded	Redsh Brn	Red slip	2.5	6.2	N/A	N/A	N/A	0	1	UID Ost
43	2687.9	2512.5	Med.	Felsic	Slipped	Slipped	Brn	Other	1.7	5.4	N/A	N/A	N/A	0	1	Cuevas
43	2687.9	2512.5	Med.	Felsic	Smthd	Eroded	Redsh Brn	Org on Buff	2.6	6.3	N/A	N/A	N/A	0	1	UID Ost
43	2687.9	2512.5	Med.	Felsic	Smthd	Smthd	Dark Brn	N/A	4.6	8.2	N/A	N/A	N/A	0	1	Esperanza
43	2687.9	2512.5	Med.	Felsic	Smthd	Smthd	Brn	N/A	4.4	6.7	Parallel	N/A	N/A	0	2	UID Ost

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
43	2687.9	2512.5	Med.	Felsic	Smthd	Slf. Slip	Redsh Brn	N/A	2.7	5.2	N/A	N/A	N/A	0	1	UID Ost
43	2687.9	2512.5	Med.	Vlcanic	Brnshd	Burnish	Dark Brn	N/A	2.8	6.2	N/A	N/A	N/A	0	1	UID Ost
43	2687.9	2512.5	Med.	Vlcanic	Eroded	Burnish	Dark Brn	Brn slip	3.7	6.7	N/A	N/A	N/A	0	1	UID Ost
43	2687.9	2512.5	Med.	Vlcanic	Eroded	Eroded	Redsh Brn	N/A	3.6	6.2	N/A	N/A	N/A	0	1	UID Ost
43	2687.9	2512.5	Med.	Vlcanic	Eroded	Slf. Slip	Org. Brn	N/A	1.6	7.1	N/A	N/A	N/A	0	1	UID Ost
43	2687.9	2512.5	Med.	Vlcanic	Smthd	Burnish	Redsh Brn	N/A	2.7	5.9	N/A	N/A	N/A	0	1	UID Ost
43	2687.9	2512.5	Med.	Vlcanic	Smthd	Eroded	Brn	Red slip	2.4	6.7	N/A	N/A	N/A	0	1	Cuevas/Ost Puro
43	2687.9	2512.5	Med.	Vlcanic	Smthd	Smthd	Brn	N/A	10.3	7.5	Parallel	Flat	Convex out	0	3	UID Ost
43	2687.9	2512.5	Med.	Vlcanic	Slf. Slip	Eroded	Brn	Org slip	2	5.1	Parallel	Round	Convex vertical	6	1	UID Ost
43	2687.9	2512.5	Med.	Vlcanic	Slf. Slip	Slipped	Brn	Pink slip	2.2	5.7	N/A	N/A	N/A	0	1	Ost Puro
43	2687.9	2512.5	Med.	Vlcanic	Slf. Slip	Slf. Slip	Dark Brn	N/A	5	5.8	N/A	N/A	N/A	0	2	UID Ost
43	2687.9	2512.5	Med-Crse.	Felsic	Slipped	Slipped	Brn	Pale Brn slip	8.6	10.2	N/A	N/A	N/A	0	1	UID Ost
43	2687.9	2512.5	Med-Crse.	Felsic	Smthd	Smthd	Redsh Brn	N/A	2.2	8.3	N/A	N/A	N/A	0	1	UID Ost
43	2687.9	2512.5	Med-Crse.	Flesic w/ shell	Eroded	Eroded	Redsh Brn	N/A	4.6	9.1	N/A	N/A	N/A	0	1	UID Ost
43	2687.9	2512.5	Med-Crse.	Vlcanic	Eroded	Eroded	Redsh Brn	N/A	6.2	9.6	N/A	N/A	N/A	0	1	UID Ost
43	2687.9	2512.5	Med-Crse.	Vlcanic	Eroded	Smthd	Brn	N/A	3.6	6.2	N/A	N/A	N/A	0	1	UID Ost
43	2687.9	2512.5	Med-Crse.	Vlcanic	Slf. Slip	Slf. Slip	Brn	N/A	3.2	7.2	N/A	N/A	N/A	0	1	UID Ost
43	2687.9	2512.5	Med-Crse.	Vlcanic w/ grog	Eroded	Burnish	Dark Brn	N/A	2.2	5.1	N/A	N/A	N/A	0	1	UID Ost
43	2687.9	2512.5	Med-Crse.	Vlcanic w/ grog	Slf. Slip	Slf. Slip	Brn	N/A	4.3	7.0	N/A	N/A	N/A	0	1	UID Ost
43	2687.9	2512.5	Not-Tempered	Vlcanic	Smudged	Slf. Slip	Black	N/A	1.7	5.3	N/A	N/A	N/A	0	1	UID Ost
43	2700	2500	Med.	Felsic	Smthd	Smthd	Brn	N/A	14.2	7.8	N/A	N/A	N/A	0	3	UID Ost
43	2700	2500	Med.	Vlcanic	Eroded	Smthd	Brn	N/A	1.7	6.2	N/A	N/A	N/A	0	1	UID Ost

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
43	2700	2500	Med.	Vlcanic	Slf. Slip	Smthd	Brn	N/A	2.4	6.2	N/A	N/A	N/A	0	1	UID Ost
43	2700	2500	Med-Crse.	Felsic	Eroded	Eroded	Brn	N/A	3	5.2	N/A	N/A	N/A	0	2	UID Ost
43	2700	2500	Med-Crse.	Vlcanic	Slipped	Slipped	Pale Brn	Brn slip	5.4	7.7	N/A	N/A	N/A	0	1	UID Ost
43	2700	2512.5	Fine	Felsic	Slipped	Slipped	Dark Brn	Brn slip	2.6	6.7	Parallel	Flat	Indet.	0	1	UID Ost
43	2700	2512.5	Fine	Felsic	Smthd	Smthd	Brn	N/A	2.6	6.2	N/A	N/A	N/A	0	1	UID Ost
43	2700	2512.5	Fine	Vlcanic	Slipped	Slipped	Buff	Pink slip	1	4.1	N/A	N/A	N/A	0	1	Cuevas
43	2700	2512.5	Fine	Vlcanic	Slipped	Slipped	Buff	Pink slip	2	6.9	N/A	N/A	N/A	0	1	Cuevas/Monserrate
43	2700	2512.5	Med.	Felsic	Smthd	Smthd	Buff	N/A	5.4	5.7	N/A	N/A	N/A	0	3	UID Ost
43	2700	2512.5	Med.	Felsic w/ grog	Slf. Slip	Slf. Slip	Brn	N/A	4.2	6.2	N/A	N/A	N/A	0	1	UID Ost
43	2700	2512.5	Med.	Vlcanic	Smthd	Smthd	Redsh Brn	N/A	1.7	6.1	N/A	N/A	N/A	0	1	Snta Elena
43	2700	2512.5	Med.	Vlcanic	Smthd	Smthd	Brn	N/A	9.7	6.6	N/A	N/A	N/A	0	4	UID Ost
43	2700	2512.5	Med.	Vlcanic	Slf. Slip	Burnish	Brn	N/A	1.8	5.0	N/A	N/A	N/A	0	1	UID Ost
43	2700	2512.5	Med.	Vlcanic w/ grog	Smthd	Smthd	Buff	N/A	1.5	7.1	N/A	N/A	N/A	0	1	UID Ost
43	2700	2512.5	Med-Crse.	Felsic w/ grog	Smthd	Painted	Dark Brn	N/A	15.4	9.0	N/A	N/A	N/A	0	1	UID Ost
43	2700	2512.5	Med-Crse.	Vlcanic	Slipped	Smthd	Brn	Brn slip	1.6	5.1	N/A	N/A	N/A	0	1	UID Ost
43	2700	2525	Med.	Felsic	Smthd	Smthd	Brn	N/A	2.7	9.0	N/A	N/A	N/A	0	1	Snta Elena
43	2700	2525	Med.	Vlcanic	Smthd	Eroded	Brn	N/A	3.3	7.4	N/A	N/A	N/A	0	1	Snta Elena
43	2700	2525	Med-Crse.	Felsic	Smthd	Smthd	Redsh Brn	N/A	4.4	7.2	N/A	N/A	N/A	0	1	Snta Elena
43	2700	2537.5	Fine	Indet.	Smthd	Smthd	Buff	N/A	1.3	4.3	N/A	N/A	N/A	0	1	Cuevas
43	2700	2537.5	Fine	Indet.	Smthd	Smthd	Buff	N/A	3.5	5.5	N/A	N/A	N/A	0	1	Ost Puro
43	2700	2537.5	Fine	Vlcanic	Smthd	Smthd	Brn	N/A	3.8	4.5	N/A	N/A	N/A	0	2	UID Ost
43	2700	2537.5	Med.	Felsic	Smthd	Smthd	Brn	N/A	2.5	5.1	N/A	N/A	N/A	0	1	UID Ost
43	2700	2537.5	Med.	Quartz	Smthd	Smthd	Buff	N/A	7.4	8.2	N/A	N/A	N/A	0	1	Esperanza
43	2700	2537.5	Med.	Quartz	Smthd	Smthd	Redsh Brn	N/A	5.3	8.1	N/A	N/A	N/A	0	1	UID Ost
43	2700	2537.5	Med.	Vlcanic	Brnshd	Smthd	Dark Brn	N/A	5.2	5.3	N/A	N/A	N/A	0	1	UID Ost
43	2700	2537.5	Med.	Vlcanic	Slipped	Slipped	Redsh Brn	Red slip	2.6	8.1	N/A	N/A	N/A	0	1	Ost Puro
43	2700	2537.5	Med.	Vlcanic	Smthd	Smthd	Brn	N/A	4.2	5.0	N/A	N/A	N/A	0	1	Cuevas

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
43	2700	2537.5	Med-Crse.	Felsic w/ grog	Slf. Slip	Slf. Slip	Brn	N/A	4.6	13.2	N/A	N/A	N/A	0	1	Snta Elena
43	2700	2537.5	Med-Crse.	Vlcanic	Smthd	Smthd	Redsh Brn	N/A	2.7	8.0	N/A	N/A	N/A	0	1	UID Ost
43	2700	2537.5	Not-Tempered	Indet.	Smthd	Smthd	Buff	N/A	2.7	5.2	N/A	N/A	N/A	0	1	Cuevas
43	2700	2550	Fine	Felsic	Smthd	Smthd	Buff	N/A	3.5	6.3	Parallel	Round beveled out	Composite	0	1	Cuevas
43	2700	2550	Fine	Felsic	Smthd	Smthd	Org. Brn	N/A	13	6.9	N/A	N/A	N/A	0	3	UID Ost
43	2700	2550	Fine	Vlcanic	Painted	Eroded	Buff	Pink slip	3.6	7.1	N/A	N/A	N/A	0	1	Monserrate
43	2700	2550	Fine	Vlcanic	Smthd	Smthd	Pale Brn	N/A	2.2	5.3	Parallel	Tapered	Convex in	0	1	Monserrate
43	2700	2550	Fine	Vlcanic	Smthd	Smthd	Redsh Brn	N/A	3.5	8.1	N/A	N/A	N/A	0	1	Snta Elena
43	2700	2550	Fine	Vlcanic	Smthd	Smthd	Brn	N/A	12.3	6.7	Parallel	N/A	N/A	0	4	UID Ost
43	2700	2550	Fine	Vlcanic	Slf. Slip	Smthd	Brn	N/A	4.3	4.0	N/A	N/A	N/A	0	1	UID Ost
43	2700	2550	Fine	Vlcanic	Slf. Slip	Slf. Slip	Brn	N/A	13.8	9.0	Parallel	Flat	Convex out	32	1	UID Ost
43	2700	2550	Fine	Vlcanic w/ grog	Smthd	Smthd	Dark Brn	N/A	6.3	6.7	N/A	N/A	N/A	0	1	UID Ost
43	2700	2550	Med.	Felsic	Smthd	Smthd	Org. Brn	N/A	17	9.0	N/A	N/A	N/A	0	2	Snta Elena
43	2700	2550	Med.	Felsic	Smthd	Smthd	Org. Brn	N/A	6.2	6.5	N/A	N/A	N/A	0	2	UID Ost
43	2700	2550	Med.	Felsic w/ grog	Smthd	Smthd	Brn	N/A	4.8	11.0	N/A	N/A	N/A	0	1	UID Ost
43	2700	2550	Med.	Vlcanic	Smthd	Smthd	Redsh Brn	N/A	11.7	7.5	N/A	N/A	N/A	10	3	UID Ost
43	2700	2550	Med-Crse.	Vlcanic	Smthd	Eroded	Pale Brn	N/A	15.9	8.1	N/A	N/A	N/A	0	1	UID Ost
43	2700	2550	Med-Crse.	Vlcanic	Smthd	Smthd	Brn	N/A	4.7	4.7	N/A	N/A	N/A	0	1	UID Ost
43	2703	2512.5	Crse.	Vlcanic	Slipped	Slf. Slip	Dark Brn	Brn slip	4.3	9.1	N/A	N/A	N/A	0	1	UID Ost
43	2703	2512.5	Crse.	Vlcanic	Smthd	N/A	Org. Brn	N/A	30.6	21.2	N/A	N/A	Buren	0	1	Indet.
43	2703	2512.5	Fine	Felsic	Eroded	Eroded	Orgish Red	Pink slip	1.6	6.1	N/A	N/A	N/A	0	1	Cuevas/Ost Puro
43	2703	2512.5	Fine	Felsic	Eroded	Eroded	Pale Brn	N/A	1.9	7.5	N/A	N/A	N/A	0	1	UID Ost

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
43	2703	2512.5	Fine	Felsic	Slipped	Smthd	Brn	Brn slip	4.4	7.2	N/A	N/A	N/A	0	1	UID Ost
43	2703	2512.5	Fine	Felsic	Smthd	Slipped	Brn	N/A	2.6	8.2	N/A	N/A	N/A	0	1	UID Ost
43	2703	2512.5	Fine	Felsic	Smthd	Smthd	Pale Brn	N/A	3	5.9	Parallel	N/A	N/A	0	2	Cuevas
43	2703	2512.5	Fine	Felsic	Smthd	Smthd	Redsh Brn	N/A	1.6	4.9	Indtermi nate	Flat	N/A	0	1	UID Ost
43	2703	2512.5	Fine	Indet.	Slipped	Slipped	Org	Pale Brn slip	1.8	4.1	N/A	N/A	N/A	0	1	Cuevas
43	2703	2512.5	Fine	Indet.	Slipped	Slipped	Dark Brn	Brn slip	1.8	4.0	N/A	N/A	N/A	0	1	UID Ost
43	2703	2512.5	Fine	Indet.	Smthd	Smthd	Pale Brn	N/A	3.1	4.8	N/A	N/A	N/A	0	1	Cuevas
43	2703	2512.5	Fine	Indet.	Smthd	Smthd	Dark Brn	N/A	3	4.7	N/A	N/A	N/A	0	1	UID Ost
43	2703	2512.5	Fine	Indet.	Slf. Slip	Slf. Slip	Brn	N/A	4.5	6.2	N/A	N/A	N/A	0	1	Cuevas/Ost Puro
43	2703	2512.5	Fine	Indet.	Slf. Slip	Slf. Slip	Brn	N/A	1.7	6.8	N/A	N/A	N/A	0	1	UID Ost
43	2703	2512.5	Fine	Quartz	Eroded	Eroded	Buff	Red on Buff	4.6	7.2	N/A	N/A	N/A	0	1	Cuevas
43	2703	2512.5	Fine	Vlcanic	Brnshd	Smthd	Dark Brn	N/A	13.5	7.8	Parallel	Round bevele d out	Plate	20	1	UID Ost
43	2703	2512.5	Fine	Vlcanic	Eroded	Eroded	Buff	N/A	4.8	5.3	N/A	N/A	N/A	0	1	Cuevas
43	2703	2512.5	Fine	Vlcanic	Painted	Painted	Buff	Red on Buff	1.9	6.1	N/A	N/A	N/A	0	1	Cuevas
43	2703	2512.5	Fine	Vlcanic	Painted	Smthd	Buff	Red on Buff	1.9	5.1	N/A	N/A	N/A	0	1	Cuevas
43	2703	2512.5	Fine	Vlcanic	Slipped	Slipped	Dark Brn	N/A	12.3	8.1	N/A	N/A	N/A	0	1	UID Ost
43	2703	2512.5	Fine	Vlcanic	Slipped	Smthd	Brn	N/A	2.7	5.0	N/A	N/A	N/A	0	1	UID Ost
43	2703	2512.5	Fine	Vlcanic	Smthd	Burnish	Dark Brn	N/A	2.6	5.0	Parallel	Round	Convex in	10	1	Cuevas
43	2703	2512.5	Fine	Vlcanic	Smthd	Eroded	Brn	N/A	2.4	8.2	N/A	N/A	N/A	0	1	UID Ost
43	2703	2512.5	Fine	Vlcanic	Smthd	Smthd	Buff	N/A	6.3	6.2	Parallel	Flat	Straight vertical	4	3	Cuevas
43	2703	2512.5	Fine	Vlcanic	Smthd	Smthd	Brn	N/A	7	5.3	N/A	N/A	N/A	0	4	UID Ost
43	2703	2512.5	Fine	Vlcanic	Slf. Slip	Eroded	Brn	N/A	2.3	5.2	N/A	N/A	N/A	0	1	UID Ost
43	2703	2512.5	Fine	Vlcanic	Slf. Slip	Smthd	Smudgin g	N/A	1.5	4.8	N/A	N/A	N/A	0	1	UID Ost
43	2703	2512.5	Fine	Vlcanic	Slf. Slip	Slf. Slip	Dark Brn	N/A	3.5	4.7	N/A	N/A	N/A	0	1	Cuevas

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
43	2703	2512.5	Fine	Vlcanic	Smudged	Smthd	Smudging	N/A	5.7	6.7	N/A	N/A	N/A	0	1	UID Ost
43	2703	2512.5	Fine	Vlcanic w/ grog	Smthd	Eroded	Dark Brn	N/A	2.1	6.2	N/A	N/A	N/A	0	1	UID Ost
43	2703	2512.5	Fine	Vlcanic w/ grog	Smthd	Slf. Slip	Pale Brn	N/A	6.4	9.7	N/A	N/A	N/A	0	1	UID Ost
43	2703	2512.5	Med.	Felsic	Brnshd	Burnish	Org. Brn	N/A	5.5	7.7	N/A	N/A	N/A	0	1	UID Ost
43	2703	2512.5	Med.	Felsic	Eroded	Eroded	Brn	N/A	1.5	6.4	N/A	N/A	N/A	0	1	UID Ost
43	2703	2512.5	Med.	Felsic	Painted	Smthd	Black	Black on Buff	2.7	4.3	N/A	N/A	N/A	0	1	UID Ost
43	2703	2512.5	Med.	Felsic	Slipped	Slipped	Redsh Brn	Red slip	34.6	6.9	Parallel	Flat	Composite	22	1	Cuevas/Monserrate
43	2703	2512.5	Med.	Felsic	Slipped	Slipped	Org	Org slip	4.1	5.6	Thinned	Flat	Straight vertical	12	2	UID Ost
43	2703	2512.5	Med.	Felsic	Slipped	Smthd	Dark Brn	N/A	3.4	4.9	Thinned	N/A	N/A	0	2	UID Ost
43	2703	2512.5	Med.	Felsic	Slipped	Slf. Slip	Dark Brn	Brn slip	5.5	7.2	N/A	N/A	N/A	0	1	UID Ost
43	2703	2512.5	Med.	Felsic	Smthd	Painted	Org. Brn	N/A	3.4	7.8	N/A	N/A	N/A	0	1	UID Ost
43	2703	2512.5	Med.	Felsic	Smthd	Smthd	Pale Brn	N/A	1.8	4.2	N/A	N/A	N/A	0	1	Cuevas
43	2703	2512.5	Med.	Felsic	Smthd	Smthd	Brn	N/A	20	5.9	Thickened In/Ext	N/A	N/A	0	9	UID Ost
43	2703	2512.5	Med.	Felsic	Smthd	Slf. Slip	Brn	N/A	3.7	5.2	N/A	N/A	N/A	0	2	UID Ost
43	2703	2512.5	Med.	Felsic	Slf. Slip	Eroded	Brn	N/A	2.7	5.1	N/A	N/A	N/A	0	1	UID Ost
43	2703	2512.5	Med.	Felsic	Slf. Slip	Smthd	Redsh Brn	N/A	3.9	6.6	N/A	N/A	N/A	0	2	UID Ost
43	2703	2512.5	Med.	Felsic	Slf. Slip	Slf. Slip	Dark Brn	N/A	7.9	6.5	Parallel	N/A	N/A	0	3	UID Ost
43	2703	2512.5	Med.	Felsic	Smudged	Smudged	Dark Brn	N/A	2.1	7.4	N/A	N/A	N/A	0	1	UID Ost
43	2703	2512.5	Med.	Felsic w/ grog	Eroded	Smthd	Redsh Brn	N/A	1.6	6.1	N/A	N/A	N/A	0	1	UID Ost
43	2703	2512.5	Med.	Felsic w/ grog	Smthd	Smthd	Dark Brn	N/A	1.9	7.8	N/A	N/A	N/A	0	1	UID Ost
43	2703	2512.5	Med.	Quartz	Slf. Slip	Slf. Slip	Dark Brn	N/A	1.6	5.9	Parallel	Flat	N/A	0	1	UID Ost
43	2703	2512.5	Med.	Vitrified	Slf. Slip	Smthd	Dark Brn	N/A	6.2	8.2	N/A	N/A	N/A	0	2	UID Ost
43	2703	2512.5	Med.	Vitrified	Slf. Slip	Slf. Slip	Pale Brn	N/A	3.5	4.7	N/A	N/A	N/A	0	1	Cuevas/Monserrate
43	2703	2512.5	Med.	Vlcanic	Eroded	Smthd	Redsh Brn	N/A	1.6	7.3	N/A	N/A	N/A	0	1	UID Ost
43	2703	2512.5	Med.	Vlcanic	Smthd	Slipped	Dark Brn	N/A	2.6	3.8	N/A	N/A	N/A	0	1	UID Ost

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
43	2703	2512.5	Med.	Vlcanic	Smthd	Smthd	Pale Brn	N/A	25.3	6.3	Parallel	N/A	N/A	0	8	UID Ost
43	2703	2512.5	Med.	Vlcanic	Slf. Slip	Smthd	Dark Brn	N/A	13	6.7	N/A	N/A	N/A	0	2	UID Ost
43	2703	2512.5	Med.	Vlcanic	Slf. Slip	Slf. Slip	Black	N/A	7.3	5.5	N/A	N/A	N/A	0	2	UID Ost
43	2703	2512.5	Med-Crse.	Felsic	Slipped	Smthd	Red	N/A	18.4	9.9	N/A	N/A	N/A	0	1	UID Ost
43	2703	2512.5	Med-Crse.	Felsic	Smthd	Painted	Pale Brn	N/A	2.6	8.3	N/A	N/A	N/A	0	1	UID Ost
43	2703	2512.5	Med-Crse.	Felsic	Smthd	Slipped	Org. Brn	N/A	4.2	6.3	N/A	N/A	N/A	0	1	UID Ost
43	2703	2512.5	Med-Crse.	Felsic	Smthd	Smthd	Org. Brn	N/A	25.9	12.5	N/A	N/A	N/A	0	1	Snta Elena
43	2703	2512.5	Med-Crse.	Felsic	Smthd	Smthd	Brn	N/A	13.3	14.7	Parallel	Flat	Buren	0	2	UID Ost
43	2703	2512.5	Med-Crse.	Felsic	Slf. Slip	Smthd	Brn	N/A	3.9	6.0	Parallel	Round	Indet.	0	1	UID Ost
43	2703	2512.5	Med-Crse.	Felsic w/ grog	Smthd	Eroded	Buff	N/A	12.2	9.4	N/A	N/A	N/A	0	2	UID Ost
43	2703	2512.5	Med-Crse.	Vlcanic	Eroded	Eroded	Brn	N/A	2.4	6.7	N/A	N/A	N/A	0	1	UID Ost
43	2703	2512.5	Med-Crse.	Vlcanic	Slipped	Slf. Slip	Dark Brn	Brn slip	7.2	8.1	N/A	N/A	N/A	0	1	UID Ost
43	2703	2512.5	Med-Crse.	Vlcanic	Smthd	Smthd	Brn	N/A	1.9	6.6	N/A	N/A	N/A	0	1	Esperanza
43	2703	2512.5	Med-Crse.	Vlcanic	Smthd	Smthd	Brn	N/A	2.8	8.5	N/A	N/A	N/A	0	1	Snta Elena
43	2703	2512.5	Med-Crse.	Vlcanic	Slf. Slip	Slf. Slip	Dark Brn	N/A	3	5.1	N/A	N/A	N/A	0	2	UID Ost
43	2703	2512.5	Med-Crse.	Vlcanic	Smudged	Smthd	Dark Brn	N/A	2.4	7.5	N/A	N/A	N/A	0	1	UID Ost
43	2703	2512.5	Med-Crse.	Vlcanic w/ grog	Brnshd	Slf. Slip	Dark Brn	N/A	9.5	7.1	N/A	N/A	N/A	0	1	UID Ost
43	2703	2512.5	Med-Crse.	Vlcanic w/ grog	Slf. Slip	Smthd	Org. Brn	N/A	3.2	8.2	N/A	N/A	N/A	0	1	Snta Elena
43	2712.5	2512.5	Fine	Felsic	Smthd	Smthd	Brn	N/A	5.1	5.3	N/A	N/A	N/A	0	2	UID Ost
43	2712.5	2512.5	Fine	Felsic	Slf. Slip	Slf. Slip	Brn	N/A	1.6	4.9	N/A	N/A	N/A	0	1	UID Ost
43	2712.5	2512.5	Fine	Vlcanic	Smthd	Smudged	Dark Brn	N/A	2.1	5.2	N/A	N/A	N/A	0	1	UID Ost
43	2712.5	2512.5	Med.	Felsic	Smthd	Smthd	Brn	N/A	8.5	7.5	N/A	N/A	N/A	0	1	UID Ost
43	2712.5	2512.5	Med.	Felsic	Smthd	Slf. Slip	Redsh Brn	N/A	3.2	5.3	N/A	N/A	N/A	0	1	UID Ost
43	2712.5	2512.5	Med.	Felsic	Slf. Slip	Slf. Slip	Org. Brn	N/A	23.7	6.8	N/A	N/A	N/A	0	2	UID Ost

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
43	2712.5	2512.5	Med.	Vlcanic	Smthd	Slf. Slip	Brn	N/A	3.6	8.9	N/A	N/A	N/A	0	1	UID Ost
43	2712.5	2512.5	Med.	Vlcanic	Slf. Slip	Slf. Slip	Dark Brn	N/A	33.6	5.4	N/A	N/A	Compos ite	20	1	Ost Puro
43	2712.5	2512.5	Med.	Vlcanic	Slf. Slip	Slf. Slip	Redsh Brn	N/A	4.2	5.3	N/A	N/A	N/A	0	2	UID Ost
43	2712.5	2512.5	Med-Crse.	Felsic	Smthd	Smthd	Pale Brn	N/A	4.5	5.9	Parallel	N/A	N/A	0	2	UID Ost
43	2712.5	2512.5	Med-Crse.	Vlcanic	Smthd	Smthd	Brn	N/A	1.7	7.8	N/A	N/A	N/A	0	1	UID Ost
43	2712.5	2512.5	Med-Crse.	Vlcanic w/ grog	Slipped	Slf. Slip	Dark Brn	N/A	6.4	9.1	N/A	N/A	N/A	0	1	Ost Mod
43	2712.5	2525	Fine	Vlcanic	Slipped	Slipped	Buff	Pink slip	2.6	5.4	N/A	N/A	N/A	0	1	Cuevas/Ost Puro
43	2712.5	2525	Fine	Vlcanic	Smthd	Smthd	Brn	N/A	1.5	4.9	N/A	N/A	N/A	0	1	UID Ost
43	2712.5	2525	Med.	Felsic	Eroded	Eroded	Org. Brn	N/A	4.1	7.2	Parallel	Round bevele d in	Indet.	0	1	UID Ost
43	2712.5	2525	Med.	Felsic	Eroded	Smthd	Pale Brn	N/A	6	13. 2	N/A	N/A	N/A	0	1	UID Ost
43	2712.5	2525	Med.	Felsic	Smthd	Smthd	Org. Brn	N/A	7.4	8.8	Parallel	Flat	Convex vertical	14	1	Snta Elena
43	2712.5	2525	Med.	Felsic	Smthd	Smthd	Pale Brn	N/A	5.7	7.8	N/A	N/A	N/A	0	1	UID Ost
43	2712.5	2525	Med.	Felsic	Smthd	Smudg ed	Brn	N/A	1.8	5.2	N/A	N/A	N/A	0	1	UID Ost
43	2712.5	2525	Med.	Quartz	Slipped	Slipped	Org. Brn	Org slip	1.5	5.6	N/A	N/A	N/A	0	1	Cuevas
43	2712.5	2525	Med.	Quartz	Smthd	Smthd	Org. Brn	N/A	3.5	6.3	N/A	N/A	N/A	0	1	UID Ost
43	2712.5	2525	Med.	Vlcanic	Brnshd	Slf. Slip	Black	N/A	1.8	5.0	N/A	N/A	N/A	0	1	UID Ost
43	2712.5	2525	Med.	Vlcanic	Smthd	Smthd	Brn	N/A	3.5	5.7	N/A	N/A	N/A	0	1	Cuevas/Ost Puro
43	2712.5	2525	Med.	Vlcanic	Smthd	Smthd	Brn	N/A	1.7	7.9	N/A	N/A	N/A	0	1	UID Ost
43	2712.5	2525	Med.	Vlcanic	Slf. Slip	Slipped	Brn	Red slip	1.6	6.1	N/A	N/A	N/A	0	1	Cuevas/Ost Puro
43	2712.5	2525	Med.	Vlcanic	Slf. Slip	Slipped	Brn	Other	8.2	6.3	N/A	N/A	N/A	0	1	UID Ost
43	2712.5	2525	Med.	Vlcanic	Slf. Slip	Slf. Slip	Brn	N/A	3.3	5.5	N/A	N/A	N/A	0	1	UID Ost
43	2712.5	2525	Med.	Vlcanic w/ grog	Eroded	Eroded	Brn	N/A	3.5	7.1	N/A	N/A	N/A	0	1	UID Ost
43	2712.5	2525	Med-Crse.	Felsic w/ grog	Smthd	Smthd	Brn	N/A	2.7	7.8	N/A	N/A	N/A	0	1	UID Ost
43	2712.5	2525	Med-Crse.	Quartz	Smthd	Smthd	Buff	N/A	6.6	9.2	N/A	N/A	N/A	0	1	UID Ost

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
43	2712.5	2525	Med-Crse.	Vlcanic w/ shell	Slipped	Slipped	Org	Pale Brn slip	15.9	6.8	Parallel	Round beveled in	Convex vertical	16	1	Cuevas/Monserrate
43	2712.5	2537.5	Med.	Felsic	Smthd	Burnish	Brn	N/A	9.7	12.5	N/A	N/A	N/A	0	1	Snta Elena
43	2712.5	2537.5	Med.	Felsic	Smthd	Eroded	Brn	N/A	3.3	8.4	N/A	N/A	N/A	0	1	UID Ost
43	2712.5	2537.5	Med.	Felsic	Smthd	Smthd	Redsh Brn	N/A	11.6	6.3	N/A	N/A	N/A	0	2	UID Ost
43	2712.5	2537.5	Med-Crse.	Felsic	Smthd	Smthd	Org. Brn	N/A	8.5	6.9	Parallel	Flat	Indet.	0	1	UID Ost
43	2720	2555	Fine	Vlcanic	Smthd	Smthd	Dark Brn	N/A	2.2	4.8	N/A	N/A	N/A	0	1	UID Ost
43	2720	2555	Fine	Vlcanic	Slf. Slip	Slf. Slip	Pale Brn	N/A	1.8	5.1	N/A	N/A	N/A	0	1	Cuevas
43	2720	2555	Med.	Felsic	Eroded	Eroded	Org. Brn	N/A	3.5	6.9	N/A	N/A	N/A	0	1	UID Ost
43	2720	2555	Med-Crse.	Felsic	Eroded	Slf. Slip	Redsh Brn	N/A	3.7	7.0	N/A	N/A	N/A	0	1	UID Ost
43	2720	2555	Med-Crse.	Felsic	Slipped	Smthd	Org	Pale Brn slip	15.3	12.2	N/A	N/A	N/A	0	1	Snta Elena
43	2720	2555	Med-Crse.	Felsic	Smthd	Smthd	Brn	N/A	5.6	6.7	N/A	N/A	N/A	0	1	UID Ost
43	2720	2555	Med-Crse.	Vlcanic	Slipped	Slipped	Brn	Pink slip	7	7.6	N/A	N/A	N/A	0	1	Ost Puro
43	2722	2555	Crse.	Felsic	Smthd	N/A	Redsh Brn	N/A	66.4	17.2	N/A	N/A	Buren	0	1	UID Ost
43	2722	2555	Crse.	Quartz	Smthd	Smthd	Brn	N/A	4.4	13.1	N/A	N/A	N/A	0	1	UID Ost
43	2722	2555	Fine	Felsic	Smthd	Painted	Org. Brn	N/A	1	5.2	N/A	N/A	N/A	0	1	UID Ost
43	2722	2555	Fine	Felsic	Smthd	Smthd	Brn	N/A	2.9	5.0	Parallel	Round beveled in	Straight vertical	6	1	Cuevas
43	2722	2555	Fine	Felsic	Slf. Slip	Slf. Slip	Org. Brn	N/A	2.7	4.7	Parallel	Round beveled in	Convex out	0	1	UID Ost
43	2722	2555	Fine	Vlcanic	Brnshd	Burnish	Brn	N/A	3.3	5.5	Parallel	Indet.	Straight vertical	12	1	UID Ost
43	2722	2555	Fine	Vlcanic	Brnshd	Smudged	Smudging	N/A	1.6	4.2	N/A	N/A	N/A	0	1	UID Ost
43	2722	2555	Fine	Vlcanic	Smthd	Smthd	Brn	N/A	2.9	5.5	Parallel	Round	Indet.	0	1	UID Ost
43	2722	2555	Fine	Vlcanic	Slf. Slip	Slf. Slip	Redsh Brn	N/A	1.9	5.0	N/A	N/A	N/A	0	1	Cuevas
43	2722	2555	Med.	Felsic	Brnshd	Burnish	Brn	N/A	1.9	5.3	N/A	N/A	N/A	0	1	UID Ost

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
43	2722	2555	Med.	Felsic	Brnshd	Slf. Slip	Dark Brn	N/A	4.4	5.6	N/A	N/A	N/A	0	1	UID Ost
43	2722	2555	Med.	Felsic	Eroded	Eroded	Org. Brn	N/A	6.8	9.2	N/A	N/A	N/A	0	1	UID Ost
43	2722	2555	Med.	Felsic	Eroded	Smthd	Pale Brn	N/A	2	5.9	N/A	N/A	N/A	0	1	UID Ost
43	2722	2555	Med.	Felsic	Slipped	Slipped	Org	Pale Brn slip	1.9	4.3	Parallel	Round	Indet.	0	1	UID Ost
43	2722	2555	Med.	Felsic	Slipped	Smthd	Pale Brn	Pink slip	4.2	7.8	N/A	N/A	N/A	0	1	Ost Puro
43	2722	2555	Med.	Felsic	Slipped	Smthd	Pale Brn	Pale Brn slip	3	6.5	N/A	N/A	N/A	0	1	UID Ost
43	2722	2555	Med.	Felsic	Smthd	Eroded	Brn	N/A	7.7	8.5	N/A	N/A	N/A	0	1	Snta Elena
43	2722	2555	Med.	Felsic	Smthd	Smthd	Brn	N/A	40.9	8.0	Thinned	Tapere d	Indet.	0	8	UID Ost
43	2722	2555	Med.	Felsic	Slf. Slip	Slf. Slip	Brn	N/A	13.6	7.4	N/A	N/A	N/A	0	3	UID Ost
43	2722	2555	Med.	Quartz	Slipped	Burnish	Brn	Red slip	2.6	5.1	N/A	N/A	N/A	0	1	UID Ost
43	2722	2555	Med.	Quartz	Slipped	Slipped	White/Gr ey	Pale Brn slip	6.4	6.2	N/A	N/A	N/A	0	1	UID Ost
43	2722	2555	Med.	Quartz	Smthd	Smthd	Brn	N/A	3.8	9.2	N/A	N/A	N/A	0	1	UID Ost
43	2722	2555	Med.	Quartz	Slf. Slip	Slf. Slip	Pale Brn	N/A	2.2	6.9	N/A	N/A	N/A	0	1	Snta Elena
43	2722	2555	Med.	Quartz	Slf. Slip	Slf. Slip	Brn	N/A	2.5	5.1	Parallel	Flat	Straight vertical	0	1	UID Ost
43	2722	2555	Med.	Vlcanic	Smthd	Smthd	Dark Brn	N/A	3.2	7.6	N/A	N/A	N/A	0	1	Cuevas
43	2722	2555	Med.	Vlcanic	Smthd	Smthd	Brn	N/A	63.7	6.2	Thicken ed In/Ext	N/A	N/A	14	9	UID Ost
43	2722	2555	Med.	Vlcanic	Slf. Slip	Smthd	Dark Brn	N/A	2.2	5.1	N/A	N/A	N/A	0	1	UID Ost
43	2722	2555	Med.	Vlcanic	Slf. Slip	Slf. Slip	Dark Brn	N/A	13.1	6.3	N/A	N/A	N/A	0	3	UID Ost
43	2722	2555	Med.	Vlcanic	Smudg ed	Smthd	Black	N/A	2.1	5.4	N/A	N/A	N/A	0	1	UID Ost
43	2722	2555	Med.	Vlcanic w/ grog	Smthd	Smthd	Redsh Brn	N/A	6.3	8.9	N/A	N/A	N/A	0	1	UID Ost
43	2722	2555	Med-Crse.	Felsic	Eroded	Eroded	Org. Brn	N/A	3.7	7.1	Parallel	Round	Indet.	0	1	UID Ost
43	2722	2555	Med-Crse.	Felsic	Smthd	Eroded	Pale Brn	N/A	2.2	8.2	N/A	N/A	N/A	0	1	UID Ost
43	2722	2555	Med-Crse.	Felsic	Smthd	Painted	Brn	N/A	8.4	6.2	N/A	N/A	N/A	0	1	Ost Mod

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
43	2722	2555	Med-Crse.	Felsic	Smthd	Smthd	Brn	N/A	20.1	8.6	N/A	N/A	N/A	0	7	UID Ost
43	2722	2555	Med-Crse.	Felsic	Smthd	Smudged	Brn	N/A	3.2	9.1	N/A	N/A	N/A	0	1	UID Ost
43	2722	2555	Med-Crse.	Felsic	Smudged	Slf. Slip	Brn	N/A	3.6	6.5	Parallel	Round	Indet.	9	1	UID Ost
43	2722	2555	Med-Crse.	Vlcanic	Eroded	Slf. Slip	Brn	N/A	5.4	6.5	Parallel	N/A	Plate	22	1	UID Ost
43	2722	2555	Med-Crse.	Vlcanic	Slipped	Slf. Slip	Redsh Brn	Other	4.4	6.2	N/A	N/A	N/A	0	1	Cuevas
43	2722	2555	Med-Crse.	Vlcanic	Smthd	N/A	Brn	N/A	1.9	6.2	N/A	N/A	N/A	0	1	UID Ost
43	2722	2555	Med-Crse.	Vlcanic	Smthd	Smthd	Brn	N/A	2	9.0	Thickened In/Ext	Flat	Convex vertical	0	1	Capa
43	2722	2555	Med-Crse.	Vlcanic	Smthd	Smthd	Brn	N/A	7.4	8.4	N/A	N/A	N/A	0	2	UID Ost
43	2722	2555	Med-Crse.	Vlcanic	Slf. Slip	Eroded	Redsh Brn	N/A	2.9	5.4	N/A	N/A	N/A	0	1	UID Ost
43	2722	2555	Med-Crse.	Vlcanic	Slf. Slip	Slf. Slip	Dark Brn	N/A	2.4	5.9	N/A	N/A	N/A	0	1	UID Ost
43	2722	2555	Med-Crse.	Vlcanic w/ grog	Smthd	Slf. Slip	Brn	N/A	5.3	7.2	N/A	N/A	N/A	0	1	UID Ost
43	2725	2500	Fine	Vlcanic	Slf. Slip	Slf. Slip	Dark Brn	N/A	3.6	7.1	N/A	N/A	N/A	0	1	UID Ost
43	2725	2500	Med.	Felsic	Eroded	Eroded	Brn	N/A	1.5	7.3	N/A	N/A	N/A	0	1	UID Ost
43	2725	2500	Med.	Vlcanic	Slipped	Eroded	Brn	Pale Brn slip	7.7	6.5	N/A	N/A	N/A	0	1	Monserrate
43	2725	2500	Med.	Vlcanic	Smthd	Smthd	Brn	N/A	4.5	6.2	N/A	N/A	N/A	0	1	Monserrate
43	2725	2500	Med.	Vlcanic	Smthd	Smthd	Brn	N/A	3.3	6.6	N/A	N/A	N/A	0	1	UID Ost
43	2725	2512.5	Fine	Felsic	Smthd	Smthd	Brn	N/A	4.2	7.3	N/A	N/A	N/A	0	1	UID Ost
43	2725	2512.5	Med.	Felsic	Painted	Painted	Brn	Other	6.4	5.7	Thickened Ext. Round	Round beveled in	Straight out	16	1	Monserrate
43	2725	2512.5	Med.	Felsic	Smthd	Smthd	Org. Brn	N/A	16.7	7.1	Parallel	Flat	Convex vertical	12	1	Monserrate
43	2725	2512.5	Med-Crse.	Vlcanic	Slf. Slip	Smthd	Brn	N/A	3.2	5.7	N/A	N/A	N/A	0	1	UID Ost
43	2725	2537.5	Fine	Felsic	Smthd	Smthd	Buff	N/A	4.4	6.7	N/A	N/A	N/A	0	1	Monserrate
43	2725	2537.5	Fine	Vlcanic	Smthd	Slf. Slip	Brn	N/A	5.8	7.2	N/A	N/A	N/A	0	1	Monserrate

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
43	2725	2537.5	Med.	Felsic	Smthd	Smthd	Redsh Brn	N/A	4.6	6.2	N/A	N/A	N/A	0	1	Monserrate
43	2725	2537.5	Med.	Vlcanic	Smthd	Smthd	Redsh Brn	N/A	2.4	5.4	N/A	N/A	N/A	0	1	Monserrate
43	2725	2537.5	Med.	Vlcanic	Smthd	Smthd	Redsh Brn	N/A	5.6	6.7	N/A	N/A	N/A	0	2	UID Ost
43	2725	2550	Fine	Vlcanic	Brnshd	Smthd	Pale Brn	Pale Brn slip	2.6	5.2	N/A	N/A	N/A	0	1	Cuevas
43	2725	2550	Med.	Felsic	Smthd	Smthd	Org. Brn	N/A	2.2	5.8	N/A	N/A	N/A	0	1	UID Ost
43	2725	2550	Med.	Quartz	Slf. Slip	Slf. Slip	Redsh Brn	N/A	3.8	6.7	N/A	N/A	N/A	0	1	UID Ost
43	2725	2550	Med.	Vlcanic	Brnshd	Smthd	Redsh Brn	Other	3.4	4.0	Parallel	N/A	N/A	0	2	UID Ost
43	2725	2550	Med.	Vlcanic	Eroded	Smthd	Brn	N/A	2.4	9.0	Indtermi nate	Flat	Indet.	0	1	UID Ost
43	2725	2550	Med.	Vlcanic	Smthd	Smthd	Redsh Brn	N/A	19.3	7.6	N/A	N/A	N/A	0	4	UID Ost
43	2725	2550	Med.	Vlcanic w/ grog	Slf. Slip	Smthd	Dark Brn	N/A	4.5	7.2	N/A	N/A	N/A	0	1	UID Ost
43	2725	2550	Med-Crse.	Vlcanic	Brnshd	Eroded	Dark Brn	N/A	5.2	9.1	N/A	N/A	N/A	0	1	Ost Mod
43	2737.5	2512.5	Med.	Vlcanic	Smthd	Slf. Slip	Redsh Brn	N/A	4.5	5.0	N/A	N/A	N/A	0	1	Cuevas
43	2737.5	2512.5	Med-Crse.	Felsic w/ grog	Smthd	Eroded	Brn	N/A	8.8	9.8	N/A	N/A	N/A	0	1	UID Ost
43	2737.5	2525	Fine	Vlcanic	Smthd	Smthd	Pale Brn	N/A	19.5	8.1	N/A	N/A	N/A	16	1	Cuevas
43	2737.5	2525	Med.	Felsic	Slf. Slip	Slf. Slip	Brn	N/A	19.2	8.2	N/A	N/A	N/A	0	1	Snta Elena
43	2737.5	2525	Med.	Vlcanic	Smthd	Slipped	Redsh Brn	Brn slip	5.8	8.7	N/A	N/A	N/A	0	1	UID Ost
43	2737.5	2525	Med-Crse.	Felsic	Eroded	Eroded	Redsh Brn	N/A	3	7.6	N/A	N/A	N/A	0	1	UID Ost
43	2737.5	2525	Med-Crse.	Felsic	Smthd	Smthd	Brn	N/A	4.6	8.2	N/A	N/A	N/A	0	1	UID Ost
43	2737.5	2525	Med-Crse.	Flesic w/ shell	Slf. Slip	Slf. Slip	Redsh Brn	N/A	4.5	8.1	N/A	N/A	N/A	0	1	UID Ost
43	2737.5	2525	Med-Crse.	Vlcanic	Eroded	Eroded	Org. Brn	N/A	3.2	7.2	N/A	N/A	N/A	0	1	UID Ost
43	2737.5	2537.5	Fine	Felsic	Smthd	Smthd	Pale Brn	N/A	1.5	7.2	Parallel	Round	N/A	0	1	UID Ost
43	2737.5	2537.5	Fine	Vlcanic	Smthd	Smthd	Brn	N/A	19.5	6.4	N/A	N/A	N/A	0	2	UID Ost

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
43	2737.5	2537.5	Med.	Felsic	Eroded	Eroded	Brn	N/A	1.6	10.2	N/A	N/A	N/A	0	1	UID Ost
43	2737.5	2537.5	Med.	Vlcanic	Eroded	Eroded	Org. Brn	N/A	5.1	6.0	N/A	N/A	N/A	0	1	UID Ost
43	2737.5	2537.5	Med.	Vlcanic	Smthd	Smthd	Brn	N/A	1.8	6.1	N/A	N/A	N/A	0	1	UID Ost
43	2737.5	2537.5	Not-Tempered	Indet.	Smthd	Smthd	Brn	N/A	1.9	4.9	N/A	N/A	N/A	0	1	Cuevas
43	2750	2500	Med.	Felsic	Smthd	Smthd	Brn	N/A	5.4	6.3	N/A	N/A	N/A	0	1	UID Ost
43	2750	2550	Med.	Vlcanic	Smthd	Eroded	Brn	N/A	4.7	6.7	N/A	N/A	N/A	0	1	UID Ost
43	2750	2575	Fine	Vlcanic	Eroded	Eroded	Org	N/A	1.8	10.0	N/A	N/A	N/A	0	1	UID Ost
43	2762.5	2512.5	Fine	Felsic	Painted	Painted	Buff	Red on Buff	4.1	9.0	Parallel	Flat	Straight out	0	1	Monserrate
43	2762.5	2512.5	Med.	Felsic	Smthd	Slipped	Redsh Brn	Pale Brn slip	2.7	7.0	N/A	N/A	N/A	0	1	UID Ost
43	2762.5	2512.5	Med.	Felsic	Smthd	Smthd	Org. Brn	N/A	5.7	5.2	Parallel	Round	Convex in	10	1	UID Ost
43	2762.5	2512.5	Med.	Felsic	Slf. Slip	Slf. Slip	Org. Brn	N/A	2.7	6.9	N/A	N/A	N/A	0	1	UID Ost
43	2762.5	2525	Fine	Felsic	Slf. Slip	Eroded	Org. Brn	N/A	6.8	8.9	N/A	N/A	N/A	0	1	UID Ost
43	2762.5	2525	Med.	Vlcanic	Eroded	Smthd	Org. Brn	N/A	3.5	8.1	Parallel	Flat	Indet.	0	1	Monserrate
43	2762.5	2525	Med-Crse.	Felsic	Eroded	Eroded	Brn	N/A	2.6	7.3	N/A	N/A	N/A	0	1	UID Ost
43	2775	2550	Fine	Vlcanic	Smthd	Smthd	Brn	N/A	3	4.9	N/A	N/A	N/A	0	1	UID Ost
45	1687.5	3075	Med.	Felsic	Brnshd	Burnish	Org. Brn	N/A	10.1	5.6	Thickened In/Ext	Round beveled out	Convex out	20	1	UID Ost
45	1687.5	3075	Med.	Felsic	Brnshd	Smthd	Dark Brn	N/A	10.1	7.8	N/A	N/A	N/A	0	1	UID Ost
45	1687.5	3075	Med.	Felsic	Smthd	Smthd	Brn	N/A	1.2	6.5	N/A	N/A	N/A	0	1	UID Ost
45	1687.5	3087.5	Med-Crse.	Vlcanic w/ grog	Slf. Slip	Slf. Slip	Brn	N/A	2	7.9	N/A	N/A	N/A	0	1	UID Ost
45	1712.5	3037.5	Med.	Felsic	Brnshd	Smthd	Pale Brn	N/A	2.7	7.7	N/A	N/A	N/A	0	1	UID Ost
45	1712.5	3037.5	Med.	Felsic	Smthd	Smthd	Org. Brn	N/A	6.9	7.9	N/A	N/A	N/A	0	3	UID Ost
46	1525	1550	Med.	Felsic	Eroded	Eroded	Org	N/A	2.4	8.4	N/A	N/A	N/A	0	1	UID Ost
46	1525	1550	Med.	Felsic	Smthd	Smthd	Redsh Brn	N/A	8.8	6.9	Parallel	Indet.	Straight vertical	24	1	UID Ost
46	1525	1550	Med-Crse.	Quartz	Slf. Slip	Smthd	Org. Brn	N/A	12.3	10.2	N/A	N/A	N/A	0	1	Esperanza
46	1600	1475	Med.	Felsic	Smthd	Smthd	Brn	N/A	1.9	7.5	N/A	N/A	N/A	0	1	UID Ost

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
47	2950	950	Med.	Quartz w/ shell	Smthd	Slipped	Brn	Pale Brn slip	7.5	10.3	N/A	N/A	N/A	0	1	Ost Mod
47	3100	1025	Fine	Felsic	Slipped	Slf. Slip	Buff	Pale Brn slip	4.2	6.2	N/A	N/A	N/A	0	1	Cuevas
47	3100	1025	Fine	Felsic	Smthd	Eroded	Buff	Other	11.2	5.4	N/A	N/A	N/A	0	1	Cuevas/Ost Puro
47	3100	1025	Fine	Vlcanic	Brnshd	Burnish	Brn	N/A	3.2	4.2	N/A	N/A	N/A	0	1	UID Ost
47	3100	1025	Fine	Vlcanic	Slipped	Slipped	Redsh Brn	Other	4.3	5.8	N/A	N/A	N/A	0	1	Cuevas/Ost Puro
47	3100	1025	Med.	Felsic	Brnshd	Burnish	Redsh Brn	N/A	14.2	7.1	N/A	N/A	N/A	0	1	Ost Mod
47	3100	1025	Med.	Felsic	Eroded	Eroded	Org. Brn	N/A	2.2	6.3	N/A	N/A	N/A	0	1	UID Ost
47	3100	1025	Med.	Felsic	Slipped	Burnish	Buff	Pale Brn slip	3.1	5.2	Thickened Ext. Angular	Round beveled in	Convex in	0	1	Ost Mod
47	3100	1025	Med.	Felsic	Slipped	Slipped	Buff	Pink slip	2.9	5.0	N/A	N/A	N/A	0	1	Cuevas/Ost Puro
47	3100	1025	Med.	Felsic	Slipped	Slipped	Buff	Pale Brn slip	2	5.7	N/A	N/A	N/A	0	1	UID Ost
47	3100	1025	Med.	Felsic	Smthd	Smthd	Org. Brn	N/A	2.2	6.4	N/A	N/A	N/A	0	1	UID Ost
47	3100	1025	Med.	Felsic	Slf. Slip	Burnish	Brn	N/A	3	7.2	N/A	N/A	N/A	0	1	UID Ost
47	3100	1025	Med.	Felsic	Slf. Slip	Slf. Slip	Pale Brn	N/A	2.1	5.7	N/A	N/A	N/A	0	1	UID Ost
47	3100	1025	Med.	Vlcanic	Brnshd	Burnish	Brn	N/A	3.5	4.8	Indterminate	Round beveled out	Indet.	0	2	UID Ost
47	3100	1025	Med.	Vlcanic	Brnshd	Eroded	Org. Brn	N/A	7	6.1	N/A	N/A	N/A	0	1	UID Ost
47	3100	1025	Med.	Vlcanic	Slipped	Burnish	Brn	Pale Brn slip	6.5	6.9	Thinned	Round	Indet.	0	1	Ost Mod
47	3100	1025	Med.	Vlcanic	Smthd	Burnish	Brn	N/A	14.2	10.1	N/A	N/A	N/A	0	1	Ost Mod
47	3100	1025	Med.	Vlcanic	Smthd	Smthd	Brn	N/A	1.7	5.2	Thinned	Round beveled out	Indet.	0	1	UID Ost
47	3100	1025	Med-Crse.	Vlcanic	Brnshd	Burnish	Redsh Brn	N/A	2.1	8.0	N/A	N/A	N/A	0	1	Ost Mod
47	3100	1025	Med-Crse.	Vlcanic	Brnshd	Slipped	Org	Brn slip	3.2	7.8	N/A	N/A	N/A	0	1	Ost Mod

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
47	3100	1025	Med-Crse.	Vlcanic	Eroded	Slipped	Org. Brn	Pale Brn slip	4	6.6	N/A	N/A	N/A	0	1	UID Ost
47	3100	1025	Med-Crse.	Vlcanic	Slipped	Smthd	Redsh Brn	Brn slip	2.1	9.8	N/A	N/A	N/A	0	1	UID Ost
47	3100	1025	Med-Crse.	Vlcanic	Smthd	Smthd	Redsh Brn	N/A	1.4	7.2	N/A	N/A	N/A	0	1	UID Ost
47	3100	1037.5	Med.	Felsic	Smthd	Smthd	Brn	N/A	2.5	6.2	N/A	N/A	N/A	0	1	Snta Elena
47	3100	1050	Fine	Felsic	Smthd	Smthd	Org. Brn	N/A	4.4	7.1	Thinned	Round beveled in	Outflaring	0	1	Cuevas
47	3100	1050	Med-Crse.	Quartz	Smthd	Smthd	Org. Brn	N/A	13.1	11.1	N/A	N/A	N/A	0	1	Snta Elena
47	3125	1025	Med.	Vlcanic	Brnshd	Slipped	Redsh Brn	N/A	6.9	6.8	N/A	N/A	N/A	0	1	Ost Mod
47	3125	1025	Med.	Vlcanic	Smthd	Smthd	Brn	N/A	13.8	7.0	N/A	N/A	N/A	0	2	Ost Mod
47	3125	1025	Med-Crse.	Vlcanic	Smudged	Smthd	Brn	N/A	1.9	7.3	N/A	N/A	N/A	0	1	Ost Mod
47	3125	1037.5	Crse.	Felsic	Eroded	Eroded	Brn	N/A	5.3	14.9	N/A	N/A	Buren	0	1	UID Ost
47	3125	1037.5	Med-Crse.	Felsic	Eroded	Eroded	Buff	N/A	34.9	7.4	N/A	N/A	N/A	0	1	Snta Elena
48	3805	4220	Med.	Felsic	Smthd	Smthd	Org	N/A	5.2	6.8	N/A	N/A	N/A	0	1	Ost Mod
48	3805	4220	Med.	Vlcanic	Smthd	Eroded	Org. Brn	N/A	4.4	8.7	N/A	N/A	N/A	0	1	Ost Mod
48	3805	4220	Med.	Vlcanic	Smthd	Smthd	Org. Brn	N/A	10	9.3	N/A	N/A	N/A	0	1	Ost Mod
48	3805	4220	Med.	Vlcanic	Slf. Slip	Slf. Slip	Org. Brn	N/A	5.3	7.6	N/A	N/A	N/A	0	1	Ost Mod
48	3805	4220	Med-Crse.	Felsic	Eroded	Smthd	Redsh Brn	N/A	27.7	17.2	Thickened In/Ext	Indet.	Buren	0	1	UID Ost
48	3820	4220	Med.	Felsic w/ grog	Slf. Slip	Smthd	Org. Brn	N/A	3.7	8.3	N/A	N/A	N/A	0	1	Ost Mod
48	3820	4220	Med.	Vlcanic	Eroded	Smthd	Brn	N/A	19.5	8.5	Thickened In Round	Round beveled in	Indet.	0	1	Snta Elena
48	3820	4225	Med.	Felsic	Smthd	Smudged	Brn	N/A	8.1	8.4	N/A	N/A	N/A	0	1	Ost Mod
48	3820	4225	Med.	Vlcanic	Slipped	Slipped	Brn	Pale Brn slip	2.6	8.1	N/A	N/A	N/A	0	1	Ost Mod
48	3820	4225	Med.	Vlcanic	Slf. Slip	Smudged	Redsh Brn	N/A	2.5	5.3	N/A	N/A	N/A	0	1	UID Ost

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
48	3820	4245	Med.	Felsic	Brnshd	Smthd	Brn	N/A	5.2	7.5	N/A	N/A	N/A	0	1	Ost Mod
48	3820	4245	Med.	Felsic	Slipped	Eroded	Buff	Pink slip	3.1	5.3	N/A	N/A	N/A	0	1	Cuevas/Ost Puro
48	3820	4245	Med.	Felsic	Smthd	Slipped	Org. Brn	Pale Brn slip	1.9	5.3	N/A	N/A	N/A	0	1	UID Ost
48	3820	4245	Med.	Felsic	Smthd	Smthd	Redsh Brn	N/A	5.3	8.4	N/A	N/A	N/A	0	2	Ost Mod
48	3820	4245	Med.	Felsic	Smthd	Smthd	Org. Brn	N/A	3.1	5.2	N/A	N/A	N/A	0	1	UID Ost
48	3820	4245	Med.	Felsic	Smthd	Slf. Slip	Brn	N/A	2.1	6.8	N/A	N/A	N/A	0	1	UID Ost
48	3820	4245	Med.	Quartz	Smthd	Smthd	Buff	N/A	4.2	8.2	N/A	N/A	N/A	0	1	UID Ost
48	3820	4245	Med.	Vlcanic	Brnshd	Smthd	Dark Brn	N/A	11.3	6.2	Thinned	Round bevele d in	Compos ite	12	3	Ost Mod
48	3820	4245	Med.	Vlcanic	Eroded	Eroded	Dark Brn	N/A	1.2	5.2	N/A	N/A	N/A	0	1	UID Ost
48	3820	4245	Med.	Vlcanic	Eroded	Smthd	Brn	N/A	4.2	6.1	N/A	N/A	N/A	0	2	UID Ost
48	3820	4245	Med.	Vlcanic	Smthd	Burnish	Brn	N/A	5	7.5	N/A	N/A	N/A	0	2	UID Ost
48	3820	4245	Med.	Vlcanic	Smthd	Eroded	Brn	N/A	3.1	5.2	N/A	N/A	N/A	0	1	UID Ost
48	3820	4245	Med.	Vlcanic	Smthd	Smthd	Org. Brn	N/A	2	6.2	N/A	N/A	N/A	0	1	Ost Mod
48	3820	4245	Med.	Vlcanic	Smthd	Smthd	Org. Brn	N/A	13.4	6.4	N/A	N/A	N/A	0	4	UID Ost
48	3820	4245	Med-Crse.	Felsic	Smthd	Slipped	Redsh Brn	Org slip	3.4	6.4	N/A	N/A	N/A	0	1	UID Ost
48	3820	4245	Med-Crse.	Vlcanic	Slipped	Slipped	Brn	Pale Brn slip	14.2	9.7	N/A	N/A	N/A	0	1	Ost Mod
48	3820	4245	Med-Crse.	Vlcanic	Smthd	Smthd	Redsh Brn	N/A	4.2	8.7	N/A	N/A	N/A	0	1	Ost Mod
48	3820	4245	Med-Crse.	Vlcanic	Smthd	Smthd	Org. Brn	N/A	2.4	5.2	N/A	N/A	N/A	0	1	UID Ost
48	3820	4255	Med.	Felsic	Eroded	Slipped	Brn	Pale Brn slip	11.2	10.1	N/A	N/A	N/A	0	1	Ost Mod
48	3820	4255	Med.	Felsic	Smthd	Smthd	Org. Brn	N/A	12.7	8.7	N/A	N/A	N/A	0	1	Cuevas/Monserrate
48	3820	4255	Med.	Felsic	Smthd	Smthd	Brn	N/A	1.3	8.2	Indtermi nate	Round bevele d in	Indet.	0	1	Esperanza
48	3820	4255	Med.	Felsic	Smthd	Smthd	Brn	N/A	7.8	11.1	N/A	N/A	N/A	0	1	Ost Mod
48	3820	4255	Med.	Felsic	Smthd	Slf. Slip	Redsh Brn	N/A	11.7	6.7	N/A	N/A	N/A	0	2	Ost Mod

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
48	3820	4255	Med.	Vlcanic	Smthd	Burnish	Dark Brn	N/A	3.6	6.2	N/A	N/A	N/A	0	1	Ost Mod
48	3820	4255	Med.	Vlcanic	Smthd	Eroded	Brn	N/A	23	11.2	N/A	N/A	N/A	0	1	Ost Mod
48	3820	4255	Med.	Vlcanic	Smthd	Slipped	Org. Brn	Org slip	5.3	7.7	N/A	N/A	N/A	0	1	Ost Mod
48	3820	4255	Med.	Vlcanic	Smthd	Smthd	Brn	N/A	4.1	9.1	N/A	N/A	N/A	0	1	Ost Mod
48	3820	4255	Med.	Vlcanic	Smthd	Slf. Slip	Org. Brn	N/A	11.2	7.2	N/A	N/A	N/A	0	1	Ost Mod
48	3820	4255	Med-Crse.	Felsic	Smthd	Eroded	Org. Brn	N/A	6.2	13.1	N/A	N/A	N/A	0	1	Ost Mod
48	3820	4255	Med-Crse.	Felsic	Slf. Slip	Eroded	Brn	N/A	4.9	8.3	N/A	N/A	N/A	0	1	Ost Mod
48	3820	4255	Med-Crse.	Vlcanic	Brnshd	Smthd	Dark Brn	N/A	14.3	8.1	N/A	N/A	N/A	0	1	Ost Mod
48	3820	4255	Med-Crse.	Vlcanic	Smthd	Eroded	Brn	N/A	8	10.1	N/A	N/A	N/A	0	1	Ost Mod
48	3820	4255	Med-Crse.	Vlcanic	Smthd	Eroded	White/Grey	N/A	2.4	12.2	N/A	N/A	N/A	0	1	UID Ost
48	3830	4245	Med.	Felsic	Eroded	Eroded	Org. Brn	N/A	6.7	14.5	N/A	N/A	N/A	0	1	UID Ost
48	3830	4245	Med.	Felsic	Smthd	Smthd	Org. Brn	N/A	4.5	7.8	Parallel	N/A	N/A	0	2	Ost Mod
48	3830	4245	Med.	Vlcanic	Brnshd	Smthd	Brn	N/A	24.2	7.5	N/A	N/A	N/A	0	1	Ost Mod
48	3830	4245	Med.	Vlcanic	Smthd	Smthd	Brn	N/A	8.1	10.0	N/A	N/A	N/A	0	1	Ost Mod
48	3835	4220	Med.	Felsic	Smthd	Smthd	Org. Brn	N/A	4.3	7.7	N/A	N/A	N/A	0	3	UID Ost
48	3835	4220	Med.	Felsic	Smthd	Slf. Slip	Brn	N/A	0.9	7.1	N/A	N/A	N/A	0	1	UID Ost
48	3835	4220	Med.	Felsic	Slf. Slip	Slipped	Org	Pale Brn slip	9.2	6.1	Parallel	Round	Plate	18	1	UID Ost
48	3835	4220	Med.	Vlcanic	Brnshd	Slf. Slip	Org. Brn	N/A	11.7	8.5	N/A	N/A	N/A	0	1	Ost Mod
48	3835	4220	Med.	Vlcanic	Smthd	Burnish	Redsh Brn	N/A	3.1	6.1	N/A	N/A	N/A	0	1	UID Ost
48	3835	4220	Med.	Vlcanic	Smthd	Smthd	Org. Brn	N/A	5.2	6.5	N/A	N/A	N/A	0	1	Ost Mod
50	1150	3300	Med.	Felsic	Smthd	Smthd	Brn	N/A	3.3	7.9	Parallel	Round	Indet.	0	1	UID Ost
50	1150	3300	Med.	Vlcanic	Smthd	Smthd	Dark Brn	N/A	2.1	9.4	N/A	N/A	N/A	0	1	UID Ost
50	1175	3225	Med.	Vlcanic	Brnshd	Smthd	Dark Brn	N/A	2.4	4.2	Parallel	Round	Indet.	0	1	UID Ost
50	1250	3300	Med.	Felsic	Eroded	Smthd	Brn	N/A	3.5	9.1	N/A	N/A	N/A	0	1	Cuevas/Ost Puro
50	1250	3300	Med.	Felsic	Smthd	Smthd	Redsh Brn	N/A	8.9	11.4	N/A	N/A	N/A	0	1	Cuevas/Ost Puro
50	1250	3300	Med-Crse.	Felsic	Smthd	Smthd	Dark Brn	N/A	12.9	9.7	N/A	N/A	N/A	0	1	UID Ost

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
50	1250	3312.5	Med.	Felsic	Smthd	Smthd	Redsh Brn	N/A	8.6	12.7	N/A	N/A	N/A	0	1	UID Ost
50	1250	3312.5	Med-Crse.	Felsic	Eroded	Slipped	Brn	Org slip	1.7	5.1	N/A	N/A	N/A	0	1	UID Ost
50	1250	3312.5	Med-Crse.	Felsic	Eroded	Smthd	Brn	N/A	1.5	8.9	N/A	N/A	N/A	0	1	UID Ost
50	1250	3312.5	Med-Crse.	Vlcanic	Smthd	Burnish	Dark Brn	N/A	11.2	13.2	N/A	N/A	N/A	0	1	UID Ost
50	1251	3300	Med-Crse.	Felsic	Smthd	Smthd	Black	N/A	40.2	9.6	N/A	N/A	N/A	0	1	Cuevas/Ost Puro
50	1251	3300	Med-Crse.	Quartz	Smthd	Smthd	Brn	N/A	42.9	11.5	N/A	N/A	N/A	0	1	Snta Elena
50	1262.5	3300	Crse.	Felsic	Smthd	Smthd	Redsh Brn	N/A	20.6	11.9	N/A	N/A	N/A	0	1	UID Ost
50	1262.5	3300	Med.	Felsic	Smthd	Smthd	Brn	N/A	20.8	8.0	N/A	N/A	N/A	0	3	Cuevas/Ost Puro
50	1262.5	3300	Med.	Vlcanic	Smthd	Smthd	Redsh Brn	N/A	29.9	10.5	N/A	N/A	N/A	0	2	UID Ost
50	1262.5	3300	Med-Crse.	Felsic	Smthd	Smthd	Org. Brn	N/A	17.9	14.4	N/A	N/A	N/A	0	1	Elenan Ost
50	1262.5	3300	Med-Crse.	Felsic	Smthd	Smthd	Org. Brn	N/A	12.5	9.4	N/A	N/A	N/A	0	1	Snta Elena
50	1262.5	3300	Med-Crse.	Felsic	Smthd	Smthd	Brn	N/A	75.4	12.5	N/A	N/A	N/A	0	4	UID Ost
50	1262.5	3300	Med-Crse.	Vlcanic	Smthd	Smthd	Brn	N/A	22.1	13.2	N/A	N/A	N/A	0	1	UID Ost
50	1262.5	3312.5	Med.	Felsic	Smthd	Smthd	Redsh Brn	N/A	29.7	9.2	N/A	N/A	N/A	0	2	UID Ost
50	1275	3300	Med.	Felsic	Brnshd	Burnish	Brn	N/A	7.2	8.9	N/A	N/A	N/A	0	1	UID Ost
50	1275	3312.5	Med-Crse.	Vlcanic	Smthd	Smthd	Dark Brn	N/A	12.3	11.7	N/A	N/A	N/A	0	1	UID Ost
50	1300	3300	Crse.	Felsic	Smthd	Smthd	Brn	N/A	723	16.0	N/A	N/A	N/A	0	5	UID Ost
50	1300	3300	Crse.	Felsic w/ grog	Smthd	Smthd	Brn	N/A	65	12.5	N/A	N/A	N/A	0	1	UID Ost
50	1300	3300	Fine	Felsic	Eroded	Eroded	Org	N/A	23.1	6.6	Thickened In/Ext	Flat	Outflaring	0	1	Cuevas
50	1300	3300	Med.	Felsic	Brnshd	Smthd	Black	N/A	19.9	7.8	N/A	N/A	N/A	0	1	Cuevas/Ost Puro

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
50	1300	3300	Med-Crse.	Felsic	Smthd	Smthd	Redsh Brn	N/A	221	11.8	Parallel	Round beveled out	Straight vertical	32	1	Cuevas/Ost Puro
50	1300	3300	Med-Crse.	Felsic	Smthd	Smthd	Dark Brn	N/A	268	8.6	Thinned	Round beveled out	Convex out	24	3	UID Ost
50	1300	3300	Med-Crse.	Limestone	Smthd	Smthd	Redsh Brn	N/A	115	6.5	N/A	N/A	N/A	0	1	UID Ost
50	1300	3300	Med-Crse.	Quartz	Smthd	Smthd	Buff	N/A	55.3	17.0	N/A	N/A	N/A	0	1	UID Ost
50	1300	3300	Med-Crse.	Vlcanic	Smthd	Smthd	Dark Brn	N/A	90.7	9.9	Parallel	N/A	N/A	0	3	UID Ost
51	0	0	Fine	Felsic	Smthd	Smthd	Brn	N/A	12.4	7.9	N/A	N/A	N/A	0	3	UID Ost
51	0	0	Fine	Vlcanic	Slf. Slip	Slf. Slip	Brn	N/A	10.9	5.9	N/A	N/A	N/A	0	3	UID Ost
51	0	0	Med.	Felsic	Brnshd	Burnish	Brn	N/A	2.2	5.5	N/A	N/A	N/A	0	1	UID Ost
51	0	0	Med.	Felsic	Eroded	Slf. Slip	Org. Brn	Pink slip	8	6.7	N/A	N/A	N/A	0	1	Cuevas/Ost Puro
51	0	0	Med.	Felsic	Smthd	Burnish	Org	N/A	10.6	6.8	N/A	N/A	N/A	0	1	UID Ost
51	0	0	Med.	Felsic	Smthd	Slipped	Buff	White on Red	6.2	7.3	N/A	N/A	N/A	0	1	UID Ost
51	0	0	Med.	Felsic	Smthd	Smthd	Pale Brn	N/A	104	7.5	Parallel	N/A	N/A	14	17	UID Ost
51	0	0	Med.	Felsic	Slf. Slip	Smthd	Org. Brn	Org slip	7.1	6.7	N/A	N/A	N/A	0	2	UID Ost
51	0	0	Med.	Felsic	Slf. Slip	Slf. Slip	Org. Brn	N/A	8.6	6.5	N/A	N/A	N/A	0	2	UID Ost
51	0	0	Med.	Vlcanic	Brnshd	Burnish	Org. Brn	N/A	11.7	5.8	N/A	N/A	N/A	0	2	UID Ost
51	0	0	Med.	Vlcanic	Smthd	Slipped	Buff	White on Red	27.4	5.5	N/A	N/A	N/A	0	1	UID Ost
51	0	0	Med.	Vlcanic	Smthd	Smthd	Brn	N/A	33.3	5.8	Thinned	N/A	N/A	14	5	UID Ost
51	0	0	Med-Crse.	Felsic	Eroded	Smthd	Org. Brn	Org slip	5.2	7.2	N/A	N/A	N/A	0	1	Cuevas/Ost Puro
51	0	0	Med-Crse.	Felsic	Eroded	Smthd	Org. Brn	N/A	10.6	12.9	N/A	N/A	Buren	0	1	Indet.
51	0	0	Med-Crse.	Felsic	Smthd	Smthd	Org. Brn	N/A	6.7	10.0	N/A	N/A	N/A	0	1	Snta Elena
51	0	0	Med-Crse.	Felsic	Smthd	Smthd	Org	N/A	37	7.1	Thickened In Round	N/A	N/A	20	5	UID Ost
51	0	0	Med-Crse.	Vlcanic	Brnshd	Burnish	Dark Brn	N/A	6.6	7.7	N/A	N/A	N/A	0	1	UID Ost

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
51	0	0	Med-Crse.	Vlcanic	Slipped	Slipped	Org. Brn	Pale Brn slip	12.3	9.7	N/A	N/A	N/A	0	1	Esperanza
51	0	0	Med-Crse.	Vlcanic	Slipped	Smthd	Pale Brn	Pale Brn slip	2.8	7.1	N/A	N/A	N/A	0	1	UID Ost
51	0	0	Med-Crse.	Vlcanic	Slipped	Slf. Slip	Org. Brn	White on Red	11.2	10.0	N/A	N/A	N/A	0	1	Snta Elena
51	0	0	Med-Crse.	Vlcanic	Slipped	Slf. Slip	Pale Brn	Pale Brn slip	2.1	6.0	N/A	N/A	N/A	0	1	UID Ost
51	0	0	Med-Crse.	Vlcanic	Smthd	Smthd	Org. Brn	N/A	12.1	9.8	N/A	N/A	N/A	0	1	Snta Elena
51	0	0	Med-Crse.	Vlcanic	Smthd	Smthd	Pale Brn	N/A	27	7.6	Parallel	Round beveled in	Convex vertical	20	4	UID Ost
51	0	0	Med-Crse.	Vlcanic	Slf. Slip	Slf. Slip	Buff	N/A	9.4	5.9	N/A	N/A	N/A	0	1	UID Ost
52	1805	2837.5	Crse.	Felsic	Smthd	Smthd	Brn	N/A	118	19.6	N/A	N/A	Buren	0	1	UID Ost
52	1805	2837.5	Crse.	Vlcanic	Smthd	Smthd	Brn	N/A	414	20.1	N/A	N/A	Buren	0	1	UID Ost
52	1805	2837.5	Med.	Felsic	Smthd	Slipped	Org. Brn	Org slip	3.7	5.9	N/A	N/A	N/A	0	1	UID Ost
52	1805	2837.5	Med.	Felsic	Smthd	Smthd	Brn	N/A	4.2	5.8	Parallel	Round	Indet.	0	1	UID Ost
52	1805	2837.5	Med.	Felsic	Smthd	Slf. Slip	Redsh Brn	N/A	3.8	5.8	N/A	N/A	N/A	0	1	UID Ost
52	1805	2837.5	Med-Crse.	Felsic	Eroded	Eroded	Brn	N/A	3.8	6.7	N/A	N/A	N/A	0	1	UID Ost
52	1805	2837.5	Med-Crse.	Felsic	Eroded	Smthd	Org. Brn	N/A	18.3	11.0	N/A	N/A	Buren	0	1	Indet.
52	1805	2837.5	Med-Crse.	Felsic	Eroded	Smthd	Org. Brn	N/A	44.5	7.4	N/A	N/A	Buren	0	2	UID Ost
52	1805	2837.5	Med-Crse.	Felsic	Smthd	Eroded	Brn	N/A	12.9	11.5	N/A	N/A	N/A	0	1	UID Ost
52	1805	2837.5	Med-Crse.	Felsic	Smthd	Smthd	Redsh Brn	N/A	17.2	8.5	N/A	N/A	N/A	0	1	Esperanza
52	1805	2837.5	Med-Crse.	Felsic	Smthd	Smthd	Org. Brn	N/A	530	16.6	Thickened In/Ext	N/A	Buren	36	2	Indet.

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
52	1805	2837.5	Med-Crse.	Felsic	Smthd	Smthd	Brn	N/A	78.4	19.4	N/A	N/A	Buren	0	1	UID Ost
52	1805	2837.5	Med-Crse.	Felsic	Slf. Slip	Slf. Slip	Brn	N/A	18.7	8.7	N/A	N/A	N/A	0	3	UID Ost
52	1825	2837.5	Med.	Felsic	Smthd	Smthd	Org. Brn	N/A	2.5	6.2	Thinned	Round beveled in	Composite	10	1	Capa
52	1825	2837.5	Med.	Felsic	Smthd	Smthd	Org. Brn	N/A	2.1	8.1	Thinned	Tapered	Indet.	0	1	UID Ost
52	1825	2837.5	Med-Crse.	Felsic	Eroded	Burnish	Org. Brn	N/A	1.7	8.1	N/A	N/A	N/A	0	1	UID Ost
52	1825	2837.5	Med-Crse.	Felsic	Eroded	Slf. Slip	Brn	N/A	6.3	7.5	N/A	N/A	N/A	0	1	UID Ost
52	1825	2837.5	Med-Crse.	Felsic	Smthd	Smthd	Brn	N/A	3.5	11.4	N/A	N/A	N/A	0	1	Snta Elena
52	1825	2850	Crse.	Felsic	Smthd	Smthd	Org. Brn	N/A	11.7	12.4	N/A	N/A	N/A	0	1	Snta Elena
52	1825	2850	Fine	Felsic	Smthd	Smthd	Org	N/A	2.1	8.3	N/A	N/A	N/A	0	1	UID Ost
52	1825	2850	Med.	Felsic	Smthd	Burnish	Brn	N/A	14.8	8.6	Thickened In Round	Round beveled in	Plate	22	1	UID Ost
52	1825	2850	Med.	Vlcanic	Brnshd	Smthd	Brn	N/A	3.4	7.7	N/A	N/A	N/A	0	1	UID Ost
52	1825	2850	Med.	Vlcanic	Smthd	Smthd	Brn	N/A	3.3	10.7	N/A	N/A	N/A	0	1	UID Ost
52	1825	2850	Med-Crse.	Felsic	Eroded	Eroded	Org. Brn	N/A	19.9	15.0	N/A	N/A	Buren	0	1	Indet.
52	1825	2850	Med-Crse.	Felsic	Eroded	Smthd	Org. Brn	N/A	3.5	10.5	N/A	N/A	N/A	0	1	Snta Elena
52	1825	2850	Med-Crse.	Felsic	Smthd	N/A	Org. Brn	N/A	12.3	16.1	N/A	N/A	Buren	0	1	Indet.
52	1825	2850	Med-Crse.	Vlcanic	Brnshd	Burnish	Brn	N/A	9.2	7.2	N/A	N/A	N/A	0	1	UID Ost
52	1835	2825	Med.	Felsic	Eroded	Eroded	Org. Brn	N/A	13.5	10.3	N/A	N/A	Buren	0	2	UID Ost
52	1835	2825	Med.	Felsic	Eroded	Smthd	Org. Brn	N/A	6.8	3.8	N/A	N/A	N/A	0	1	UID Ost
52	1835	2825	Med-Crse.	Felsic	Smthd	Smthd	Org. Brn	N/A	6.9	16.2	N/A	N/A	Buren	0	1	Indet.
52	1837.5	2837.5	Med.	Vlcanic	Slipped	Smthd	Dark Brn	Brn slip	1.7	5.4	N/A	N/A	N/A	0	1	UID Ost
52	1837.5	2837.5	Med.	Vlcanic	Smthd	Smthd	Brn	N/A	3.8	8.1	N/A	N/A	N/A	0	1	Esperanza

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
52	1837.5	2837.5	Med-Crse.	Felsic	Smthd	Smthd	Org. Brn	N/A	3.7	8.4	N/A	N/A	N/A	0	1	Esperanza
52	1850	2836	Med.	Felsic	Brnshd	Smthd	Redsh Brn	N/A	9.3	8.9	N/A	N/A	N/A	0	1	UID Ost
52	1850	2836	Med.	Felsic	Smthd	Burnish	Dark Brn	N/A	3.7	6.7	N/A	N/A	N/A	0	1	UID Ost
52	1850	2836	Med.	Felsic	Smthd	Slipped	Org. Brn	N/A	5	6.3	N/A	N/A	N/A	0	2	UID Ost
52	1850	2836	Med.	Felsic	Smthd	Smthd	Redsh Brn	N/A	1.7	7.4	N/A	N/A	N/A	0	1	UID Ost
52	1850	2836	Med.	Felsic	Slf. Slip	Slf. Slip	Org. Brn	N/A	1.7	4.8	N/A	N/A	N/A	0	1	UID Ost
52	1850	2836	Med.	Vlcanic	Smthd	Burnish	Brn	N/A	2.7	6.5	N/A	N/A	N/A	0	1	Esperanza
52	1850	2836	Med.	Vlcanic	Smthd	Smthd	Brn	N/A	9.1	7.7	Thinned	Round	Indet.	12	2	UID Ost
52	1850	2836	Med-Crse.	Felsic	Eroded	Smthd	Org. Brn	N/A	2.7	7.7	N/A	N/A	N/A	0	1	UID Ost
52	1850	2836	Med-Crse.	Felsic	Smthd	Slipped	Brn	N/A	4.8	7.8	N/A	N/A	N/A	0	1	Esperanza
52	1850	2836	Med-Crse.	Vlcanic	Smthd	Smthd	Dark Brn	N/A	5.2	9.0	N/A	N/A	N/A	0	1	UID Ost
52	1850	2850	Med-Crse.	Felsic	Eroded	Eroded	Redsh Brn	N/A	3	10.1	N/A	N/A	N/A	0	1	UID Ost
52	1850	2850	Med-Crse.	Felsic	Smthd	N/A	Redsh Brn	N/A	13.7	19.1	N/A	N/A	Buren	0	1	UID Ost
52	1853	2845	Med.	Felsic	Smthd	Smthd	Brn	N/A	5.9	7.1	N/A	N/A	N/A	0	1	UID Ost
52	1853	2845	Med.	Felsic	Slf. Slip	Slipped	Pale Brn	Org slip	2.1	6.2	N/A	N/A	N/A	0	1	UID Ost
52	1853	2845	Med.	Vlcanic	Slf. Slip	Burnish	Org. Brn	N/A	1.2	5.1	N/A	N/A	N/A	0	1	Cuevas/Ost Puro
52	1853	2845	Med-Crse.	Vlcanic	Smthd	Burnish	Brn	N/A	7.4	10.2	N/A	N/A	N/A	0	1	UID Ost
52	1853	2845	Med-Crse.	Vlcanic	Smthd	Slf. Slip	Dark Brn	N/A	12.8	11.1	N/A	N/A	N/A	0	1	Snta Elena
52	1900	2800	Med.	Felsic	Smthd	Burnish	Redsh Brn	N/A	3.5	6.2	N/A	N/A	N/A	0	1	UID Ost
53	560	3990	Med.	Felsic	Smthd	Smthd	Org. Brn	N/A	1.6	5.7	N/A	N/A	N/A	0	1	UID Ost
53	560	4000	Med.	Felsic	Brnshd	Smthd	Org. Brn	N/A	2.5	5.2	N/A	N/A	N/A	0	1	UID Ost
53	560	4000	Med.	Felsic	Smthd	Burnish	Dark Brn	N/A	4.2	12.6	N/A	N/A	N/A	0	1	UID Ost
53	560	4000	Med.	Felsic	Smthd	Smthd	Brn	N/A	4.5	7.4	Parallel	Round beveled out	Indet.	0	1	UID Ost
53	560	4000	Med-Crse.	Felsic	Brnshd	Burnish	Redsh Brn	N/A	1.9	8.3	N/A	N/A	N/A	0	1	UID Ost

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_ Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
53	560	4000	Med-Crse.	Felsic	Smthd	Smthd	Brn	N/A	5.6	9.8	N/A	N/A	N/A	0	1	UID Ost
53	560	4005	Crse.	Felsic	Eroded	Smthd	Org	N/A	9.5	9.8	N/A	N/A	N/A	0	1	Elenan Ost
53	560	4005	Med-Crse.	Felsic	Slipped	Smthd	Org	Pink slip	13.2	7.2	Parallel	Round beveled in	Convex out	0	1	Cuevas/Ost Puro
53	560	4005	Med-Crse.	Felsic	Smthd	Eroded	Org. Brn	N/A	16.8	11.8	N/A	N/A	N/A	0	1	Elenan Ost
53	560	4005	Med./Crse.	Felsic	Smthd	Smthd	Brn	N/A	20.5	9.5	Thinned	Round beveled in	Convex out	0	2	Snta Elena
53	560	4005	Med./Crse.	Felsic	Slf. Slip	Smthd	Brn	N/A	8.9	9.2	N/A	N/A	N/A	0	1	UID Ost
53	560	4005	Med./Crse.	Vlcanic w/ shell	Smthd	Smthd	Org. Brn	N/A	7.9	8.6	N/A	N/A	N/A	0	1	Snta Elena
53	562	3985	Crse.	Felsic	Smthd	Smthd	Buff	N/A	7.3	10.0	N/A	N/A	N/A	0	1	Snta Elena
53	562	3985	Crse.	Felsic	Smthd	Smthd	Brn	N/A	19.2	17.4	Flat-In Platformed	Flat	Buren	0	1	UID Ost
53	562	3985	Fine	Vlcanic	Smthd	Smthd	Brn	N/A	1	2.3	N/A	N/A	N/A	0	1	Indet.
53	562	3985	Med.	Felsic	Brnshd	Slf. Slip	Brn	N/A	7	5.5	Thinned	Flat	Convex vertical	14	1	Capa
53	562	3985	Med.	Felsic	Eroded	Smthd	Redsh Brn	N/A	23	8.2	N/A	N/A	N/A	0	1	UID Ost
53	562	3985	Med.	Felsic	Smthd	Smthd	Dark Brn	N/A	5.5	7.9	N/A	N/A	N/A	0	3	UID Ost
53	562	3985	Med.	Quartz	Eroded	Burnish	Org	N/A	25.1	7.2	N/A	N/A	N/A	0	1	Cuevas
53	562	3985	Med.	Vlcanic	Smthd	Burnish	Dark Brn	N/A	30.7	7.8	Indterminate	Round beveled in	Indet.	0	1	Ost Mod
53	562	3985	Med.	Vlcanic	Smthd	Smthd	Org. Brn	N/A	11.6	9.6	N/A	N/A	N/A	0	1	UID Ost
53	562	3985	Med./Crse.	Felsic	Smthd	Smthd	Brn	N/A	1.5	6.4	N/A	N/A	N/A	0	1	UID Ost
53	562	3985	Med./Crse.	Felsic	Slf. Slip	Burnish	Brn	N/A	11.5	10.4	N/A	N/A	N/A	0	1	Monserate/ Snta Elena
53	562	3985	Med./Crse.	Vlcanic	Smthd	Eroded	Org. Brn	N/A	33.8	8.4	N/A	N/A	N/A	0	1	Snta Elena
53	562	4005	Med.	Felsic	Eroded	Eroded	Redsh Brn	N/A	1.6	6.5	N/A	N/A	N/A	0	1	UID Ost
53	562	4005	Med.	Vlcanic	Smthd	Burnish	Brn	N/A	8.2	9.1	N/A	N/A	N/A	0	1	UID Ost
53	562	4005	Med.	Vlcanic	Smthd	Slf. Slip	Org. Brn	N/A	3.3	5.7	N/A	N/A	N/A	0	1	UID Ost

Table E-1. continued

Site (PO)	N	E	Ptxt	Ptype	Srftrt	Inttrt	Srf. Clr.	Pnt_Slp	Wt	Thk	Rim	Lip	Orient	D.	#	Style
54	2725	1100	Med.	Felsic	Smthd	Slf. Slip	Brn	N/A	3.6	6.6	N/A	N/A	N/A	0	1	UID Ost
57	1150	5125	Med.	Felsic	Smthd	Burnish	Dark Brn	N/A	4.5	6.2	N/A	N/A	N/A	0	1	Snta Elena

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APPENDIX F
SHELL ANALYSIS

This appendix contains the results of the analysis of shell and coral recovered during the Tibes Archaeological Survey Project. Columns for each row in the table are:

- TAXON: Family, Genus and/or species of the shell or coral specimen.
- DATA: Metrics for the following:
  - NISP: Number of Individual Specimens
  - MNI: Minimum Number of Individuals
  - Wt.: Weight
- SITE: Site from which the specimen(s) was retrieved.
- TOTAL: Total for metrics listed under DATA (above) for each site.

Table F-1. Shell Analysis

Taxon	Data	PO-42	PO-43	PO-45	PO-50	PO-51	PO-52	PO-53	Total
Aequipecten sp.	NISP	0	0	0	0	0	0	2	2
	MNI	0	0	0	0	0	0	2	2
	wt (g)	0	0	0	0	0	0	6.5	6.5
Anadara chemnitzi	NISP	2	0	0	0	0	0	6	8
	MNI	2	0	0	0	0	0	5	7
	wt (g)	1.5	0	0	0	0	0	12.7	14.2
Anadara floridana	NISP	0	0	0	0	0	3	4	7
	MNI	0	0	0	0	0	3	3	6
	wt (g)	0	0	0	0	0	24.7	15.3	40
Anadara notabilis	NISP	8	11	0	0	1	5	0	25
	MNI	5	8	0	0	1	3	0	17
	wt (g)	51.1	57.7	0	0	8.2	46.8	0	163.8
Anadara ovalis	NISP	11	1	0	0	11	2	38	63
	MNI	6	1	0	0	1	2	27	37
	wt (g)	37.5	6.7	0	0	53.1	8.3	70.9	176.5
Anadara sp.	NISP	12	9	0	0	1	1	15	38
	MNI	1	0	0	0	0	0	0	1
	wt (g)	9.8	14	0	0	3.4	0.8	9.1	37.1
Anadarinae	NISP	0	0	0	0	0	0	3	3
	MNI	0	0	0	0	0	0	0	0
	wt (g)	0	0	0	0	0	0	0.7	0.7
Anomalocardia brasiliana	NISP	1083	288	54	0	32	176	5	1638
	MNI	490	122	12	0	14	94	2	734
	wt (g)	822.8	233.5	20.8	0	20.3	129.1	2.2	1228.7
Anthozoa	NISP	60	82	0	0	0	5	2	149
	MNI	0	0	0	0	0	0	0	0
	wt (g)	514.2	421.2	0	0	0	65.5	17.1	1018

Table F-1. continued

Taxon	Data	PO-42	PO-43	PO-45	PO-50	PO-51	PO-52	PO-53	Total
Arca sp.	NISP	0	0	0	0	0	1	0	1
	MNI	0	0	0	0	0	1	0	1
	wt (g)	0	0	0	0	0	0.7	0	0.7
Arca inbricata	NISP	1	1	0	0	0	0	0	2
	MNI	1	1	0	0	0	0	0	2
	wt (g)	1.1	0.8	0	0	0	0	0	1.9
Arca zebra	NISP	474	282	7	0	0	61	6	830
	MNI	160	135	5	0	0	32	4	336
	wt (g)	885.9	815.25	13.4	0	0	162.5	15.7	1892.8
Arcidae	NISP	86	298	16	0	0	2	10	412
	MNI	0	0	0	0	0	1	1	2
	wt (g)	48.8	283.8	16	0	0	1.2	2.7	352.5
Astreae sp.	NISP	3	0	0	0	0	0	0	3
	MNI	1	0	0	0	0	0	0	1
	wt (g)	8.5	0	0	0	0	0	0	8.5
Barbatia cancellaria	NISP	0	3	0	0	0	0	0	3
	MNI	0	3	0	0	0	0	0	3
	wt (g)	0	6.3	0	0	0	0	0	6.3
Bivalvea	NISP	573	30	10	0	0	56	50	719
	MNI	0	0	0	0	0	0	0	0
	wt (g)	329.65	523.35	2.3	0	0	19.3	9.1	883.7
Brachidontes recurvis	NISP	1	5	0	0	0	0	0	6
	MNI	1	2	0	0	0	0	0	3
	wt (g)	0.5	1.6	0	0	0	0	0	2.1
Calliostoma javanicum	NISP	0	1	0	0	0	0	0	1
	MNI	0	1	0	0	0	0	0	1
	wt (g)	0	0.4	0	0	0	0	0	0.4

Table F-1. continued

Taxon	Data	PO-42	PO-43	PO-45	PO-50	PO-51	PO-52	PO-53	Total
Cassis sp.	NISP	2	0	0	0	0	0	0	2
	MNI	0	0	0	0	0	0	0	0
	wt (g)	3.8	0	0	0	0	0	0	3.8
Cerithum algicola	NISP	0	1	0	0	0	0	0	1
	MNI	0	1	0	0	0	0	0	1
	wt (g)	0	0.4	0	0	0	0	0	0.4
Cerithum auricoma	NISP	0	0	0	0	0	0	1	1
	MNI	0	0	0	0	0	0	1	1
	wt (g)	0	0	0	0	0	0	0.9	0.9
Cerithum eburneum	NISP	1	0	0	0	0	0	0	1
	MNI	1	0	0	0	0	0	0	1
	wt (g)	0.2	0	0	0	0	0	0	0.2
Chama macerophylla	NISP	1	0	0	0	0	1	0	2
	MNI	1	0	0	0	0	1	0	2
	wt (g)	1.3	0	0	0	0	3.7	0	5
Chama sp.	NISP	19	13	0	0	0	1	0	33
	MNI	0	0	0	0	0	0	0	0
	wt (g)	17.6	7.9	0	0	0	0.9	0	26.4
Chione cancellata	NISP	9	6	0	0	0	7	31	53
	MNI	4	4	0	0	0	5	19	32
	wt (g)	10.4	7.2	0	0	0	9	43.8	70.4
Citarium pica	NISP	2	0	0	0	0	0	0	2
	MNI	2	0	0	0	0	0	0	2
	wt (g)	3.6	0	0	0	0	0	0	3.6
Codakia costada	NISP	6	0	0	0	0	0	0	6
	MNI	2	0	0	0	0	0	0	2
	wt (g)	5.3	0	0	0	0	0	0	5.3

Table F-1. Shell analysis

Taxon	Data	PO-42	PO-43	PO-45	PO-50	PO-51	PO-52	PO-53	Total
Codakia orbicularis	NISP	73	49	0	0	1	10	3	136
	MNI	19	16	0	0	1	6	2	44
	wt (g)	164.8	91.05	0	0	1	29.7	35.3	321.85
Crassostrea rhizophorae	NISP	129	26	0	0	4	66	0	225
	MNI	22	7	0	0	1	15	0	45
	wt (g)	221.7	30.6	0	0	8.8	185.8	0	446.9
Diploria sp.	NISP	0	1	0	0	0	0	0	1
	MNI	0	1	0	0	0	0	0	1
	wt (g)	0	1.5	0	0	0	0	0	1.5
Donax straiatus	NISP	0	3	0	0	1	0	0	4
	MNI	0	3	0	0	1	0	0	4
	wt (g)	0	2.2	0	0	2.1	0	0	4.3
Echininus nodulosus	NISP	1	0	0	0	0	0	0	1
	MNI	1	0	0	0	0	0	0	1
	wt (g)	0.9	0	0	0	0	0	0	0.9
Gastropoda	NISP	73	28	0	11	1	5	2	112
	MNI	0	3	0	0	0	0	0	3
	wt (g)	49.3	17.7	0	25.9	2.7	2.5	1.9	94
Lucinadae	NISP	87	82	2	0	0	5	1	177
	MNI	0	0	0	0	0	0	0	0
	wt (g)	53.1	93.9	1.1	0	0	2.9	1	152
Lyropecten nodosus	NISP	0	0	0	0	0	1	0	1
	MNI	0	0	0	0	0	1	0	1
	wt (g)	0	0	0	0	0	14.9	0	14.9
Mullosca	NISP	16	10	0	0	0	3	5	34
	MNI	0	0	0	0	0	0	0	0
	wt (g)	12.8	2.3	0	0	0	1.2	1.2	17.5

Table F-1. continued

Taxon	Data	PO-42	PO-43	PO-45	PO-50	PO-51	PO-52	PO-53	Total
Murex breviforns	NISP	1	0	0	0	0	1	0	2
	MNI	1	0	0	0	0	1	0	2
	wt (g)	4	0	0	0	0	5.2	0	9.2
Murex pomum	NISP	0	1	0	0	0	0	0	1
	MNI	0	1	0	0	0	0	0	1
	wt (g)	0	26	0	0	0	0	0	26
Murex sp.	NISP	1	0	0	0	0	0	0	1
	MNI	0	0	0	0	0	0	0	0
	wt (g)	2	0	0	0	0	0	0	2
Muricidae	NISP	3	4	0	0	0	1	0	8
	MNI	1	0	0	0	0	0	0	1
	wt (g)	4.2	3.6	0	0	0	0.7	0	8.5
Mytilopsis domingensis	NISP	7	2	0	0	0	0	0	9
	MNI	6	2	0	0	0	0	0	8
	wt (g)	4.5	1	0	0	0	0	0	5.5
Neitina virginea	NISP	0	4	0	0	0	0	0	4
	MNI	0	4	0	0	0	0	0	4
	wt (g)	0	4.2	0	0	0	0	0	4.2
Nerita tessellata	NISP	6	0	0	0	0	0	0	6
	MNI	6	0	0	0	0	0	0	6
	wt (g)	3.5	0	0	0	0	0	0	3.5
Neritina sp.	NISP	17	8	0	0	0	0	0	25
	MNI	17	3	0	0	0	0	0	20
	wt (g)	8.15	2.7	0	0	0	0	0	10.85
Neritina virginea	NISP	2	1	0	0	0	0	0	3
	MNI	2	1	0	0	0	0	0	3
	wt (g)	1.2	0.7	0	0	0	0	0	1.9

Table F-1. continued

Taxon	Data	PO-42	PO-43	PO-45	PO-50	PO-51	PO-52	PO-53	Total
Nertitina puntculata	NISP	0	1	0	0	0	0	0	1
	MNI	0	1	0	0	0	0	0	1
	wt (g)	0	0.2	0	0	0	0	0	0.2
Phacoides pectinatus	NISP	17	35	0	0	0	1	0	53
	MNI	8	16	0	0	0	1	0	25
	wt (g)	42	117.7	0	0	0	2.2	0	161.9
Plicatula gibbosa	NISP	4	0	0	0	0	0	0	4
	MNI	1	0	0	0	0	0	0	1
	wt (g)	2.3	0	0	0	0	0	0	2.3
Pseudochama radians	NISP	4	1	0	0	0	0	0	5
	MNI	4	1	0	0	0	0	0	5
	wt (g)	83.1	1.4	0	0	0	0	0	84.5
Solen obliquus	NISP	26	0	0	0	0	2	0	28
	MNI	4	0	0	0	0	1	0	5
	wt (g)	10.1	0	0	0	0	2.1	0	12.2
Strombadea	NISP	0	0	0	0	0	2	0	2
	MNI	0	0	0	0	0	0	0	0
	wt (g)	0	0	0	0	0	1.9	0	1.9
Strombus costatus	NISP	0	0	0	0	0	1	0	1
	MNI	0	0	0	0	0	1	0	1
	wt (g)	0	0	0	0	0	197.6	0	197.6
Strombus gigas	NISP	1	0	0	0	0	2	0	3
	MNI	1	0	0	0	0	1	0	2
	wt (g)	15.3	0	0	0	0	255.8	0	271.1
Strombus pugilis	NISP	26	10	0	0	2	19	2	59
	MNI	23	10	0	0	2	14	2	51
	wt (g)	807.8	368.4	0	0	63.1	763.4	46.2	2048.9

Table F-1. continued

Taxon	Data	PO-42	PO-43	PO-45	PO-50	PO-51	PO-52	PO-53	Total
Strombus sp.	NISP	160	91	8	0	7	45	12	323
	MNI	37	23	0	0	4	9	9	82
	wt (g)	472.75	237.8	16.9	0	118.9	249.2	50.1	1145.7
Tellina fausta	NISP	47	28	0	0	0	0	0	75
	MNI	15	13	0	0	0	0	0	28
	wt (g)	290.2	122.2	0	0	0	0	0	412.4
Tellina radiate	NISP	0	1	0	0	0	0	0	1
	MNI	0	1	0	0	0	0	0	1
	wt (g)	0	1.9	0	0	0	0	0	1.9
Tellinidae	NISP	170	76	0	0	0	3	1	250
	MNI	0	0	0	0	0	0	0	0
	wt (g)	226.1	103.3	0	0	0	3.9	1.5	334.8
Trachycardium isochardia	NISP	0	1	0	0	1	0	0	2
	MNI	0	1	0	0	1	0	0	2
	wt (g)	0	0.4	0	0	2.1	0	0	2.5
Truncatella puchella	NISP	1	0	0	0	0	0	0	1
	MNI	1	0	0	0	0	0	0	1
	wt (g)	1.3	0	0	0	0	0	0	1.3
Turbo castanea	NISP	0	1	0	0	0	0	0	1
	MNI	0	1	0	0	0	0	0	1
	wt (g)	0	0.9	0	0	0	0	0	0.9
Turretilla variegate	NISP	50	29	0	0	1	11	4	95
	MNI	25	17	0	0	1	9	4	56
	wt (g)	96	33.5	0	0	1.9	37.3	12.2	180.9
Total Sum of NISP		3276	1524	97	11	63	499	203	5673
Total Sum of MNI		871	403	17	0	27	201	81	1600
Total Sum of Weight (g)		5330.7	3645.3	70.5	25.9	285.6	2228.8	356.1	11943

APPENDIX G
SOUTH-CENTRAL REGION ARCHAEOLOGICAL SITE DATABASE

The following appendix provides details regarding the archaeological sites from the Geographical Information Systems data used inthis study. Explanantions for the table columns are listed below.

- SITE #: PRSHPO site number.
- ID: ID reference number used on maps in this work.
- NAME: Official site name.
- PII: Presence (1) or absence (0) of Saladoid material culture at the site.
- PIII: Presence (1) or absence (0) of Ostionan Ostionoid material culture at the site.
- PIV: Presence (1) or absence (0) of Chican Ostionoid material culture at the site.
- HG: Presence (1) or absence (0) of Hacienda Grande pottery at the site.
- CVS: Presence (1) or absence (0) of Cuevaspottery at the site.
- SE: Presence (1) or absence (0) of Santa Elena pottery at the site.
- OST.: Presence (1) or absence (0) of Pure/Modified Ostiones pottery at the site.
- MO: Presence (1) or absence (0) of Monserrate pottery at the site.
- BC: Presence (1) or absence (0) of Boca Chica pottery at the site.
- CAPÁ: Presence (1) or absence (0) of Capá pottery at the site.
- ESP: Presence (1) or absence (0) of Esperanza pottery at the site.
- ST: Functional site type—(1) Ceremonial architecture no habitation, (2) Habitation with ceremonial architecture, (3) Habitation with no ceremomnial architecture, (4) Hamlet, (5) Limited activity area.
- PT.: Presence (1) or absence (0) of petroglyphs at the site.
- HA: Size of the site in hectares.
- P. Area: Total area of plaza/*batey* features at a site (if any) in m^2.
- P#: Nmber of plazas at a given site.
- SOURCE: Source of the site information.

Table G-1. South-central region archaeological site database

Site #	ID	Name	PII	PIII	PIV	HG	CV	SE	OM	Mo	BC	Cp	Ep	ST	PT	Ha.	PA	P #	Source
AI004	1	Vega del Suburruco	0	1	0	0	0	0	0	0	0	0	0	2	0	0.6	0	1	Site form
AI005	2	Los Burgos	0	1	1	0	0	1	0	0	0	1	0	3	0	0.6	0	0	Site form
CY001	3	Jajome	0	0	1	0	0	0	0	0	0	0	0	2	0	0.6	0	0	Site form
CY002	4	Las Planas	1	1	1	1	1	0	1	0	0	1	0	2	1	0.4	?	0	Site form
CO001	5	Las Flores	1	1	0	1	1	1	1	0	0	0	0	2	0	3	1000	1	Site form;Siegel 1999; Alegria 1983; Aguilu in Wilson 1991
CO002	6	Villon/Cuyon	0	1	1	0	0	1	1	0	1	1	1	2	1	3.2	1620	3	Site form/Siegel 1989/Alegria 1983
CO003	7	Buenos Aires	1	1	0	0	1	1	1	0	0	0	0	3	0	1.6	0	0	Weaver *et al.* 1992; Rouse 1952; Site form
CO004	8	Canters	0	1	0	0	0	0	1	0	0	0	0	5	0	0.1	0	0	Site form
CO005	9	Banos de Coamo	0	0	1	0	0	0	0	0	0	0	0	5	1	0.4	0	0	Site form
GN013	10		1	1	0	0	0	0	0	0	0	0	0	5	0	0.1	0	0	Site form; Pantel 2004
GN014	11		1	0	0	0	0	0	0	0	0	0	0	5	1	0.1	0	0	Pantel 2004; Site form
GY001	12	Tecla	1	1	0	1	1	0	1	0	0	0	0	3	0	2.0	0	0	Siegel 1989; Moscoso 1981; Chanlatte 1975; Narganes 1989
GY004	14	Antes Cotui	1	1	1	0	0	0	0	0	0	0	0	5	0	0.1	0	0	Site form
GY005	15	Cueva Vallejo	0	1	1	0	0	0	0	0	0	0	0	5	1	0	0	0	Site form.
GY006	16	Los Sitios	0	1	1	0	0	0	0	0	0	0	0	5	1	0	0	0	Site form
GY013	20	GU13	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	Site form
GY014	21	GU14	0	0	0	0	0	0	0	0	0	0	0	5	1	0.1	0	0	Site form
GY015	22	GU15	0	0	0	0	0	0	0	0	0	0	0	3	0	0.1	0	0	Site form
GY016	23	GU16	1	1	0	0	1	0	1	0	0	0	0	4	0	0.3	0	0	Site form.
GY017	24	GU17	0	1	0	0	0	0	1	0	0	0	0	4	0	0.3	0	0	Site form; Maiz 1990
GY018	25	GU18	0	0	0	0	0	0	0	0	0	0	0	5	0	0.4	0	0	Maiz 1990

Table G-1. continued

Site #	ID	Name	PII	PIII	PIV	HG	CV	SE	OM	Mo	BC	Cp	Ep	ST	PT	Ha.	PA	P #	Source
JD001	27	Santi	0	1	0	0	0	0	1	0	0	0	0	3	0	0.4	0	0	Pantel 2006
JD004	28	Guayabal	0	0	1	0	0	0	0	0	0	0	0	3	0	0.2	0	0	Pantel 2006; Site form
JD005	29	Guayabal II/Cueva Lucero	0	1	1	0	0	0	0	0	0	0	0	5	1	0	0	0	Site form
JD007	30	Río Cañas	0	1	0	0	0	0	0	0	0	0	0	2	0	0.4	0	1	Site form
JD002	31	Autopista	0	1	0	0	0	0	1	0	0	0	0	5	0	0.2	0	0	Site form; González Colon 1997; Pantel 2006
JD003	32	Venegas/JD -3	0	0	1	0	0	0	0	0	0	0	0	2	0	0.2	0	2	Site form; Lundberg 1985:L16
JD006	33	Collores	1	1	0	1	1	1	1	1	0	0	0	3	0	2.2	0	0	Lundberg 1985, Site form, Pantel 1978; Rodrigues 1983; Rouse 1952
PN001	34	Caracoles/P E-1	0	1	1	0	0	0	1	0	0	0	0	2	0	0.6	0	1	Site form; Gonzalez-Colon 1984; Pantel 2006
PN003	35	La Jagua	0	1	0	0	0	0	1	0	0	0	0	2	0	0.6	0	1	Site form; Plaza based on González Colon 1984
PN004	36	Olefinas	0	0	1	0	0	0	0	0	0	0	0	5	0	0	0	0	Pantel 2006, Site form
PN005	37	El Oregano	0	0	1	0	0	0	0	0	0	0	0	5	1	0	0	0	Site form; Pantel 2006
PO002	38	Tibes II	0	1	1	0	0	0	1	0	0	0	0	4	0	0.4	0	0	Pantel 1978; Miguel 2008; Pantel 2006
PO003	39	Tibes III	0	1	0	0	0	0	1	0	0	0	0	5	0	0	0	0	Pantel 1978; Solis Magana 1989

Table G-1. continued

Site #	ID	Name	PII	PIII	PIV	HG	CV	SE	OM	Mo	BC	Cp	Ep	ST	PT	Ha.	PA	P #	Source
PO008	40	Cañas	1	1	0	1	1	0	1	0	0	0	0	3	0	2.0	0	0	Site form; Peabody Catalog; Rainey 1940; Rouse 1952; Chanlatte Baik 1975
PO029	42	PO-29	0	1	1	0	1	1	0	1	1	1	0	2	0	2.0	2000	1	Espenshade 2007, 2009; Kaplan 2009
YA002	43	Duey/Diego Hernandez	1	1	1	0	1	0	1	0	0	1	0	3	0	0.8	0	0	Maiz 1985, Lundberg 1985. Rouse 1952, Weaver *et al.* 1992
YA008	46		0	1	0	0	0	0	1	0	0	0	0	4	0	0.16	0	0	Maiz 1990, Site form
YA011	47	YA11	0	1	0	0	0	0	1	0	0	0	0	3	0	0.6	0	0	Site form.
YA012	48	La Fraternidad	1	0	0	0	1	0	0	0	0	0	0	3	0	0.6	0	0	Site form; Maiz 1985
PO005	49	Tuque	0	1	0	0	0	0	1	0	0	0	0	5	1	0.04	0	0	Site form; Lundberg 1985
PO015	50	Holiday Inn	0	1	0	0	0	0	1	0	0	0	0	5	0	0.04	0	0	Site form.
YA004	51	Barinas II	0	0	1	0	0	0	0	0	1	0	0	4	0	0.4	0	0	Maiz 1990; Site form
YA009	52		0	0	1	0	0	0	0	0	0	1	0	3	0	0.6	0	0	Site form; Maiz 1990
YA010	53		0	1	1	0	0	0	1	0	0	1	0	5	0	0.01	0	0	Maiz 1985; Site form
PO001	54	Tibes	1	1	0	1	1	1	1	1	0	1	0	2	1	4.04	4434 .5	9	Site form Siegel, Curet *et al.* 2006
PO012	55	Maraguez	0	1	0	0	0	0	1	0	0	0	0	1	0	0.40	0	1	Site form
PO013	56	Hernandez Colon	1	1	0	1	1	0	1	0	0	0	0	3	0	1.5	0	1	Maiz 2003; Maiz 2002; Site area from 2003:
PO014	57	Tizol	0	1	0	0	0	0	1	0	0	0	0	5	0	0.04	0	0	Site form
PO016	58	Tito Castro	0	0	1	0	0	0	0	0	0	0	0	5	1	0	0	0	Site form
PO031	59	Lagos Geley	0	1	1	0	0	1	0	0	1	1	0	3	0	9.2	0	0	Thomas and Swanson 1986; Site form

Table G-1. continued

Site #	ID	Name	PII	PIII	PIV	HG	CV	SE	OM	Mo	BC	Cp	Ep	ST	PT	Ha.	PA	P #	Source
PO038	62	El Parking-CT2	1	1	0	0	1	1	1	1	0	0	0	4	0	0.4	0	0	Weaver *et al.* 1992
PO039	63	La Iglesia de Maraguez (CT-4)	0	1	1	0	0	1	1	1	0	1	1	1	1	0.5	200	1	Garrow *et al.* 1995
PO009	64	Tiburnes	0	1	0	0	0	0	1	0	0	0	0	5	0	0.04	0	0	Site form
PO010	65	Caracoles	0	1	1	0	0	1	1	0	1	0	1	2	0	4.4	0	1	Site form; Newsom and Curet 200; Ridriguez 1985
SN015	66	P1 (K-8-02)	0	1	0	0	0	1	0	0	0	0	0	4	0	0.4	0	0	Rodríguez 1985
SN016	67	P-2 (F-4-01)	0	1	0	0	0	1	0	0	0	0	0	2	0	1.7	0	0	Rodríguez 1985
SN017	68	P-3 (M-18-01)	0	1	0	0	0	0	0	0	0	0	0	3	0	0.6	0	0	Rodríguez 1985
SN018	69	P-4 (M-14-01)	0	1	0	0	0	1	0	0	0	0	0	3	0	0.6	0	0	Rodríguez 1985
SN021	70	P7 (E-5-01)	0	1	1	0	0	1	0	0	0	0	1	3	0	0.6	0	0	Rodríguez 1985
SN022	71	P8 (E-6-01)	0	1	1	0	0	1	0	0	0	1	0	3	0	0.6	0	0	Rodríguez 1985
SN023	72	P9 (E-7-01)	0	1	0	0	0	1	0	0	0	0	0	3	0	0.6	0	0	Rodríguez 1985
SN024	73	P10 (F-3-01)	0	1	0	0	0	1	0	0	0	0	0	2	0	0.6	37.2	1	Rodríguez 1985
SN025	74	P11 (G-4-01)	0	1	0	0	0	1	0	0	0	0	0	3	0	0.6	0	0	Rodríguez 1985
SN026	75	P12 (G-4-02)	0	1	0	0	0	1	0	0	0	0	0	4	0	0.4	0	0	Rodríguez 1985
SN027	76	P13 (G-4-03)	0	1	0	0	0	1	0	0	0	0	0	4	0	0.4	0	0	Rodríguez 1985
SN028	77	P14 (G-15-01)	0	1	0	0	0	1	1	0	0	0	0	2	0	0.6	343.75	1	Rodríguez 1985
SN029	78	P15 (H-1-01)	0	1	0	0	0	1	0	0	0	0	0	3	0	0.6	0	0	Rodríguez 1985
SN030	79	P16 (H-7-01)	0	1	0	0	0	1	0	0	0	0	0	3	0	0.6	0	0	Rodríguez 1985
SN031	80	P17 (J-5-02)	0	1	0	0	0	1	0	0	0	0	0	3	0	0.6	0	0	Rodríguez 1985
SN032	81	P18 (L-13-01)	0	1	0	0	0	1	0	0	0	0	0	3	0	0.6	0	0	Rodríguez 1985

Table G-1. continued

Site #	ID	Name	PII	PIII	PIV	HG	CV	SE	OM	Mo	BC	Cp	Ep	ST	PT	Ha.	PA	P #	Source
SN033	82	P19 (N-5-01)	0	1	1	0	0	1	0	0	0	0	0	2	0	0.6	0	1	Rodríguez 1985
SN034	83	P20 (P-12-01)	0	1	1	0	0	1	0	0	0	0	0	3	0	0.6	0	0	Rodríguez 1985
SN035	84	P21 (P-13-02)	0	1	0	0	0	1	0	0	0	0	0	4	0	0.4	0	0	Rodríguez 1985
SN036	85	P22 (R-13-01)	0	0	1	0	0	0	0	0	0	0	0	4	0	0.4	0	0	Rodríguez 1985; Pantel 2006
SI008	86	Penuelas	0	1	0	0	0	1	0	0	0	0	0	3	0	0.6	0	0	Rodríguez1985/Site form
SN003	87	Turrado	0	1	1	0	0	0	0	0	0	0	0	2	0	0.8	0	1	Rodríguez1985/Site form
SN005	88	La Plena II	0	1	0	0	0	1	0	0	0	0	0	2	0	0.8	0	1	
SN037	89	SA-37	0	1	1	0	0	0	1	0	0	0	0	3	0	2	0	0	Site form; Pantel 2006
SN038	90	SA-038	0	0	1	0	0	0	0	0	0	1	0	3	0	1	0	0	Pantel 2006
SN039	91	Las Yeyesas	0	1	1	0	0	0	0	0	0	0	0	3	0	3	0	0	Site form
SN011	92	El Llano	0	1	0	0	0	1	0	0	0	0	0	2	0	0.4	0	0	Pantel 2006; Rodríguez1985
SN020	93	P6 (B-8-01)	0	0	1	0	0	0	0	0	0	0	1	4	0	0.4	0	0	Rodríguez 1985
SI001	94	Jauca I	0	0	1	0	0	0	0	0	0	0	0	3	0	2.0	0	0	Rodríguez1985; Site form
SI002	95	Jauca II	0	0	1	0	0	0	0	0	0	0	0	3	0	0.4	0	0	Rodríguez1985;Site form
SI003	96	Jauca III/Texidor	0	0	0	0	0	0	0	0	0	0	0	3	0	0.4	0	0	Rodríguez1985;Site form
SN006	98	Aguirre	0	1	1	0	0	1	1	0	0	0	0	3	0	0.6	0	0	Rodríguez1985/Site form
SN008	99	Abeynos	0	1	0	0	0	0	0	0	0	0	0	5	0	0	0	0	Pantel 2006; Rodríguez 1985
SI006	106	Las Ollas	0	1	0	0	0	1	0	0	0	0	0	2	0	0.8	0	1	Rodríguez1985;Site form

Table G-1. continued

Site #	ID	Name	PII	PIII	PIV	HG	CV	SE	OM	Mo	BC	Cp	Ep	ST	PT	Ha.	PA	P #	Source
SI007	107	El Cayito	0	0	1	0	0	0	0	0	1	0	0	3	0	2.0	0	0	Site form; Garrow 1995;Lundberg 1985; Rouse 1952; Rodríguez 1985
VL004	108	VL 4	0	1	0	0	0	1	1	0	0	0	0	3	0	0.8	0	0	
GA008	110	XP-3/4	0	1	1	0	0	1	1	0	0	0	1	3	0	1.5	0	0	Site form
GA009	111	X P-5	0	1	0	0	0	1	0	1	0	0	0	2	0	2.5	0	0	Site form
GA002	117	El Palo	0	0	1	0	0	0	0	0	0	0	0	5	1	0	0	0	
GY010	120	Cemetario de Guyanilla	1	0	0	0	0	0	0	0	0	0	0	4	0	0.4	0	0	Site form
GY011	121	GU-11	0	0	1	0	0	0	0	0	0	0	0	5	0	0	0	0	Site form
GY012	122	GU12	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	Site form
PO021	129	PO-21	0	1	0	0	0	0	1	0	0	0	0	4	0	0.5	0	0	Espenshade 1987; 2000
PO027	131	PO-27	0	1	1	0	0	1	1	0	0	1	1	2	1	2.0	720	1	Krause 1989.; Soili Magana 1989
SI004	132	La Florida/Los Indios	1	1	1	0	0	1	1	0	1	1	0	2	0	4.0	780	1	Rodríguez 1985; Site form; Pantel 1978; Rouse 1952 Rodríguez 2007; Rodríguez Lopez 2007
PO011	135	El Bronce	0	1	1	0	0	1	1	0	0	1	0	2	1	1.6	400	1	Robonson *et al.* 1985
PO023	136	PO-23	0	1	0	0	0	0	1	0	0	0	0	4	0	0.4	0	0	Krause 1989
PO037	137	CT-1	0	1	0	0	0	0	0	0	0	0	0	4	0	0.0	0	0	Site form; Pantel 2006
SN004	138	La Plena I	0	1	0	0	0	1	0	0	0	0	0	2	0	0.8	0	1	Rodríguez 1985/Site form
SN007	139	El Coco	0	1	1	0	0	1	0	0	0	0	0	2	0	1.2	0	1	Pantel 2006
SN010	140	Carmen	1	1	1	0	0	1	0	0	0	0	0	3	0	2.0	0	0	Rodríguez1985; Rouse
SN013	141	La Arbolead A	0	0	1	0	0	0	0	0	0	0	0	4	0	0.4	0	0	
SN014	142	La Arbolead B	0	1	0	0	0	0	0	0	0	0	0	4	0	0.4	0	0	

Table G-1. continued

Site #	ID	Name	PII	PIII	PIV	HG	CV	SE	OM	Mo	BC	Cp	Ep	ST	PT	Ha.	PA	P #	Source
SN012	143	Las Marias	0	1	1	0	0	0	0	0	0	0	0	4	0	0.4	0	0	
SN002	144	Esperanza	0	1	1	0	1	1	1	0	1	0	1	2	0	2.0	0	1	Alegria 1983, Pantel 1977, Rouse 1952
PO051	145	Río Bayagan	0	1	0	0	1	1	1	0	0	0	0	3	0	4.7	0	0	Torres 2008
PO050	146	Pico's Ranchero	0	1	0	0	0	1	0	1	0	1	0	4	0	0.9	0	0	Torres 2008
PO043	147	Los Gongolones	0	1	1	0	0	1	1	0	0	1	0	2	0	1.3	750	1	Torres 2008
PO042	148	La Mineral	0	1	1	0	0	1	1	0	0	1	0	2	0	2.4	90	1	Torres 2008
PO052	149	Finca Feleciana	0	1	1	0	0	1	1	0	0	1	0	4	0	0.8	0	0	Torres 2008
PO049	150	Reyes Ranchero	0	1	0	0	0	1	1	0	0	0	0	5	0	1.0	0	0	Torres 2008
PO048	151	Escuela Río Chiquito	0	1	1	0	0	1	0	0	0	1	0	4	0	0.4	0	0	Torres 2008
PO046	152	Cañas II	0	0	1	0	0	1	0	0	0	1	0	4	0	0.7	0	0	Torres 2008
PO045	153	La Vaqueria	0	1	0	0	0	1	0	0	0	1	0	4	0	0.3	0	0	Torres 2008
PO053	156	PR-10 Midden	0	1	1	0	0	0	1	0	0	0	0	4	0	0.4	0	0	Torres 2008
YA003	157	Mattei Y-3	0	0	1	0	0	0	1	0	0	1	0	2	0	0.6	0	1	Alegria 1983
Bronce III	158	El Bronce III	0	1	1	0	0	1	1	0	0	1	0	4	0	0.8	0	0	Robinson *et al.* 1985
Bronce II	159	El Bronce II	0	1	1	0	0	1	1	0	0	1	0	4	0	0.8	0	0	Robinson *et al.* 1985:77
El Monte	160	El Monte	0	1	1	0	0	1	1	0	0	1	0	4	0	0.8	0	0	Robinson *et al.* 1985:77
PO041	163	El Colmado Perez	0	1	1	0	0	0	0	0	0	0	0	1	0	0.4	480	1	Nate MountJoy 10/27/07
PO047	164	Cañas I	0	1	1	0	0	1	0	0	0	1	0	4	0	1.1	0	0	Torres 2008
YA001	167	La Florida	1	1	0	0	1	0	1	0	0	0	0	3	0	1.5	0	0	Maiz Lopez 2008

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BIOGRAPHICAL SKETCH

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