SOCIAL CHANGE AND MIGRATION IN THE RIVAS REGION, PACIFIC NICARAGUA (1000 BC – AD 1522)

by

Karen Stephanie Niemel

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ABSTRACT

This study examines sociopolitical change in Rivas, Pacific Nicaragua from 1000 BC to 1522 AD. Archaeological evidence for the ethnohistorically-reported immigration of Mesoamerican groups and their social impact is explored. Forty-eight archaeological sites were identified within the region and settlement patterns were reconstructed through time. Prior to AD 300, there is no indication of sociopolitical centralization. Social complexity emerges between 300 and 800 AD, reflected by a three-tiered site hierarchy with one central place and a limited distribution of imported goods. From 800 to 1350 AD, the site hierarchy is maintained but there are changes in micro- and macro-settlement patterns: increases in settlement size and number; replacement of main settlements by new ones; and occupation along the coast of Lake Nicaragua. Funerary practices and lithic complexes are different and a white-slipped ceramic tradition emerges. These changes are associated with the arrival of a Mesoamerican group, the Chorotega, and reflect a post-migration phase marked by the development of social institutions and associations. Between 1350 and 1522 AD, there is a decline in the number of sites and further change in ceramic complexes. This is considered to signal the arrival of another group, the Nicarao. Ceramics dating to this time are limited in frequency and distribution, which does not point to the presence of a substantial new ethnic presence like that hinted at between 800 and 1350 AD. Instead, the Nicarao may have been a relatively small, intrusive group who dominated a primarily Chorotegan population. The importance of migration in the development of Pre-Columbian Pacific Nicaragua is undeniable and local sociopolitical processes should not be explained without taking into account this aspect of macro-regional dynamics.

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CHAPTER 1
INTRODUCTION

Migration frequently played an important role in social change in both the New and Old Worlds (e.g., Anthony 1990; Carmack 1981; Chapman and Hamerow 1997; Demarest 1988; Fowler 1989; Renfrew 1987; Rouse 1986). Nevertheless, the theoretical prevalence of neoevolutionism in archaeology led to a negative attitude towards explanations that include population movement as a significant source of change (Anthony 1990:896). Recently, there has been a renewed interest in the theoretical and practical aspects of migration (e.g., Anthony 1990, 1992; Beekman and Christensen 1999; Burmeister 2000; Cameron 1995; Chapman and Hamerow 1997; Collett 1987; Ezzo et al. 1997; Härke 1998; Renfrew 1987; Rouse 1986; Snow 1995, 1996; Sutton 1994). While new conceptual and methodological approaches can be used to re-examine known cases of migration, so also can they be used to explore migration in shaping social and political development.

The Postclassic migration of Mesoamerican peoples to Greater Nicoya, an area roughly encompassing Pacific Nicaragua and the Guanacaste region of northwest Costa Rica, has long been recognized as a significant aspect of the culture-history of the area (Chapman 1960; Fowler 1989; Healy 1980; Newson 1987; Salgado 1996a). When Spanish missionaries and explorers first arrived, they encountered at least four different groups, three of which, the Nicarao, Chorotega, and Maribio, exhibited a variety of Mexican-derived customs, traditions, and language (Fowler 1989; Newson 1987; Salgado 1996a). Ethnohistorical sources describe the region as a series of sociopolitical provinces, some of which were led by caciques, a term adopted by the Spanish from Arawak-speaking Caribbean islanders and typically translated to mean "chief" (Abel-Vidor 1980;

Chapman 1960:35-38; Creamer and Haas 1985:738). The potential influence of caciques was considerable. In the space of three days, for example, a Chorotegan cacique near the modern city of Granada was able to raise a force of 4,000 warriors to attack a group of Spaniards who believed that the cacique was coming to be baptized along with all of his people (Oviedo 1959:119:295)

This study presents a diachronic reconstruction of changes in the sociopolitical structure of Rivas, Pacific Nicaragua from approximately 1000 BC to AD 1522 (Figure 1.1). It explores the evidence for the migration of Mesoamerican groups to the area and how the arrival of the groups may have affected sociopolitical development.

Research Problem and Objectives

Interpretations of Greater Nicoyan prehistory have frequently emphasized a connection with Mesoamerica. The movement of Mesoamerican groups to the region has been viewed as the result of widespread instability and complex change that marked the Late Classic to Early Postclassic transition (Fowler 1989:274; Healy 1980:22). Among other processes occurring were the decline of Teotihuacan and Monte Albán, the emergence of Tula, El Tajín, and Chichén Itzá, and the restructuring of the Maya lowlands (Chase and Rice 1985; Fowler 1989). The impact of the arrival of migrant groups has also been framed in terms of the degree that Mesoamerican cultural practices became dominant, and whether or not the area was subsequently incorporated into a Mesoamerican cultural sphere (Day 1984; Fowler 1989; Healy 1980; Lange et al. 1992; Lange 1996a).

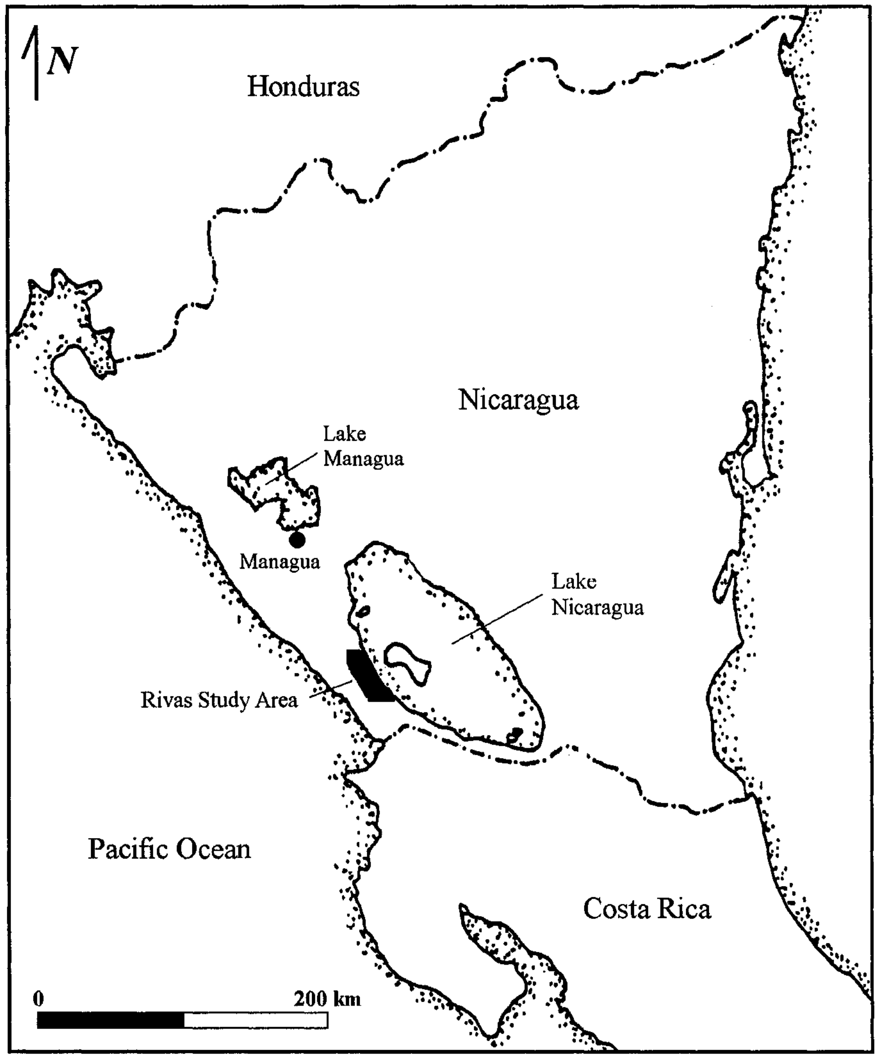


Figure 1.1. Location of the Rivas Study Area in Nicaragua.

Unfortunately, the archeological evidence of migration in Greater Nicoya has never been systematically examined. The tendency instead has been to focus on the evidence for foreign contact and not on the exploration of migration as a process and to explain cultural contact and the importance of outside influence without first understanding local cultural traditions. In addition, the sociopolitical impact of the arrival of migrant groups and how indigenous societies were structured has not been adequately explored. Ethnohistorical interpretations have frequently classified the inhabitants as chiefdoms at the time of Spanish contact (e.g., Abel-Vidor 1980; Chapman 1960; Fowler 1989; Newson 1987). However, contradictory archaeological evidence suggests that this was an over-generalization (Creamer and Haas 1985; Lange 1992b; Lange et al. 1992; Salgado 1996a). While this is partly due to a lack of equivalency in previous research, one factor that has not been considered is that the arrival of Mesoamerican peoples could have had a differential affect due to local historical context, the scale of migration, and the form of native-migrant interactions.

There are two primary objectives of this research: to explore changes in sociopolitical organization through time within Rivas, Pacific Nicaragua and to investigate the evidence of prehistoric migration. First, I reconstruct settlement patterns from a diachronic perspective. Changes in sociopolitical organization are then inferred primarily from changes in settlement patterns. Second, I consider the evidence for migration within the region, which can include such things as the founding of new settlements and abandonment of others, changes in intra-site organization, the emergence of new ceramic and lithic technologies, or changes in burial practices. Inferences are then drawn about the chronology and scale of migration to the region, the nature of migrant-native interactions, and the sociopolitical impact of the migrants' arrival.

Migration is usually a long-term process. It is typically performed by cultural subgroups that are often kin-related. The subgroups target known destinations and are likely to use well-established travel routes (Anthony 1990:895-896). Information on environmental, social, and economic conditions in the destination area always heavily influences the decision of whether to migrate. As a result, I also address how the societies of Rivas were incorporated in larger socioeconomic systems, how interregional relationships changed with the arrival of migrant groups, and the extent to which the social and economic networks facilitated migration to the area.

Rivas provides a unique background for examining the impact of migration upon sociopolitical organization. Ethnohistorical sources report that dense populations of Nicarao, a Nahuat-speaking Mexican group, inhabited this area, and that Quauhcapolca, the capital of the well-known cacique Nicaragua, was located near the modern town of Rivas (Fowler 1989:68). Additionally, Nicarao migratory accounts state that when they arrived at the area, another Mesoamerican group, the Chorotega, already inhabited it. It has been presumed that the Chorotega arrived at approximately AD 700/800, the Nicarao at around AD 1250/1350, and that each group at least partially displaced the already existing population (Day 1984; Healy 1980; Lothrop 1979 [1926]; Salgado 1996a; Stone 1966). The accuracy and chronology of the migration accounts need to be studied through the examination of the archaeological record.

Migration models are best applied in areas with a long history of high-quality research (Burmeister 2000), which is certainly not the case for Nicaragua. The archaeology of most of the country remains unknown and work within Rivas and nearby areas has been highly sporadic. While I do not expect to definitively explain the nature of prehistoric migration within the region and all of the cultural changes that were associated with it, this dissertation does represent a significant contribution to a part of lower Central America that has long been overlooked by archaeologists. It also adds to the growing body of research directed to answer questions concerning the nature of sociopolitical change in this area of the world and the nature of the interaction between Mesoamerica and lower Central America through time.

Organization

This dissertation is divided into 12 chapters. The following two chapters (Chapters 2 and 3) provide the ethnohistorical and archaeological background of the research region. Chapter 2 discusses the ethnohistory of the groups inhabiting Rivas and surrounding regions at the time of Spanish contact. Specific attention is given to the ethnohistorical evidence concerning the migration of Mesoamerican groups and information concerning their social structure. Chapter 3 is an overview of archaeological research in the region from the mid-nineteenth century to the present day. It traces three major trends: (1) the early search for evidence of contact with Mesoamerica; (2) the definition of Pacific Nicaragua and northwest Costa Rica as a Mesoamerican cultural subarea known as Greater Nicoya; and (3) recent criticisms of the cultural area concept and the recognition of the unique, autonomous developments within the region.

Chapters 4 and 5 provide theoretical context. Chapter 4 discusses theoretical approaches to migration. It also discusses other explanations for cultural change and outlines how migration can be distinguished from them in the material record. A model for identifying the archaeological correlates of migration within the study area is drawn from the works of Anthony (1990, 1997), Burmeister (2000), Renfrew (1987), and Schwartz (1969). Chapter 5 first discusses the classification of social systems and the theory and methods used to reconstruct social organization from the archaeological record. This chapter provides the framework for the archaeological inference of prehistoric social organization within the study area.

Chapters 6 and 7 describe the archaeological data acquisition. Field investigations within the Rivas study area consisted of survey and subsequent test excavations at several sites. Chapter 6 first describes the physical setting of the study area, followed by a discussion of the survey methodology and its results. The test excavations are summarized in Chapter 7.

Chapters 8, 9, and 10 discuss the results of the data analysis. Cultural artifacts recovered during this investigation include ceramic, lithic, and faunal materials. Chapter 8 discusses the analysis and principal aspects of the ceramic complexes; the results of the analysis of the lithic, faunal, and other classes of artifacts are presented in Chapter 9. The emphasis of the artifact analyses was chronological and spatial variation, which is integral to the inferences drawn concerning migration and social organization in later chapters. Chapter 10 analyses the settlement pattern of the study area. The archaeological sites identified during survey are first ranked from a synchronic perspective in order to develop a working site typology. Sites are then considered from a diachronic perspective; changes in the settlement pattern are discussed and inferences made concerning sociopolitical organization.

Chapter 11 synthesizes the results of the data analysis as they pertain to the evidence for migration and its social impact. The study area is also discussed within a larger sociopolitical and economic context in order to illuminate how interregional relationships changed during the post-migration period and the extent to which the social and economic networks of Rivas facilitated migration to the area. Chapter 12 presents conclusions concerning prehistoric migration and social change.

CHAPTER 2
ETHNOHISTORICAL BACKGROUND

This chapter provides an overview of the information concerning the native societies of Pacific Nicaragua and northwest Costa Rica during the period of Spanish contact. The ethnohistorical accounts suggest that the early conquistadors were impressed by the size of the native populations of Pacific Nicaragua (Abel-Vidor 1986). They perceived the region as "another Yucatan"; it was eminently exploitable for its wealth and human resources and immediately colonized (Abel-Vidor 1981:89). In contrast, northwest Costa Rica was characterized by much lower indigenous settlement density and smaller settlement size (Abel-Vidor 1981:90). However, difficult navigation along the Pacific coast of Nicaragua led to the development of a supply route from Panama up the west coast of Costa Rica to the Gulf of Nicoya (Abel-Vidor 1981:89). The route continued overland to the Nicaraguan settlements, ensuring continuous Spanish activity within the area.

Population estimates for Pacific Nicaragua and northwest Costa Rica range from 500,000 to two million inhabitants, which stems from controversy over the estimated 95 percent population decline that occurred within a generation of Spanish arrival (Abel-Vidor 1981:90; Newson 1987:84-85). The conquistador Francisco de Las Casas, who visited the region in 1524, provided one estimate: over 500,000 Indians had been exported as slaves; 500,000 to 600,000 had been killed in battles with the Spaniards; 20,000 to 30,000 died of disease; and only 4,000 to 5,000 remained (Motolinía 1970, as cited by Newson 1987:85). This loss of population was accompanied by an equally great loss of native lore and tradition, which are very poorly preserved compared to Mesoamerica to the north (Abel-Vidor 1981:89-90; Lange et al. 1992:15).

Ethnohistorical Sources

The earliest known documents concerning the region are reports by Andres de Cereceda from 1522 and 1529, a letter to the Spanish Crown by Gíl González Dávila in 1524, and the chronicles of Peter Martyr D'Anghera from 1530 (Abel-Vidor 1986; Fowler 1989). González headed the first Entrada into the region, with Cereceda as his treasurer, in 1522. González set out from Panama and explored the Pacific Coast of Central America as far north as Tehuantepec. Martyr never visited the Americas, but his position in the Court of Ferdinand and Isabel allowed him access to official documents and written and verbal reports from explorers and conquistadors (Abel-Vidor 1986:388-389).

Important firsthand observations of native society and culture were published in the *Historia general y natural de las indias* by Gonzalo Fernandez de Oviedo y Valdéz (1959), who lived in Nicaragua from 1527 to 1529. Oviedo's (1959) writings cover a range of areas including language, social and political organization, subsistence, economy, religion, material culture, and physiology.

Another primary source is the *Tasciones de tributos* (tribute assessments) from 1548 to 1581 by Alonso López de Cerrato, president of the audencia of Guatemala. The document provides demographic and economic data from most settlements that were assessed, from Yucatan and Chiapas, south to Nicaragua (Fowler 1989:26-27). Secondary sources include the works of Juan de Torquemada, Antonio Herrera y Tordesillas, Fray Antonio de Ciudad Real, Francisco López de Gomara and Toribio de Motolinía de Benavente (Abel-Vidor 1981; Fowler 1989).

Most of this early literature has not been published in forms that are readily available. Modern reprints of the materials are infrequent and poorly distributed. However, numerous syntheses have been undertaken including those of Abel-Vidor (1980), Chapman (1960), Ferrero (1977), Fowler (1989), Ibarra (1994), Incer (1990), Leon-Portilla (1972), Lothrop (1979 [1926]), Newson (1987), and Stone (1966).

The Early Societies

The ethnohistorical sources are apparently in agreement that three distinct groups of Mesoamerican origin inhabited Pacific Nicaragua and northwest Costa Rica at the period of Spanish contact: the Chorotega, Nicarao, and Maribio (Figure 2.1). In addition, the term Matagalpa was used to identify the peoples occupying a large region to the northeast of Lake Nicaragua (see Figure 2.1).

Discussion of the groups is limited by the breadth and detail of information contained within the available documents, most of which pertains to the Nicarao and, to a lesser extent, the Chorotega. One problem that pervades Oviedo's work is the frequent omission of the name of the group being referred to (Lothrop 1979:29[1926]; see Oviedo 1959:120:363-365). Lothrop (1979:29[1926]), in particular, warns that "muchas costumbres se atribuyen a los chorotegas y los nicarao por causa de esta falta de definicíon." Difficulties also arise from the fact that language is typically used to identify the different groups. Oviedo and Ciudad Real do not use the same terms to describe linguistic groups nor are they consistent in their usage of terms (Abel-Vidor 1981). Oviedo, for example, refers to "Chorotega" and "Orosí" as two distinct languages and later as two groups with the same language (Abel-Vidor 1981:88). He also uses the terms

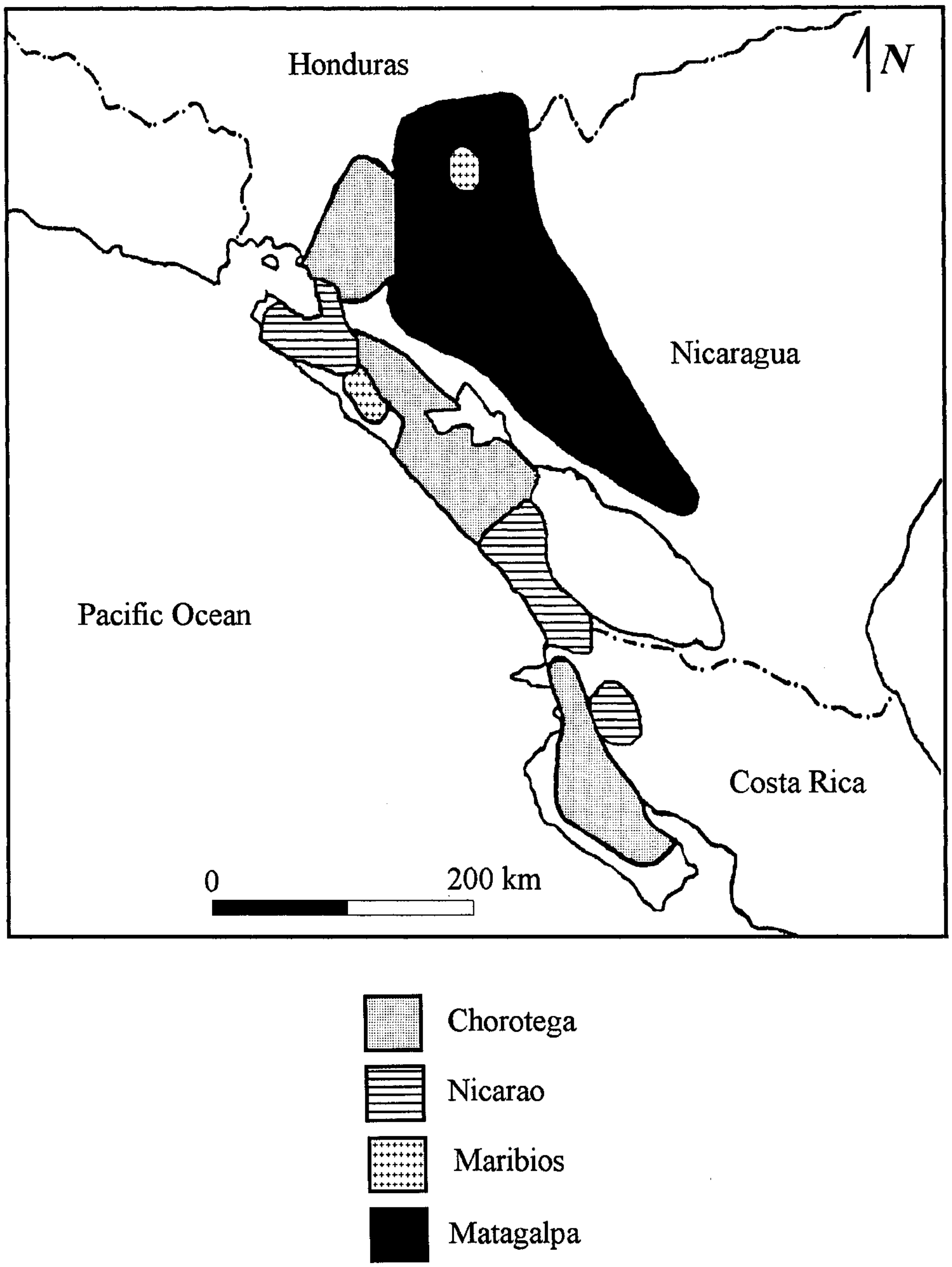


Figure 2.1. Distribution of Groups Inhabiting Greater Nicoya at Contact (after Lothrop 1979: Fig. 2 [1926]).

"Chorotega" and "Nicaragua" to refer to languages since classified as "Chorotega" and "Nahuat" while Ciudad Real uses the terms "Mangue" and "corrupt Mexican" (Abel-Vidor 1981:88). In addition to difficulties arising from how groups are identified within ethnohistorical documents, the equation of cultural groups and linguistic groups gives the impression that different people sharing a common tongue were culturally homogenous (Abel-Vidor 1980:161). With these limitations in mind, the following provides a description of each linguistic group:

1) The Chorotega, the largest group, occupied most of Pacific Nicaragua, northwestern Costa Rica, and part of the Choluteca province in southern Honduras (Lothrop 1979:23-24[1926]). The word chorotega could be derived from Chololteca, or inhabitants of Cholula, Mexico; likewise it may have originated from the cacique Chorotega, who was encountered by the Spanish in Costa Rica (Lothrop 1979:22[1926]). There are other instances of the Spanish naming people after a leader (Lothrop 1979:22[1926]). Chorotega and other Oto-Manguean languages had a broad geographic distribution, which included not only these areas of lower Central America but parts of the Mexican states of Guerrero, Oaxaca, and Chiapas (Lothrop 1979:23-24 [1926]).

In Nicaragua, the Chorotegan language was known by different names in various areas; Choluteca was spoken on the shores of the Bay of Fonseca; Orotiña in the Nicoya Peninsula; and Mangue, derived from the word ruler, was spoken on the Pacific Coastal plain of Nicaragua (Newson 1987:28). Mangue was in turn divided into two forms named Nagrandan and Dirian. It is unclear whether these terms refer to specific dialects of the Chorotegan language or if they represent a conflation of language with distinct social groups in the ethnohistorical documents.

López de Gómara considered the Chorotega speech to have been in the region long enough to be described as "natural and old" (Stone 1966:212). Oviedo also considered it to be "old"—at least compared to the Nicarao language (Perez 1976:277, as cited by Ibarra 1994:233). Major Chorotegan towns in Nicaragua included Diriamba, Diriomo, Masatepe, Masaya, Managua, Nandaime, Nindirí, Subtiaba, and Tipitapa (Lothrop 1979:26 [1926]).

2) The Nicarao had settlements both north and south of the Chorotega, in the areas between Chinandega and the Cosigüina Peninsula and also in the Isthmus of Rivas (Lothrop 1979:5-6[1926]; Newson 1987:29). Nicarao is a Nahuat language closely related to the comparatively more recent dialect, Nahuatl—the language of the Aztecs. This fact probably explains why more information is available about the Nicarao than other groups: Spanish translators from Mexico could communicate more easily with them.

Within the Isthmus of Rivas, Lothrop (1979:5 [1926]) states that the northwestern boundary of Nicarao territory was the Río Ochomógo, while the exact location of the southern boundary, probably somewhere in northern Guanacaste, Costa Rica, is not known. To the south, the Nicarao occupied the Santa Elena Peninsula, between the Chorotega in the Nicoya Peninsula and the Corobici (Chibcha) to the east (Stone 1966:212). The so-called capital of the Isthmus Nicarao was Quauhcapolca, near the modern town of Rivas (Lothrop 1979:6[1926]). Abel-Vidor (1986:392) suggests that Quauhcapolca probably stretched from the town east to Puerto San Jorge. Other important Nicarao towns were Tecoatega, Totoaca, Teoca, Mistega, Xoxoyota, Papagayo, Ochomógo, and Oxmorio (Lothrop 1979:6 [1926]).

Despite Nahua place names there, it is unclear whether the Nicarao inhabited Ometepe or any other islands of Lake Nicaragua (Healy 1980:21). This may be due to the fact that Nahua was used as a *lingua franca* during the early Colonial Period, making its distribution wider than it was in Precolumbian times (Newson 1987:30; Salgado 1996a). Oviedo, for example, claims that the town of Managua was Mangue-speaking (i.e., Chorotega) (Oviedo 1959:120:391), while Ponce, who journeyed through the region in 1584, states that Nahua was spoken there (Ponce 1873:1:359, as cited by Stone 1966:214). A linguistic boundary is suggested by the fact that the languages Mangue and Nahua "met" in the vicinity of Granada (Ponce 1873:1:352, 354, as cited by Stone 1966:214).

3) The Maribio, or Subtiaba, inhabited Leon in northwest Nicaragua. They also occupied an area approximately 144 km northeast of Leon along the Río Maribichicao or Guatahiguala (Lothrop 1979:13 [1926])(see Figure 2.1). Linguistically, the Maribio may have belonged to the Hokan-Siouz stock (Chapman 1960:17; Lothrop 1979:13 [1926]), however Kaufman

(1974:960) suggests they belonged to the Oto-Manguean group, the same group as the Chorotega.

In 1586, Maribio was reportedly spoken in the towns of Mazatega, Chichigalpa, Posoltega, Posolteguilla, and Chinandega (Ponce 1873:354-356, as cited by Newson 1987:29). The inhabitants of Subtiaba were described as Mangue-speaking or Chorotega. Newson (1987:29) suggests that this was probably an error:

> ...a census five years previously had recorded that Maribio was spoken throughout the province of Subtiaba, which included the towns of San Pedro, Soyatega, Posolteguilla, Xiquilapa, Ayatega, Cindegapipil, Panaltega, and Distanguis, although Mexican Corrupta was apparently used as a lingua franca throughout the area.

4) The last group, known as the Matagalpa, inhabited the present-day departments of Chontales, Boaco, Matagalpa, Jinotega, and Estelí, the southwestern section of Nueva Segovia, and the adjacent region of Honduras (Costenla 1994:194; Ibarra 1994:299). The Matagalpa were also referred to as the "Caribe"—a collective term used for groups inhabiting all of eastern Nicaragua and southeast Honduras—"Chondales", as well as "Chontales" (Costenla 1994; Ibarra 1994). The latter term was derived from the Nahuatl word, *chontalli,* meaning "rude, rustic person" (Costenla 1994:195; Newson 1987:37). Newson (1987:37) considers the word used by the Spanish "to identify Indian groups that did not display a high level of civilization...and ...a term of abuse."

Matagalpa is a Macro-Chibchan language, closely related to the eastern Nicaraguan languages of Moskito, Sumo, Cacaopera, and Ulúa (Constenla 1994:196; Ibarra 1994:233). Stone (14966:212) notes that, regardless of linguistic distinctions, the name Matagalpa only occurs within historical documents concerning Nicaragua. Ethnohistorical information about the Matagalpa is extremely limited. In order to reconstruct aspects of their society, researchers have typically incorporated information about other groups such as the Rama, Sumu, Moskito, and Corobici, all of which are considered to have shared a similar cultural base of South American derivation (e.g., Ibarra 1994; Newson 1987).

Accounts of Migration

The ethnohistorical record provides a number of migratory accounts for the Nicarao and Chorotega from somewhere in Mexico. These accounts are often confusing and contradictory. Information concerning the Maribio is limited: a group living near present-day Leon reportedly migrated from Mexico during a period of famine shortly before the arrival of the Spanish (Lothrop 1979:13[1926]). It is possible that aspects of their migratory experience have been blended with the information about the other two groups.

The estimated dates of the Nicarao and Chorotega arrival to Nicaragua have ranged from about AD 700/800 to a century before the arrival of the Spanish. One explanation for this is that immigration to Lower Central America did not occur as a single event but involved a series of movements beginning as early AD 400 (Fowler 1989:38).

The most important data on migration come from Oviedo, Torquemada, and Motolinía. In particular, Oviedo (1959:120) provides a transcription of interviews conducted by Fray Francisco de Bobadilla of Nicarao nobles, elders, and priests in 1538. According to these sources, the Chorotega and Nicarao were not native inhabitants of Nicaragua, but had come from the north, out of Mexico. Within the context of Bobadilla's transcribed interviews, Oviedo (1959:120:372) provides the only clear information concerning the origin of the groups, naming the Nicarao homeland as Ticomega and Maguatega. The location of this homeland is unknown. Lehman (1920:2:1006, as cited by Fowler 1989:32) identified Ticomega with Tecoman, Morelos, and Maguatega with Miahuatlan, Puebla (both near Cholula), which Fowler (1989:32) subsequently considered to be linguistically weak. Lothrop (1979 [1926]), and more recently McCafferty and Steinbrenner (2001), have found stylistic relationships between ceramics from Pacific Nicaragua and Cholula. Torquemada's (1969:1:bk 3, ch. 40, pg 331-333, as cited by Fowler 1989:34) account associates the groups with the region of Soconusco:

> According to what is said among the inhabitants of this land, especially the old men, they say that the Indians of Nicaragua and those of Nicoya (which by another name are called Mangues) anciently lived in the uninhabited area of Xoconochco (Soconusco), which is in the gobernación de Mexico. The Nicoyas are descended from the Chololtecas. They lived toward the sierra, inland; and the Nicaraguas, who are from Anahuac, Mexicans, lived toward the coast of the south sea (Pacific Ocean).

Reportedly, the Chorotega and the Nicarao left their homelands to escape persecution and heavy tribute imposed on them by the historic Olmeca-Xicallanca (Fowler 1989:34). One of Bobadilla's informants also stated that the Nicarao served their masters, the Olmeca, "como agora servimos a los cristianos" (Oviedo 1959:120:372); he continued:

> ...e aquellos sus amos los tenían para esto e los comían, e por eso dejaron sus casas de miedo e vinieron a esta tierra de Nicaragua; e aquello amos

> habían allí ido de otras tierras, e los tenían avasallados, porque eran muchos, e desta causa dejaron su tierra e se vinieron a aquella de estaban.Oviedo (1959:120:372)

During the course of their migration, the Nicarao fled south, passing through Guatemala and the province of Cholulteca in southwestern Honduras. It was in Honduras that a Nicarao elder prophesied the group would settle on the shores of a freshwater sea in sight of an island with two volcanoes (presumably Lake Nicaragua and Ometepe Island). When the Nicarao arrived in Rivas, they found it already occupied by the Chorotega (Torquemada 1943:I:bk. 3, ch. 40, as cited by Chapman 1960:94). Torquemada describes the battle over the region waged by the Nicarao and the Chorotega:

> [The Nicarao] thought of a treachery to be able to stay in that land; and it was that they demanded *tamenes* (that is, many Indian porters) so that they could help them carry their baggage or belongings, and [the Chorotega], to relieve themselves of the nightmare that [the Nicarao] caused them, they gave them many Indians, and they left that day. And they settled down that night no more than one league away... and they killed the *tamenes* in their sleep, and quickly turned warlike. And they also killed those who had stayed in the town; and those who escaped fled to where is now Nicoya, and where those traitors remained is called Nicaragua (Torquemada 1969:1:bk. 3, ch. 40, pg. 333, as cited by Fowler 1989:35-36).

Migratory accounts state that the Chorotega left Mexico before the Nicarao and were the first to arrive in Nicaragua. There is no mention of the groups already inhabiting the area when they arrived. The chronology is vague and references to the Nicarao migration state that it occurred "seven or eight lives of old men" prior to contact (Fowler 1989:34). This is sometimes interpreted as occurring as early as AD 800 based on the interpretation of "lifetime of old men" as two 52-year cycles (the Nahuatl *huehuetiliztli)* (Campbell 1985:9; Fowler 1989:37). Linguistic evidence points to the Puebla and Tehuacán Valleys as the homeland of Chiapanec-Mangue (Hopkins 1984:52; Kaufman 1990; Lastra 2001:128). Hopkins (1984:52), in particular, states "with increasing pressure from Central Mexico at the end of the Classic [Period] the Chiapanec-Mangue population moved in southward migration to Chiapas and Central America." He further argues that any remnant Chiapanec-Mangue population in the Puebla area was absorbed or eliminated by later intrusive Nahuatl speakers (Hopkins 1984:52). The glottochronology of the Chiapanec-Mangue split is estimated to be around AD 600-700 (Costenla 1994:200; Kaufman 1974:49).

Historical interpretations of the Nicarao sometimes link them to the Pipil, an ethnic faction at Teotihuacan (Fowler 1989). The Pipil reportedly moved east and south along the Gulf Coast of Mexico, after the collapse of the former city, eventually passing through Soconusco on their way to into Central America (Fowler 1989:40). Fowler (1989; 2001), in particular, associates the El Salvadoran sites of Cihuatan, Santa Maria, Tacuscalco, and Cerro Ulata with the Pipil.

Costenla (1994:204) estimates that the date for the Pipil split from other Nahua dialects is approximately AD 800-900. In contrast to Fowler (1989), who views the Nicarao as split from other Pipil groups living in El Salvador and Honduras, Costenla (1994:204) argues that important linguistic differences existed between the two groups. These differences suggest that the Nicarao migration took place around AD 1200 and that it was independent from the Pipil migration to El Salvador. According to Costenla (1994), the Nicarao have closer proximity to nuclear varieties of Nahua than the Pipil, which implies either that: (1) the Nicarao derived from Pipiles and maintained their linguistic characteristics, while the Pipiles linguistically assimilated after arrival in El Salvador to an earlier established Nahua population, or (2) the Nicarao arrived later by sea to Nicaragua. The second hypothesis is supported by information recorded by

Motolinía (Fowler 1989:33). In his account, "a great fleet of *acales* or boats set out on the South Sea (Pacific Ocean), and they landed and disembarked in Nicaragua, which is more than 350 leagues distant from Mexico" (Benavente 1971:12, as cited by Fowler 1989:33). The people who migrated spoke a Mexican language. Fowler (1989:33) argues that this account is a reference to the migration of the Subtiaba from the Tlapanec region in Mexico around AD 1200. To further confuse the issue, Costenla (1994:204) proposes that the Maribio region of origin was Guerrero, Mexico; Suarez (1983:150) reports a tradition that has Tlapanecs migrating to Guerrero from Malinche, Puebla, which raises the possibility that the Maribio migrated from there instead.

Although Oviedo recognized that the Nicarao were latecomers compared to the other groups of Pacific Nicaragua, he did not differentiate the amount of time that the Chorotega and the Matagalpa had inhabited the region (Perez 1976:277, as cited by Ibarra 1994:233). Costenla (1991:11) suggests that the languages of the Misumalpa linguistic family, which includes Matagalpa, were probably present within eastern Nicaragua for as long as 4,500 years. This is based on the assumption that the near total geographic continuity of the linguistic family contradicts the possibility of a more recent immigration like that of the Nicarao, Chorotega, or Maribio. It is quite possible, therefore, that ancestors of the Matagalpa or a related group were the original inhabitants of the Rivas region.

Sociopolitical Organization

Ethnohistorical information concerning the sociopolitical organization of indigenous groups in Nicaragua must be viewed critically since the European worldview could have affected the nature of the evidence. Sturtevant (1998:138), for example, argues that:

> Europeans of the early colonial period originated in hierarchical societies and tended to describe and interpret the American Indian societies and behavior they observed on the basis of contemporary European ideas about the normal structure and workings of society. To them, individual differences in demeanor and in dress and ornament indicated differences in social rank, and they were predisposed to look for kings and nobles. Warfare was understood to be motivated by hegemonic ambitions, territorial expansion, and the collection of tribute.

Both the Nicarao and Chorotega were reportedly ranked societies divided into three social classes: slaves, commoners, and nobles (Lothrop 1979:45 [1926]; Chapman 1960:35). Priests formed a special, separate group drawn from the noble class (Lothrop 1979:45 [1926]). There is little information concerning the Maribio but researchers have typically considered their social system to be similar to that of the Nicarao and the Chorotega (e.g., Newson 1987).

The Spanish used the word cacique as a title for Chorotegan and Nicarao leaders (Creamer and Haas 1985). The term has typically been translated as "chief" (Creamer and Haas 1985) with the implication of an institutionalized, hereditary position at the top of a regional administrative hierarchy, (e.g., a chiefdom as defined by Redmond [1998:1]). Descriptions of Nicarao caciques, but not necessarily the leaders of other groups, seem to fit this definition. Nicarao caciques occupied a lifelong and hereditary position (Lothrop 1979:47[1926]; Chapman 1960:36). Under the direct authority of the cacique were *principales* or minor caciques (Oviedo 1959:120:365). The cacique of Tecoatega reportedly had twenty-four *principales* residing in his court, and the cacique of Mistega had nine (Newson 1987:56). The degree of political power held by Nicarao caciques is suggested by descriptions of the cacique Agateyte, who had an army of six thousand warriors and ruled over twenty thousand subjects (Oviedo 1959:120:413). Fowler (1989:200) states that a similar type of social organization characterized the Puebla-Tlaxcala region, from where he partially traces Nicarao origin.

The Nicarao caciques met with a council of elders (*mónexico*) on matters of their domain (Oviedo 1959:120:423). Nobles, or elite, also filled all politico-administrative positions. The official messenger, who carried feather fans or staffs, had the responsibility of collecting tribute and informing the commoners of the cacique's decisions (Oviedo 1959:120:365). Other individuals of noble rank included military and priests (Chapman 1960:38-39). Caciques and other nobles apparently never communicated directly with the lower classes and distinguished themselves by their clothes and tattoos (Lothrop 1979:46-48[1926]).

In contrast to the Nicarao, information concerning Chorotega caciques suggests that a form of short-term leadership existed. Chorotega caciques reportedly did not hold hereditary positions and were temporarily elected by a council of elders to serve as war leaders (Oviedo 1959:120:364). The community, in turn, elected the council of elders (Oviedo 1959:364). Oviedo (1959120:364) reported that if the war leader died or was killed in battle, another was elected; likewise he was killed if he did not serve the aims of the people. It appears that not all Chorotegan caciques held the same degree of power. The position of the cacique Diriangen, for example, was quite tenacious:

> Cacique Diriangen arrived to meet Gil González (somewhere in the vicinity of the modern town of Granada) in a procession led by 500 men with one or two turkeys, ten barrier carriers (*pendones*), 17 women covered with gold

> medallions, and 200 more men, some of which held golden hatches (Oviedo 1959:119:293). Diriangen was at the end of the procession with his *principales* and five trumpeters (Oviedo 1959:119:293). Diriangen is said to have promised to return in three days with his people for baptism (Oviedo 1959:119:293); he returned and instead attacked the Spaniards with an army of 4,000 warriors (Oviedo 1959:119:295).

While this suggests a strong centralized leadership such as a chieftaincy (e.g., Redmond 1998), it contrasts with the Oviedo's reports of the cacique Nambí in the Nicoya Peninsula. Nambí was probably once a war leader but afterwards had little actual authority:

> While visiting the cacique Nambí in 1529, Oviedo (1959:120:416) witnessed a festival that he considered a debauchery. He reprimanded the cacique and asked why such practices were allowed. Oviedo (1959:120:417) reported Nambí's response: "respondióme que en lo de las borracheras, él vía que era malo; pero que era así la costumbre e de sus pasados, e que si no lo hiciese, que su gente no lo querría bien e le ternían por de mala conversación y escaso, e que se le irían de la tierra." Oviedo pointedly stated that the word "nambi" meant perro (dog)(Oviedo 1959:120:417).

Although a direct historical relation cannot be established to the Chorotega at contact, Navarrete (1966:21-22) notes that Chiapanec leaders held neither absolute power nor hereditary positions. However, groups living in Mesoamerica did not have a monopoly on this: within eastern Nicaraguan societies, including the Matagalpa, there were caciques only in wartime, when they were generally chosen by a council of elders

(Newson 1987:78-79; Vasquez 1937-44:121, as cited by Stone 1966:229). Newson (1987:9) provides the following description by a late seventeenth or early eighteenth century missionary of eastern Nicaraguan groups:

> There is information that some nations in the extensive interior mountains are governed, some by leaders in the form of a republic and others by kinship and friendship, but it appears almost certain that they have not formed a republic but that they have always lived without a head or leader, natural or elected, and that at best they have been subject, not recognizing any jurisdiction, to someone who emerges in ferocity or valor or industry or goodness, so that they should have captains in war and be governed in other things which are necessary, the necessity for which having ended they remain without law, king, or court of justice.

Most of Pacific Nicaragua and northwest Costa Rica was reportedly organized into sociopolitical provinces, which, at least among the Nicarao, were then divided into smaller jurisdictions (Chapman 1960:18). Figure 2.2 shows the distribution of provinces at the time of Spanish contact. In Nicarao areas, such as the province of Nicaragua, caciques were in charge and *principales* headed the jurisdictions. The Chorotegan province of Nagrando reportedly consisted of independent towns governed by a council of elders chosen by vote and assembled from different communities (Torquemada 1943, 1:323, as cited by Stone 1966:228). It is unclear based on the available documents how widespread this custom was among Chorotega groups. Likewise, it not evident how the centralized leadership reflected by Diriangen's procession (previously described) would translate into geographic terms. Stone (1966:228) states that although Nagrando is historically associated with the Chorotega, Tacacho was claimed to have been the mother tongue of this region. She suggests that this points to an acculturation process that necessitated social changes after the arrival of Mesoamerican groups:

> A stratified society, common to both the Chorotega-Mangue and Nicarao, was maintained; but in governmental matters the council, elected from a

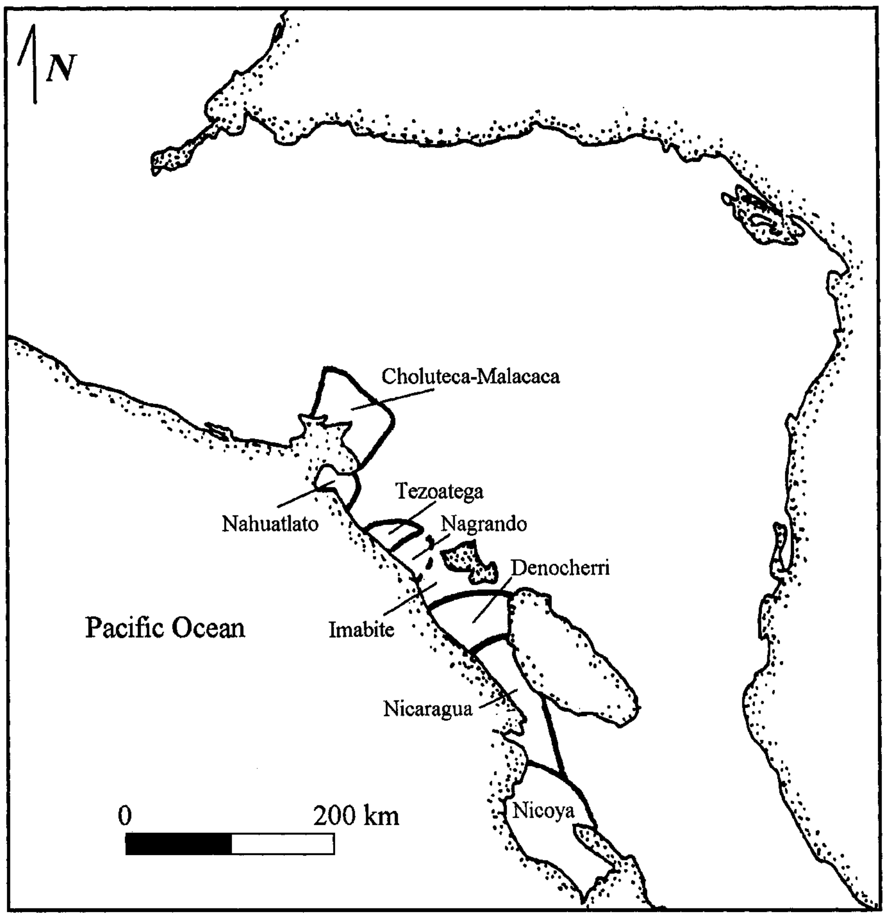


Figure 2.2. Sociopolitical provinces in Pacific Nicaragua and northwest Costa Rica (Salgado 1996a:38).

> number of communities, held the power and chose a captain-general for war (Stone 1966:228).

Plazas, market places, temples, and noble dwellings characterized regional centers among the Chorotega and Nicarao (Oviedo 1959:120:364). Temples and nobles' structures were constructed on top of earthen mounds. According to Martyr (1926:241, as cited by Healy 1980:26), noble residences were "often 100 paces long by 15 broad, open in front but closed in back, and raised above the surrounding area atop a platform or mound…(half) a man's stature from the ground…" They were rectangular in form, lacking floors, and constructed of wood, cane and grass (Stone 1966:217). The largest settlements had populations of more than 20,000 people and at least two central plaza areas (Chapman 1960:18-19). Gonzalez states that when he first arrived in the Nicarao capitol of Quauhcapolca, he found simply "una plaça y casa del alderredor della" (Gonzalez 1976:I:40 [1524]), as cited by Abel-Vidor 1986:392). After an eight-day stay baptizing thousands of people, he erected

> …dos cruzes como en los otros pueblos haya de costumbre, una muy grande en unos montones grandes de gradas que en cada lugar en la placa ay…y otros en su mezquita. (Gonzalez 1976:I:40 [1524], as cited by Abel-Vidor 1986:392)

Abel-Vidor (1986:392) infers from these comments that the town not only had a temple constructed on top of a stepped mound, but an open space in the center surrounded by houses. The area could have been separate from the part of the town where the mounds were located. In addition to Quauhcapolca, there were five large settlements in the region, each 8.5 to 11 kilometers (1.5 to 2 leagues) from one another. The smallest had a population of at least 2,000 inhabitants (Abel-Vidor 1986:392; Fowler 1989:133). Small

Nicarao and Chorotega communities lacked market places and elaborated ceremonial and living centers (Stone 1966:216).

There is contradictory information concerning Matagalpa settlements. Newson (1987:68), for example, cites an undated, seventeenth century document that describes settlements close to Muymuy and Sebaco in the Department of Matagalpa: "they do not live in formal villages, but each family lives by itself in a very large house made of straw like a galley, and in one of these houses is collected all the lineage, and these houses are situated three to four leagues apart." This manner of living reportedly also characterized the Talamanca of Costa Rica as well as groups living in Panama and Columbia (Ibarra 1994:235). In contrast, Oviedo (1959:120:364) states that principal settlements had plazas and marketplaces, "para sus tractos e mercaderías", similar to those of the Chorotega and Nicarao. This could suggest the Matagalpa had not only distinct settlement types and perhaps a settlement hierarchy but also that the existence of plazas and markets was a result of acculturation processes with the Nicarao or Chorotega.

Economy

Agriculture was reportedly the most important subsistence practice among all of the groups within Pacific Nicaragua; hunting, fishing, and gathering probably played important secondary roles (Newson 1987:49). Agriculture was predominantly a male activity, which contrasts with areas of South America where men did the hunting and fishing, and women cultivated (Newson 1987:50).

Maize (*Zea mays* L.) agriculture yielded two crops a year; other important crops included beans (probably *Phaseolus vulgaris* L., *P. lunatus* L., *P. coccineus* L., and

Canavalia ensiformis), manioc (*Manihot esculenta* Crantz), sweet potato (*Ipomoea batatas*), and cotton (Newson 1987:50-51). Cacao (*Theobrana cacao*) required specially cleared land plots and constant attention to keep them free of weeds and pests (Newson 1987:50). Nicarao cacao groves were situated on fertile soil along the banks of rivers in order to floodwater irrigation. This is the only reference to irrigation methods besides the pot irrigation of a forty-day maize grown in times of shortage (Newson 1987:50). A variety of fruit trees were grown. These include mammees (*Mammea americana*), jocotes (*Spondias pupurea* and *S. mombin*), and *nísperos* (*Zapota zapotilla*)(Newson 1987:51). *Níspero* cultivation was reportedly exclusive to the Chorotega (Oviedo 1959:117:262). Turkey and a now-extinct, mute dog were the only domesticated animals (Newson 1987:54).

Among the Chorotega, land was communally owned and allocated to individuals for cultivation. It was not possible to sell land, but it was possible to give it or will it to relatives (Newson 1987:50). Nicarao caciques controlled lands, assigning land rights to heads of lineages who in turn distributed rights among members of the lineage. Commoners provided tribute and personal service to nobles (Fowler 1989:201). There were at least part-time specialists in the production of pottery, textile, feather work, gold work, chipped stone tools, and other items (Fowler 1989:52). The Matagalpa, in particular, were famed goldworkers (Ibarra 1994:238).

As already noted, the Chorotega, Nicarao, and Matagalpa had markets located in their principal settlements (Oviedo 1959:120:364). Women conducted all negotiations, however virgin boys and male allies could enter the market (Oviedo 1959:120:364). Commodities included slaves, gold, fish, game, cloth, and agricultural products. Cacao beans were used a medium of exchange (Oviedo 1959:120:363). Oviedo (1959:120:364-365) reports that one rabbit was equal to ten cacao beans, eight to ten beans purchased the services of a prostitute, and that a slave was valued at 100 beans. The Nicarao reportedly had a monopoly on cacao production (Oviedo 1959:117:268).

Data on Chorotega and Nicarao market systems indicate that interregional exchange also took place (Fowler 1989:187), and it is reasonable to assume regional production differences existed. The Matagalpa, for example, made black dye that was exchanged for goods or cacao beans in the market (Stone 1966:229). Regional production differences of the Colonial Period may have been based upon earlier ones. The Tasaciones of 1548, analyzed by Stanislawski (1983), reveal that Granada paid relatively higher quantities of cacao, fruit, dried fish, beeswax, and hammocks in tribute to the Spanish, while Leon produced maize, beans, cotton, and woven clothes (Salgado 1996a:35-36).

There are only a few references to long-distance trade in the ethnohistorical accounts (Ibarra 1995). However, archaeological evidence attests to the existence of long-distance trade routes through Greater Nicoya. Mesoamerican obsidian and ceramics, such as Tohil Plumbate and Las Vegas Polychrome, have been recovered (Lange 1992b:201). Likewise polychromes from the region have been found in Cihuatán, Chalchuapa, Loma China (Fowler 1989:189), and as far north as Chichen Iztá (Geoffrey Braswell, personal communication 2002). Gold-related imagery associated with the Diquís-Chiriquí-Veraguas metalwork style is present on Greater Nicoyan ceramics, such Papagayo polychrome (Day 1994; Graham 1996). Although gold artifacts are seldom recovered, Cacique Nicaragua donated as much 18,506 gold pesos to the Spanish explorers (Cereceda 1883:30, as cited by Fowler 1989:193).

Ideology

Religion and ritual were highly developed in Pacific Nicaragua (Newson 1987:61). In spite of apparent similarities between Chorotega and Nicarao temples, Oviedo considered religious terms, rites, ceremonies, and customs to be different for the two groups (though supporting details are unavailable)(Oviedo 1959:120:364).

The principal deities of the Nicarao appear to have their parallel among the pantheon of Central Mexico. The most important deities, known as *teotes*, were Tamgastad and Cipattonal (Oviedo 1959:120:367-368). Thought to be the creators of all things, the two deities represent a man and a woman respectively (Oviedo 1959:120 367-368). This pair may be analogous to the Mexican Ometecuhtli and Omecihuatl (Hoopes and McCafferty 1989). Other deities with creative powers were Oxomogo, Calchitguegue, and Chicociagat (Lothrop 1979:65-66). Deities with power limited to specific spheres included: Quiateot (derived from the Aztec *quiauitl* or "rain" and *teotl* or "god"), the god of rain, thunder and lightning; Chiquinaut Ecat (derived from Ehecatl or "9 wind"), the god of wind; Mixcoa, the god of trade and identifiable with the Aztec's Mixcoatl); Macat (derived from *mazatl*), the god of the deer; and Toste (derived from *tochtli)*, the god of the rabbit (Lothrop 1979:66-68[1926]). Gods were represented in the form of idols made of stone and were petitioned for benefits, such as a good harvest or victory in a battle (Lothrop 1979:69-71[1926]).

Hoopes and McCafferty (1989) argue that the Nicarao pantheon is conspicuous for the apparent absence of several major Central Mexican deities including Tezcatlipoca, Xiuhtecuhtli, Xipe Totec, Huitzilipochtli, and Tlaloc. Hummingbird motifs depicted on pottery occur infrequently while Huitzilipochtli is indicated only by the word *orchilobo,* which meant "temple" among the Nicarao but was the Spanish corruption for deity in Mexico (see Oviedo 120:146, 363; Hoopes and McCafferty 1989). In addition, neither Tlaloc nor Quetzalcoatl is mentioned by name, although the latter may correspond to "9 wind" (e.g., Chiquinaut Ecat), the deity's day name. The distinctions between Mexican and Nicarao religion suggest that caution is in order when attempting to identify mythological figures depicted on Greater Nicoyan ceramics (Hoopes and McCafferty 1989). What is presumably Quiateot, for example, appears similar in iconographic terms as Tlaloc (e.g., goggled eyes, fangs), however it is impossible to know if there was a direct correlation between the two deities. The differences also imply that Nicarao cosmology may better represent a local interpretation of a pan-Mesoamerican tradition rather than a specific Mexican one (Hoopes and McCafferty 1989).

General similarities between the Nicarao and Mexican religions persist, however. The Nicarao also practiced self-mutilation, such as bloodletting, and conducted human sacrifices; sacrificial victims included war captives, slaves, and young men reared from birth for this purpose (Fowler 1991:200; Lothrop 1979:50,69-71[1926]). Monthly rituals were held in celebration of the gods (Chapman 1960:48; Lothrop 1979[1926])). Bobadilla reportedly stated that there were approximately 10 cempuales, or 20-day periods (Lothrop 1979:71[1926]). This would have formed a 200-day calendar, which is not known in Mesoamerica. The 20 day names are equivalent to those in the Aztec sacred 260-day calendar (Lothrop 1979:71[1926]), which suggests that the number 10 was incorrectly transcribed for 13. Lothrop (1979:72 [1926]) argues that the Nicarao day names were those of a solar calendar having 18 months of twenty days, plus five days at the end. If this is the case, the Nicarao could have used both a 260-day sacred calendar and a 365-day solar calendar.

Each of the Nicarao day names was considered to be a minor deity and a religious ceremony was held in each 20-day period (Fowler 1989:239). In addition to resting, drinking, singing, and dancing, men were not allowed to sleep with their women at this time (Oviedo 1959:120:378).

At certain ceremonies, the Nicarao performed the Volador, which was also known in Mexico (specifically Veracruz):

> This ceremony centered on a high pole at the top of which was a rectangular frame with an idol and from which ropes hung, twisted around the pole. Two or four men were attached to the ropes, and as they unwound rapidly, they were gradually lowered to the ground. In their hands they held bows and arrows, feather fans, and mirrors...(T)he symbolism of the ceremony is that the idol at the top of the pole represented the god of fertility and the men attached to the ropes were messengers whom he sent to earth. The arrows represent lightning; the feather fans, breezes and birds; and the mirrors, water and rains. The arrival of the messengers on earth represents the ripening of the crops and the harvest (Newson 1987:62).

There is less information concerning the religion of the Chorotega (e.g. Chapman 1960; Lothrop 1979:79[1926]). They had priests, temples, idols of stone or gold, and practiced self-mutilation and human sacrifice (Lothrop 1979:79-81[1926]). In contrast to the Nicarao pantheon, Oviedo recorded only three deities: Tipotani, and Nenbithia and Nenguitamali, a man and woman said to have created all things (Chapman 1960:87). None of the deities appear to be analogous to specific Mexican deities. The Chorotega practiced three major rituals during the cylindrical year, at which sacrifices took place

(Lothrop 1979:79[1926]), and did not perform the Volador. Some form of animism was present (Stone 1966:230). In particular, special reverence was given to the Volcán de Masaya.

Rivas and the Early Historic Period

As already noted, the Nicarao are associated with the Isthmus of Rivas during the early historic period. Lothrop (1979:5 [1926]) lists the northwestern border of their territory as the Río Ochomógo, while the southern boundary was probably located in northern Guanacaste, Costa Rica. Eight caciques were reportedly found in the area, the most important of whom was the cacique Nicaragua (Abel-Vidor 1986).

Nicaragua was one of the most generous contributors to the González expedition in 1522. The cacique donated a sizable quantity of gold pesos to the Spanish explorers and in exchange received a red hat, a linen shirt, and a silk jacket (Fowler 1989). González and Nicaragua spent many hours debating religion and philosophy. An original account of the dialogs by Martyr was lost but not before Lopez de Gomara summarized them; Gomara's account was later repeated by Herrera y Tordesilllas (Fowler 1989:193).

Contemporary observers agree that the population of the Isthmus was very large and dense. González claimed that more than 32,000 people had been baptized in his expedition to the Pacific lowlands of Nicaragua and the Nicoya Peninsula (Abel-Vidor 1986). At least 9,000 of the converts were subjects of chief Nicaragua. Oviedo reports that Bobadilla baptized 52,558 Indians in Pacific Nicaragua; twenty-nine thousand were from the Isthmus (Abel-Vidor 1986).

Six large settlements were noted in the Rivas region, each 8.5 to 11 kilometers (1.5 to 2 leagues) from one another, with the smallest having at least 2,000 inhabitants (Abel-Vidor 1986:392; Fowler 1989:133). One of the settlements was Quauhcapolca, the capital of Nicaragua and located near the present-day town of Rivas (Healy 1980: 21). In spite of the reported high population within the region, the Spanish did not establish their first town—Rivas—within the region until 1736. This contrasts with the early date for the founding of Granada and Leon (1524). In a review of historical sources, Abel-Vidor (1986:395) discusses this inconsistency:

> Pedrarias rather cryptically says that there was "no need," because the native population was already "in itself great." This statement would appear to imply that one of the rationale for settlements was the coalescing of more scattered native populations. If coalescing was uncalled for in Rivas, then settlement must have been considered strategically unnecessary, and/or the population already dense, and/or the Indians and their resources were judged manageable from Granada, which was strategically sited.

Neither Oviedo, who was in Nicoya from 1527-1529, nor Pedrarias had anything to say about the populations in Rivas. Both characterized the area between Guanacaste to and Granada as unpopulated, emphasizing "porque es tierra inhabitable y sin agua" (Pedrarias 1953-57:I:447 [1529], as cited by Abel-Vidor 1986:398). From these sources, it would appear that the native populations originally contacted by the González expedition had disappeared by 1529. It is quite possible that war, disease, and enslavement impacted an unknown percentage of the population in this area; the remaining inhabitants, if they truly did "disappear", could have simply moved elsewhere, an option that did exist—as reported by the cacique Nambí—just to the south in Nicoya (Oviedo 120:417)

Conclusions

The ethnohistorically recorded migration accounts of Mesoamerican groups to Greater Nicoya are often contradictory. Various scholars have suggested that the migrations took place anywhere between the fourth and fifteenth centuries and that the emigration point may have been Chiapas, Cholula, Puebla, Soconousco, or Tehuacán (e.g., Costenla 1994; Fowler 1989; Lastra 2001; Lothrop 1979[1926]; Saurez 1983). Others suggest that the Chorotega and Nicarao were driven out by the Olmeca-Xicallanca and continued overland to lower Central America; migration by sea is another hypothesis (e.g., Fowler 1989).

Although there is not much consensus among the various interpretations, other information within the ethnohistorical database does at least support the idea that the migrations occurred. The Nicarao spoke a language that was mutually intelligible to that of their Nahuatl-speaking translators while the Chorotega spoke a language belonging to the same family as the Mixtecs and Zapotec of Oaxaca (Abel-Vidor 1981:88; Fernandez et al. 2001). Similar to that in Mexico, settlements such as Tecoatega typically included a temple and platforms or mounds for performing human sacrifices arranged around a central plaza (Chapman 1960; Oviedo 1959:120; Stone 1966). The concept of the marketplace was well established and had spread to include other groups (e.g., the Matagalpa)(Oviedo 1959:120). Both the Nicarao and the Chorotega made war to secure prisoners for sacrifice, ritually consumed the remains of these victims, and also practiced autosacrifice (Chapman 1960; Oviedo 1959:120). Although several major deities (e.g., Tezcatlipoca, Huitzilipochtli, Tlaloc) appear to be lacking from the Nicarao pantheon, a strong connection to other aspects of the Mexican religious tradition remains.

The available information concerning the Chorotega and the Nicarao suggests that they were generically "Mesoamerican" in character. This could result from the length of time that the groups spent migrating and then residing within the region, which is estimated anywhere from 400/500 AD to a century before Spanish arrival. Over this time span, it could be expected that some cultural elements were lost during migration and the transitional period after arrival, while other elements were borrowed from local groups. The same argument might explain the differences in social organization between the Nicarao, Chorotega, and Matagalpa: the presumably later-arriving Nicarao had a highly stratified social system headed by a powerful hereditary chief while the Chorotega, who were more "democratic", revealed similarities to the Matagalpa and other eastern Nicaraguan groups. This assumes that the Chorotega and Nicarao societies were relatively similar prior to immigration, something that may never be known as long as their exact origins remain controversial.

Alternately, the "Mesoamerican character" of the Chorotega and Nicarao might point to whether their migration involved a general population movement or that of a sub-group. For example, the lack of monumental stone architecture (e.g., pyramids, temples, ballcourts), which is found at sites in neighboring El Salvador such as Cihuatán and which may also be associated with migrant groups (Bruhns 1980; Fowler 1989), could imply the loss of powerful elite during the course of the migrations, leaving the "underclass" or even lesser nobles to arrive in Greater Nicoya (Hoopes and McCafferty 1989).

As can be seen, the ethnohistorical record for Greater Nicoya leaves more questions than answers concerning the nature of Mesoamerican immigration to the region. The archaeological investigation of migration and its resulting cultural changes is necessary to enlighten the ambiguities and contradictions found within the early documents.

CHAPTER 3
PREVIOUS ARCHAEOLOGICAL RESEARCH

Archaeological research within Greater Nicoya has followed the general changes in method and theory characterizing the discipline during the past century and a half. The earliest work was largely exploratory, although the emphasis quickly shifted to classification and description during the early twentieth century. The development of chronological sequences began in earnest during the 1950s and 1960s, followed by explanatory and processual concerns. Recent research, reflecting some of the disappointment with the New Archaeology, indicates a more critical historical approach to the archaeological record. As will be shown, the overwhelming focus of archaeological research has revolved around the "Mesoamerican connection", with the main objective to determine the relationship of the Greater Nicoya region to Mesoamerica.

Descriptive Archaeology

Occasional archaeological research was conducted within Nicaragua and northwest Costa Rica during the mid-nineteenth century and first half of the twentieth century. Squier (1852, 1853) provided the first archaeological descriptions of in Pacific Nicaragua and illustrated the stone monuments of Zapatera Island, the petroglyphs of Masaya, and the paintings on the walls of Asososca Lagoon near Managua. He also reported a series of stone-faced mounds found at the site Punta de Las Figuras. Sixteen stone statues depicting a human figure with an animal hanging over the back, shoulders, and head were placed around the perimeter of the mounds.

Bransford (1881) explored Ometepe Island, parts of the Isthmus of Rivas, and the Gulf of Nicoya. In Rivas, he excavated at the Hacienda Palmar, located about four miles north of the town of San Jorge near the lakeshore (Bransford 1881:69). He recovered the earliest known ceramics from the region, which he called Palmar Ware (now Bocana Incised), and discovered a number of human burials while excavating near the beach[1]. In Ometepe, Bransford excavated cemeteries and isolated funerary features that dated to the period just before contact. In particular, he recovered numerous shoe-shaped burial urns that were frequently capped with polychrome vessels now known as Luna Polychrome (Bransford 1881:46).

Other early researchers include Boyle (1868), Flint (1884), and Bovallius (1886, 1977). Boyle (1868) was the first person to report differences between the monoliths of Chontales, Niquiran, and others in Nicaragua. He also illustrated Luna Ware, shoe-shaped vessels, and stone faces from Mombacho and the Chontales islands. Flint (1884), of the Smithsonian Institution, identified Tola Trichrome and reported on the human and animal footprints preserved in volcanic ash at Acahualinca (near Managua). Bovallius (1886, 1977), a Swedish botanist, visited Ometepe and Zapatera. He published drawings of petroglyphs from the "Isla del Muerto" and described Punta del Zapote, a site similar to Punta de las Figuras also having numerous stone-faced mounds.

In Costa Rica, Hartman (1901, 1907) is credited with the first systematically recorded excavations. He excavated at Las Mercedes in the Atlantic lowlands, in the Cartago Valley, and at Las Guacas in Guanacaste. Although his excavations were not "scientific" by modern standards, at Las Guacas, he described changes in soil stratigraphy

[1] Healy (1980:65) later reported on materials recovered from the same hacienda but which dated to a later time period. He does not speculate about where Bransford may have been working (see Healy 1980:64-65).

and which artifact types were typically found in different stratum (Hartman 1907:14-15). Hartman's "admirable pioneering example" was not followed up in Costa Rica until a half century later with the work of Baudez and Coe (Snarkis 1981:19).

Early researchers that focused on the evidence of Mesoamerican influences include Spinden (1917), who described the Chorotega as a homogeneous, Mayanized people spanning northern Honduras, eastern and southern Nicaragua, and northern Costa Rica, and Joyce (1971 [1916]), who argued that the Nicarao were a direct offshoot of other Nahua-speaking peoples such as the Aztecs and directly applied information about these better-known groups to describe Nicarao culture (Joyce 1971:65-68 [1916]). Lehman (1910, as cited by Stone 1984:14, 17) traced northern intrusions into Central America and argued for a Chorotega homeland in Chiapas. He also reported archaeological sites in Costa Rica and illustrated thousands of stone and clay artifacts, rock art, and pottery motifs in an overland trip from El Salvador to Costa Rica.

In 1926, Lothrop published the two-volume *Pottery of Costa Rica and Nicaragua,* which was a revised version of his 1916 Harvard dissertation. Considered to be the "first modern systematic study of Costa Rican and Nicaraguan archaeology" (Healy 1980:33), Lothrop (1979[1926]) based his work mainly on museum and private collections, and stressed design motifs and vessel forms in order to establish their relationship with different regions of Central America. His cross-dating was based on reference to Maya sequences. As noted in Chapter 2, Lothrop also compiled Conquest ethnohistory in detail.

During the mid-twentieth century, very little was published on Nicaraguan and Costa Rican archaeology. Lothrop's (1962[1940]) article in *The Maya and Their*

Neighbors discussed cultural contact between South America and Central America. He argued that the Nahua migrations had no impact upon South American culture and that "in all cases beyond the Lempa River and El Salvador they (the Nahua) had abandoned anything recognizable as Mexican except their religion and speech, and, in western Nicaragua and northwestern Costa Rica, some rare polychrome pottery patterns" (Lothrop 1962:427[1940]). Instead, the Nahua adopted the cultural mannerisms of their neighbors, "probably as a result of intermarriage" (Lothrop 1962:427[1940]). Strong's (1948) article on Nicaraguan and Costa Rican archaeology in the *Handbook of South American Indians* was based largely on Lothrop's earlier 1926 work and provides an accurate reflection of what was known for this area. Strong's stylistic analysis of artifacts from the Pacific and Highlands regions in both countries suggested connections both with parts of Mesoamerica as well as the Chiriquí region to the south. At around the same time, Stone (1958, as cited by Stone 1984:28) was also the first person to report the giant stone spheres in the Diquis Delta and named Costa Rica's three archaeological regions: Nicoya-Guanacaste, the Central Highlands-Atlantic Watershed, and the Diquís zone.

Cultural Areas and Chronological Sequences

After 1950, there was an increase of archaeological interest in the region known as the "Intermediate Area". This term was first used by Haberland (1957) and defined by Willey (1959) as the lands between western Honduras and northern Peru. An underlying assumption of the Intermediate Area was that it was part of a large cultural base extending from the cultures of Mexico and Peru, which developed as a result of mutual borrowing (Willey 1959:55). The Intermediate Area was important in terms of "mapping out" diffusion: as cultural traits spread outward from their point of origin, they would decrease in antiquity. Culture traits such as maize agriculture, stone and mound architecture, settled village life, and settlement patterns were thought to originate in the "nuclear" regions of Mexico and Peru; the Intermediate Area was a passive recipient (Creamer 1989).

During the late 1950s, Coe and Baudez (1961) conducted stratigraphic excavations in the Nicoya Peninsula, producing the "first reliable archaeological sequence for that region…complete with radiocarbon dates and chronologically significant ceramic types" (Snarkis 1981:22). They defined four chronological periods for the archaeology of northwestern Costa Rica: the Zoned Bichrome Period (AD 1-300); Early Polychrome Period (AD 300-750); Middle Polychrome Period (AD 750-1000); and Late Polychrome Period (AD 1000-Conquest)(Coe and Baudez 1961:505). The periods approximate the Late Formative to Late Postclassic Maya sequence and formed the basis for subsequent sequences in northwest Costa Rica and Pacific Nicaragua until the early 1990s.

Coe and Baudez (1961:512) focused on ceramic material dating to the Zoned Bichrome Period, noting that the assemblage most similar to theirs was the "Palmar Ware" recovered from burials in Rivas. They also found connections with the Diquis Delta and Chiriquí areas, suggesting "Zoned Bichrome ceramics may well prove to be distributed on an early level over much of Costa Rica and adjacent regions of Nicaragua and Panama (Coe and Baudez 1961:513). Coe and Baudez (1961:513) connected black-on-red zoned ceramics with Late Formative Utatlán Ware of the Guatemala highlands, multiple-brush type ceramics with Usulután ceramics from the Maya area, and color zoning decoration with South American ceramic types. They concluded that this region of lower Central America was participating in some, but not all, of the diffusional currents operating between Mesoamerica and western South America and that the Zoned Bichrome ceramics fill a gap in knowledge of the Formative Period (Coe and Baudez 1961:515). In a subsequent article, Coe (1962) refuted that Costa Rica was the meeting place between cultures of North and South America, noting that the archaeological evidence from the Intermediate Area does not indicate that very much important interchange took place. Instead, Coe described Costa Rica and the Intermediate Area as "a cul-de-sac open at both ends." Based on a discussion of ceramic similarities, Coe (1962:181) argued that Costa Rica was identifiably "Mesoamerican" as early as the Late Formative Period.

Roughly contemporaneous with the research in northwest Costa Rica, Willey and Norweb conducted test excavations in 1959 and 1961 at sites in the Departments of Rivas, Granada, Masaya, and Managua as part of a program of the Institute for Andean Research to study interrelationships of New World cultures (Lange et al. 1992:19). Norweb defined the first chronological sequence in Pacific Nicaragua, modifying the time spans for the four major periods defined in northwestern Costa Rica by Coe and Baudez (1961): Zoned Bichrome Period (500/350 BC-AD 300/400), the Early Polychrome Period (AD 300/400-800), the Middle Polychrome Period (AD 800-1200), and the Late Polychrome Period (AD 1200-Conquest). From 1962 to 1963, Haberland (1992:70) conducted excavations on Ometepe Island, discovering Dinarte phase ceramics that may be as much as 4,000 years old.

Based on ethnohistorical information and a broad distribution of ceramic and lithic similarities, Norweb (1961) defined Pacific Nicaragua and northwestern Costa Rica as a single cultural area known as Greater Nicoya (Figure 3.1). He considered Greater Nicoya to be a geographical and cultural subarea of Mesoamerica. The subarea was also influenced by societies to the south, however, since its geographical position made it a natural corridor through which cultural elements passed (Norweb 1964).

Developments in the 1970s

During the 1970s, archaeological research continued in Nicaragua despite political turmoil associated with the Somoza regime. Bruhns (1974) reported on fieldwork at Punta de las Figuras and Punto Zapote on Zapatera Island, while Reynolds (1984) classified ceramic sherds from Punto de las Figuras. Reynolds argued that the site was Chorotegan and dated it to the Middle Polychrome Period. Wyckoff (1974) developed a ceramic sequence for Nicaraguan using pottery curated by the Museum of the American Indian and data from Costa Rica. She argued that Papagayo Polychrome provided evidence for migration rather than trade with Mexico (Wyckoff 1974; Stone 1984:26). Just south of the Nicaraguan border, Lange implemented processualist techniques as part of his 1971 University of Wisconsin dissertation, focusing on settlement and subsistence patterns in the Sapoá Valley and adjacent portions of the Bay of Salinas (see Figure 3.1). The primary objective of his research was to determine the

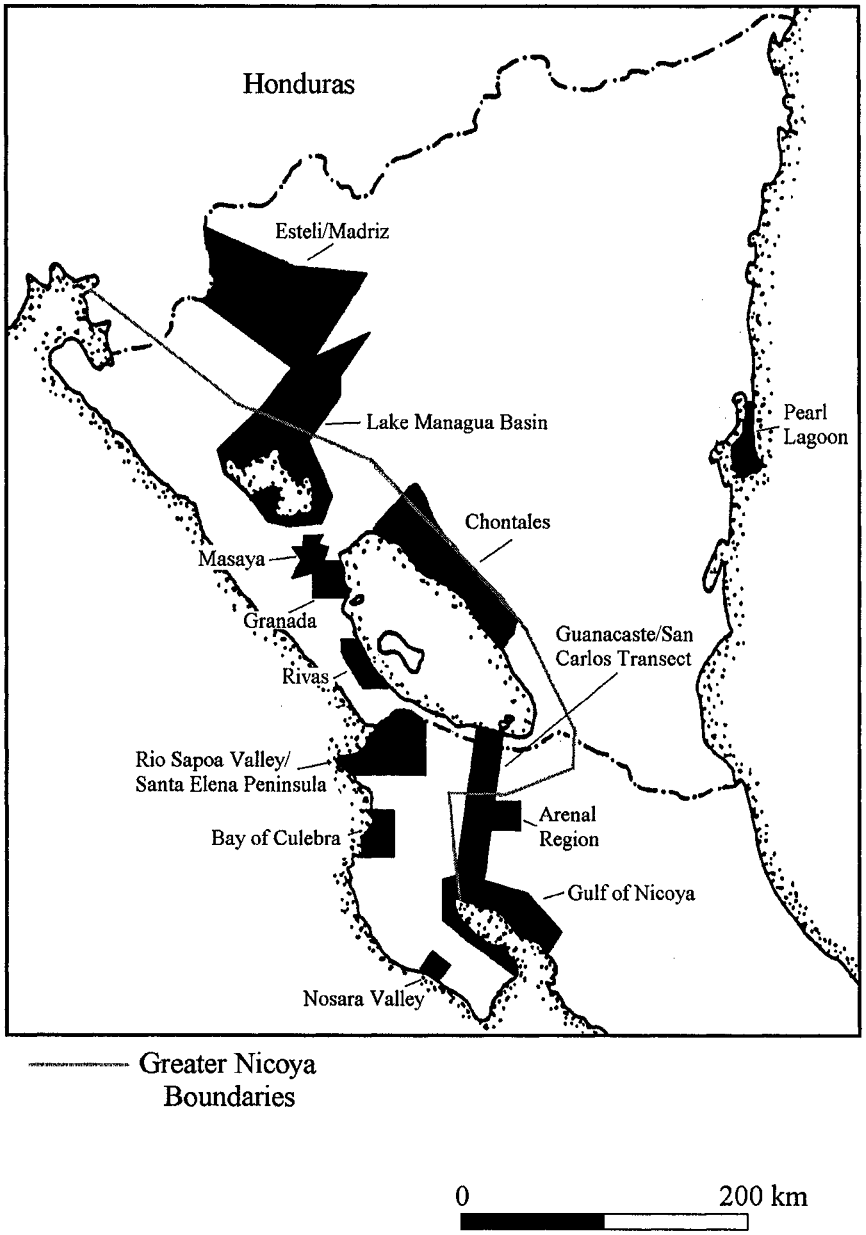


Figure 3.1. Research regions mentioned in text.

extent of Mesoamerican influence within the area (Lange 1971:257). After a discussion of the ceramic and subsistence-related evidence, however, Lange (1971:267) argued that there is "very little Central American influence on the traditionally defined southern periphery of Mesoamerica." Despite ethnohistorical evidence for the migration of Mesoamerican peoples to the area, Greater Nicoya area was strongly affiliated with what has been term the "Circum-Caribbean pattern" (Lange 1971:268). This was echoed by Sweeney's 1975 dissertation, which reanalyzed ceramics, lithics, and faunal material originally excavated by Coe on the northwest coast of Guanacaste and which came to the conclusion that "the inclusion of Nicoya in Mesoamerica is unwarranted" (Sweeney 1976, as cited by Stone 1984:29).

Another important work during this time was Healy's 1974 Harvard dissertation, which was published in 1980 as the *Archaeology of the Rivas Region, Nicaragua.* Based on his analysis of materials excavated in the Department of Rivas by Willey and Norweb, Healy (1980) developed a descriptive catalogue of the different ceramic types characteristic of the Zoned Bichrome through Late Polychrome periods. His diagnostic ceramic phase markers were subsequently used as a basis for sequences within other areas of Nicaragua (Bonilla et al. 1990; Lange and Stone 1984; Niemel et al. 1997; Salgado 1996a).

The ceramics that formed the basis for Healy's (1980) analysis were recovered from 17 test pits at seven sites (Figure 3.2). Five of the sites—Ingenio Dolores (J-Ri-2), Puerto San Jorge (J- Ri-3), Santa Isabel "A" (J-Ri-4), Santa Isabel "B" (J-Ri-5), and Palmar (J-Ri-6)—are located within the Rivas study area. Isla de Purgatorio (J-Ri-1) is

Figure 3.2. Archaeological sites visited by Gordon Willey and Andrew Norweb (Healy 1980:38).

located on the Pacific Coast, and Cruz (J-Ri-7) is on Ometepe Island. Healy provided little information concerning the precise locations of the sites or their size. In addition, there are discrepancies in the coordinates listed for each site: for example, although the Puerto San Jorge site is easily located on topographic maps, the coordinates provided by Healy for the site, 11°28' north, 86°13' west, place it in Lake Nicaragua. One aim of the Rivas survey was to find and evaluate the sites.

Based on his analysis of the Rivas materials, Healy (1980:313) argued that the Greater Nicoya subarea emerged as a definite cultural entity by at least 350 BC, and that the earliest cultures in Rivas were Mesoamerican in character, depending on maize farming and fishing for subsistence. This partly resulted from the fact that, at the time of Healy's work, there was less comparative material to evaluate from areas to the south. In addition, Healy apparently did not agree with (or have available to him) Lange's (1971:263) earlier argument against the assumption that maize cultivation signified Mesoamerican influence. Lange (1971:263) stated that maize has been found in both the "Circum-Caribbean and Tropical Forest patterns, with importance varying according to local conditions."

Healy (1980) noted that while many of the ceramic types found in Rivas were present in northwestern Costa Rica, numerous connections existed throughout prehistory with areas to the north. Usulután Ware, an important early trade ware from El Salvador, was found associated with Greater Nicoya Zoned Bichrome Period (500/350 BC - AD 300/400) ceramic types such as Schettel Incised and Rosales Zoned Engraved (Healy 1980:321). He defined the ceramic type, Obando Black-on-Red, which also dates to this period, as decorated with a multiple brush style reminiscent of Usulután. Many Early

Polychrome (AD 300/400-800) ceramics revealed connections to contemporaneous Honduran types, particularly in style and similar black-on-red and orange slips. Middle Polychrome Papagayo (AD 800-1200) was stylistically similar to Las Vegas Polychrome of central Honduras and white-slipped types from El Salvador. Middle Polychrome ceramics featured Maya-like scenes and motifs, such as the Kan cross, which were similar to those found on artifacts from Copán and El Salvador (Healy 1980:322-324). During the Late Polychrome period, Mombacho Polychrome showed similarities to Honduran types, and the Floral variety of Las Vegas Polychrome was "strongly suggestive" of the type Vallejo Polychrome (Healy 1980:324).

Healy (1980:317) further noted that there was only limited evidence for contact with other parts of Atlantic Nicaragua, Central and Eastern Costa Rica, and areas further south. He concluded that a "line might well be drawn just to the south of Rivas to demarcate the maximum extent of the Mesoamerican cultural area," with Guanacaste demonstrating less Mesoamerican influence than Rivas (Healy 1980:320).

Healy (1980:336-337) supported the idea of two migrations from Mexico. During the Middle Polychrome period, he argued that several cultural innovations, such as ceramics decorated with central Mexican design motifs (e.g., step-frets, pyramid designs, and the depiction of Mexican deities), moldmade figurines, and the emergence of the new utilitarian ware Sacasa Striated, reflected the arrival of the Chorotega (Healy 1980:334-335). The Late Polychrome Period, which was marked by even greater Mexican influence (e.g., ceramics decorated with Mixteca-Puebla designs) and an apparent decrease of contact with Guanacaste, indicated the arrival of the Nicarao (Healy 1980:326, 337). Healy (1980:339) theorized that the Nicarao fled Central Mexico following (what was then known about) the collapse of Tula. He stated that there were fewer sites occupied during this period, but that they were larger in overall dimensions than Middle Polychrome Period sites. Based on the ethnohistoric and archaeological data, Healy (1980:338) concluded that "there are strong impressions of a sizable Nicarao population living in nucleated villages."

Archaeology in the 1980s

Archaeological research in the Nicoya region of Costa Rica intensified during 1980s. Dissertations included: Day's (1984) examination of mostly unprovenienced ceramics from the Hacienda Tempisque; Creamer's (1983) study of Late Polychrome production and exchange in the Gulf of Nicoya; Moreau's (1983) study on prehistoric adaptation at the Vidor site; and Hoopes' (1987) study exploring the origins of village life in the Arenal region of Guanacaste (see Figure 3.1). Other research includes settlement pattern studies focused—among other areas—on the Bay of Culebra, the Río Sardinal, the Nosara Valley, and a corridor between Lake Nicaragua and the Gulf of Nicoya, all of which are outlined in *Prehistoric Settlement Patterns in Costa Rica,* edited by Lange and Norr (1986).

Day's (1984) work represents an important contribution to the development of the Greater Nicoya ceramic chronology. She defined new ceramic types and varieties, refined existing ones, and found that certain attributes, such as blue paint, depictions of gold jewelry, and the step-fret, were particularly late in date (Day 1984:217). In addition, vessel forms, such as large ovoid jars and round-bottom bowls, functioned as horizon markers for Middle and Late Polychrome contexts (Day 1984:217).

According to Day (1984:217), late period iconography was standardized and limited in motif to three major themes derived from postclassic central Mexico: (1) jaguars or jaguars associated with a human form; (2) plumed serpents; and (3) Tlaloc-like effigy faces. The first theme appeared at the beginning of the Middle Polychrome Period, suggesting that migrating Chorotega carried it to Nicaragua (Day 1984:217). After the initial appearance of Mesoamerican iconography and until the start of the Late Polychrome Period, ceramic imagery was increasingly abstract. Late Polychrome ceramics, characterized by their strong resemblance to Mexican motifs, signaled the arrival of the Nicarao.

Day (1984) also discovered two distinctive groups of late period vessels: white-slipped ceramics imported from Pacific Nicaragua and a local salmon-slipped variety referred to as Filadelfia Ware. She suggested the slips were "purposely prepared to serve as a surface for communicating ritual information" (Day 1984:218) and considered some Filadelfia ceramics to be direct imitations of white-slipped imports. The imitation started at the end of the Middle Polychrome Period with copies of Pataky Polychrome. The distinction between imported and local types was confirmed by neutron activation analysis. This co-variation between Guanacaste and Pacific Nicaragua indicated a special relationship based on the sharing of cultural values through exchange, economic exploitation, warfare, ethnic ties, or migration (Day 1984:219).

In the early 1980s, Snarkis (1981) provided the introduction in *Between Continents/Between Seas: Precolumbian Art of Costa Rica,* which included both the history of archaeology in the country and its cultural history. In particular, Snarkis (1981:29) argued that there is "increasingly better evidence for well-established trade routes between northern Costa Rica and southern Mexico from late Olmec times (800-400 BC) on." He suggested that the fluorescence of Nicoyan polychromes is associated with a rupture of these trade routes at around AD 500. He viewed Carrillo and Galo Polychromes, in particular, as inspired by northern models but also as incorporating southern elements to a form a "vigorous hybrid style" (Snarkis 1981:33). Middle Polychrome Period types like Mora and Papagayo also suggested Mesoamerican influence, with a possible connection between events in Mexico and the Maya area. Developments during this time included a dramatic increase in size and number of sites, a movement of the population towards the coast, and a greater accumulation of shell middens around AD 800 (Snarkis 1981:33-35). Late Polychrome Period ceramic types such as Vallejo and Mombacho were tied to Mixteca-Puebla "expansion" (1981:36) while Luna Polychromes were closed related to a ceramic type found at the mouth of the Amazon.

In contrast to Costa Rica, considerably less research was accomplished in Nicaragua during this time. Small projects included those by Abel-Vidor, who collected surface materials from sites west of Lake Nicaragua and Masaya, and Wyss (1983), who found evidence of all four ceramic periods at San Cristóbal, located near the Managua airport. Baker and Smith (1987) completed a partial survey of Zapatera Island. They found previously unrecorded sites and new information about Punta de las Figuras and Punta del Sapote. In 1983, Lange and Sheets completed a survey that gathered lithics and ceramics from 26 sites with the intention of contributing "broadly patterned data about the geographical distribution of diagnostic cultural materials (settlement patterns, ceramic types, and lithic technologies) along the Pacific Isthmus of Nicaragua" (Lange et al.

1992:35). The results of the survey were later published in *The Archaeology of Pacific Nicaragua* (1992).

Significant for the overall development of Greater Nicoyan archaeology was a series of seminars held between 1980 and 1985 in the United States and Costa Rica that aimed to clarify ceramic descriptions and chronology. The first of these seminars was at the School of American Research in Santa Fe and generated a volume edited by Lange and Stone entitled *The Archaeology of Lower Central America* (1984). A standard time scale framework for Central American archaeology was formulated: Period I (? -8000 BC); Period II (8000-4000 BC); Period III (4000-1000 BC); Period IV (1000 BC - AD 500); Period V (AD 500-1000); and Period IV (AD 1000-1550). Two later conferences in Denver focused on producing a unified set of Greater Nicoya ceramic descriptions and clarifying dates set for the standard periods (Lange and Stone 1984). The Denver conferences aimed to create a ceramic classification system incorporating information obtained from whole vessels that would still be useful to field archaeologists examining sherds (Lange and Stone 1984:200). Healy's work with the Rivas material provided a partial basis for the classification. Principal types were defined as those with either pan-regional presence and found in both Nicaragua and Costa Rica or types specific to what became known as the Northern and Southern Sectors of Greater Nicoya (see Lange 1984:167). The Denver meetings were followed by conferences in San José, Costa Rica, and Washington, D.C. (Lange 1987:1). The revised ceramic classifications were eventually published in a special volume of *Vínculos,* the journal of the Museo Nacional de Costa Rica (Bonilla et al. 1987).

Another development during the 1980s was the application of neutron activation analysis (NAA) to Central American ceramics (Bishop et al. 1988; Lange and Stone 1984:200). NAA made it possible to distinguish between Nicaraguan and Costa Rican materials and suggested regional manufacture centers for various types. In 1978, Bishop (of the Brookhaven National Laboratory) and Lange developed the Greater Nicoya Ceramic Project Analytical Program (Lange et al. 1992:138). More than 1,200 sherds were eventually analyzed by the project (Bishop et al. 1988).

The ceramic analysis project aimed "to better understand the cultural patterns of similarities and differences that led to the definition of northern and southern sectors in Greater Nicoya" (Lange et al. 1992:138). The results of the project indicated significant differences in the distribution of ceramic types as well as "differing patterns of cultural development, subsistence orientation, and degrees of impact of external influences" (Lange and Stone 1984:167). Lange and Stone (1984:184) argued that there was "no definite evidence of major Mexican population movements" such as site-unit intrusion, despite the fact that northern sector ceramic types like Vallejo and Madeira Polychrome reflect external influences.

The NAA research was part of a new trend exploring the relative importance of diffusion versus local development in Central American prehistory. This trend emphasized the achievements of Greater Nicoyan societies within their sociopolitical, economic, and environmental contexts. In an overview of the Greater Nicoyan Subarea, for example, Lange (1984:191) reinterpreted the region as a frontier-buffer zone interaction sphere. He cites four factors limiting growth of the region relative to more developed areas (e.g., states) in El Salvador, Guatemala, western Honduras, and Mexico:

(1) long geographical distances to major political and economic centers in Mexico, Guatemala, and Peru; (2) insufficient concentrations of natural resources, such as jade, which otherwise would have provided incentive for external control over the area; (3) the lack of high population densities that are necessary for major labor projects[2]; and (4) the lack of cultural and environmental factors (e.g., no arid areas with major water sources nor dense populations) that trigger hydraulic controls and their attendant social and economic mechanisms.

Lange's frontier/buffer zone idea was developed in part from his earlier analysis of maritime adaptations in northwest Costa Rica (e.g., Lange 1978). In this study, he discerned a shift in the Early Polychrome Period to a subsistence strategy focusing on mollusks and offshore resources that appeared to correlate with the beginning of the Nicoya Polychrome tradition (Lange 1978). This shift did not occur in Nicaragua, where settlements were focused around lakes Nicaragua and Managua. During the Middle Polychrome Period, there was an increase in fishing and a decrease in hunting activities. This period was also marked by the peak of the Nicoya Polychrome tradition, with evident influence from highland Mexico and the Maya lowlands and an apparent cultural unity between Costa Rica and Nicaragua. During the Late Polychrome Period, sites tended to be fewer but larger. Evidence of gold casting was present and decorated pottery virtually disappeared. The "ceramic unity of the preceding two periods dissolve(d)...reflecting population movements and political unrest to the north (Lange

[2] Lange (1984:192) states that although the Nicaraguan lakes appear to have attracted steady and large populations, there were no large geographical units such as the valleys of Teotihuacan or Oaxaca, which "in contrast to rugged or barren countryside surrounding a large oasis would attract population concentrations, particularly agriculturalists."

1978:112-113). Ceramic influences from the north, south and east were evident. Lange (1978:115) concluded:

> we are dealing with a geographical area where events in the ceramic sphere may not be inextricably correlated with events in other areas of behavior. The shift from non-molluscan-based subsistence was as important, if not more important to the majority of people, as was the shift from monochrome to polychrome pottery.

Hoopes (1987:8) also focused on in situ development, arguing that "from at least 2500-2000 BC, and possibly as early as 3000 BC, lower Central America was home to a complex diversity of localized early formative cultures" comparable to those found in traditionally "older" parts of the Americas. He suggested that these cultures may have been important sources of "technological innovations which became fundamental to more highly developed societies to the north and south", rather than the commonly-accepted reverse (Hoopes 1987:542). Hoopes completed his research while participating in *The Proyecto Prehistórico Arenal*, initiated by Payson Sheets and William Melson, who were interested in the effects of catastrophic volcanic eruption on prehistoric populations (Sheets and McKee 1994).

Continuing with this trend, Creamer and Haas (1985) questioned the ubiquity of Central American chiefdoms. In particular, they argue that although a chiefdom form of organization prevailed in Panama, the Gulf of Nicoya was occupied by tribal groups immediately prior to contact with the Spanish (Creamer and Haas 1985:738). The evidence in support of their argument included: the absence of architectural features or other results of communal labor projects; few indications of specialized production; minimal status differences (e.g., not sufficient to argue for hierarchical organization); and ethnohistorical data suggesting a lack of general leadership (Creamer and Haas 1985:748-749). In addition, ceramics appeared to form a social boundary between the Gulf and

Guanacaste to the north (Creamer and Haas 1985:749). Creamer and Haas (1985:749) argued that the tribal nature of Gulf of Nicoya societies calls into question the notion that Lower Central America should be included within the "Mesoamerican political sphere" (Creamer and Haas 1985:749). However, their focus only on the Gulf of Nicoya cannot be taken to imply that Guanacaste, Rivas, and other areas of Greater Nicoya were also organized as tribal societies, especially in the face of ethnohistorical evidence to the contrary.

Recent Developments

During the last decade, research conducted in Nicaragua, Costa Rica, and the rest of the Intermediate Area maintained a focus on the achievements rather than "historically perceived shortcomings" (Lange 1992:12) of the region. Lange et al. (1992) stated that Nicaragua was never truly part of Mesoamerica. While not denying the presence of Mesoamerican immigrant populations, they suggested that these populations were small. They questioned the extent to which immigrant groups dominated the area, pointing out that ethnohistorical records emphasizing Mesoamerican connections date to the time after the Conquest. Furthermore, these records were biased by the informant's own political goals, and "subject to political and cultural influences that cannot be understood completely from a modern perspective" (Lange et al. 1992: 269). Lange et al. (1992:271) argue that if immigrant groups left Mexico to avoid persecution—as recorded in migratory accounts—the groups they might not have brought all the trappings of an oppressive system with them, but were more inclined to accept new cultural mannerisms as a means to secure greater independence from old systems.

Other works pertaining to Nicaraguan archaeology included: *The Formation of Complex Society in Southeastern Mesoamerica* (Fowler 1991), which features a chapter arguing for the local development of Pipil and Nicarao societies in Central America; *Paths to Central American Prehistory* (Lange 1996a); *Wealth and Hierarchy in the Intermediate Area* (Lange 1992a); *Reconstructing the Prehistory of Central America* (Graham 1993); and *Mixteca-Puebla: Discoveries and Research in Mesoamerican Art and Archaeology* (Nicholson and Quinones Keber 1994) in which Day (1994) implied that the Mixteca-Puebla "horizon" originated in Greater Nicoya.

Additional research in Nicaragua included large-scale archaeological surveys in Chontales (Gorin 1990), the Lake Managua basin (Espinoza et al. 1994), Madriz and Estelí (Fletcher 1993), Granada (Salgado 1996a), and Masaya (Salgado et al. 1998) (see Figure 3.1). The current chronology of Greater Nicoya, which is based on ceramic style studies, absolute dates, settlement patterns, and mortuary customs, was also created (Vasquez et al. 1994). The new chronology and nomenclature includes the following periods: Orosí (1000-500 BC), Tempisque (500 BC - AD 300), Bagaces (AD 300-800), Sapoá (AD 800-1350) and Ometepe (AD 1350-Spanish Conquest).

In the Department of Chontales, located east of Lake Nicaragua, Gorin (1990) developed a cultural sequence divided into six phases for the years 500 BC to AD 1600 (see Figure 3.1). From 500 BC to AD 800, interaction between Chontales and Pacific Nicaragua was reflected by the presence of Pacific Nicaraguan ceramics and various formal attributes shared by the ceramic complexes of both regions. From AD 800 to 1400, Chontales and Pacific Nicaragua shared the same ceramic complexes. After AD 1400, Chontales once again experienced independent development.

Espinoza et al. (1994) surveyed the basin of Lake Managua from 1989 to 1991 (see Figure 3.1). They located a total of 78 sites, revealing a continuous occupation of the region from 500 BC until the period of Spanish contact, and carried out limited excavations at the site El Tamarindo. The ceramic assemblages from sites west of the lake indicated close relationships with the ceramic complexes of southern Pacific Nicaragua, including Rivas and Granada. Sites located east of Lake Managua were characterized by high frequencies of orange-slipped ceramics related to the Preclassic and Early Classic Usulután traditions of Honduras. After AD 800, the ceramic types found in southern Pacific Nicaragua were present at sites on both sides of Lake Managua.

From 1992 to 1993, Fletcher (1993) conducted archaeological survey and test excavations in the Departments of Madriz and Estelí in the northern part of Greater Nicoya (see Figure 3.1). The aim of her research was to explore exchange relationships between Mesoamerica and Greater Nicoya from the perspective of a frontier region. Espinoza et al. (1996) later expanded upon her project. A total of 107 sites were identified as a result of the research in Madriz and Estelí. The largest site, Güiligüisca, was classified as a regional center, with over 52 mounds spread over an area of approximately 10 hectares (Espinoza et al. 1996; Braswell et al. 2002). Excavations at the site yielded bichrome pottery dating to AD 300-600 (Fase La Mansión), the earliest yet known from northcentral Nicaragua. Prior to AD 300, ceramics were related to the Usulután tradition of Honduras (Braswell et al. 2002:6).

In 1996, Salgado (1996a) completed a 204-km^2 survey of the Department of Granada and documented 37 archaeological sites (see Figure 3.2). Two of these sites, Tepetate and Ayala, had been subject to test excavations by Willey and Norweb in 1959 and 1961. Ayala, which dates primarily to the Bagaces Period (AD 300-800), provided the largest collection of provenienced lithic artifacts recovered in Nicaragua. Tepetate was estimated at greater than 200 hectares in area and, at one time, featured at least 14 low mounds that were covered with slabs of stone and arranged around a plaza. The central area of the site, which included the mounds, was mostly destroyed by the construction of a housing project in the 1970s (Salgado 1996a). A great number of Papagayo figurine molds recovered from the Tepetate provided the first direct indication of the specialized production of ceramics (Niemel et al. 1997:678). In 1997 and 1998, the research was extended into the Department of Masaya (see Figure 3.2). Salgado et al. (1998) surveyed an additional 293 km^2 and identified 15 archaeological sites.

Braswell et al. (2002) combined the results of the Granada and Madriz/Estelí surveys to discuss when and how local development and macroregional interaction processes were intertwined within each area. They argued for the emergence of sociopolitical complexity during the Bagaces Period (AD 300-800) in both areas and increasing interaction with southeast Mesoamerica leading up to that point. During the Sapoá (AD 800-1350) and Ometepe (AD 1350-1522) periods, the sociopolitical organization of Granada was restructured and there were significant changes in all aspects of material culture, one of which was the introduction of a new set of ceramic motifs assumed to be associated with the arrival of the Chorotega (Braswell et al. 2002:21-22). It was not possible to characterize a later period component in the ceramic sequence of the Madríz/Estelí region suggesting that northcentral Nicaragua became isolated Greater Nicoya and areas to the north (Braswell et al. 2002:21). Admitting that their evidence was limited and mostly negative in character, they nonetheless suggested "northcentral Nicaragua suffered a decline in population and the degree of sociopolitical complexity" (Braswell et al. 2002:21).

Braswell et al. (1999:29) questioned the interpretive and explanatory value of the concept of Greater Nicoya and suggested that interregional interaction with southeastern Mesoamerican societies played an important role in the sociopolitical evolution of northcentral Nicaragua and Granada. They argued that the emerging Nicaraguan elites "sought to increase their status by associating themselves with the established elites of other regions, their material goods, and their esoteric knowledge" (Braswell et al. 2002:25). In addition, Nicaragua elites manipulated preciosities acquired from Mesoamerican trading partners in ways that would have negotiated and legitimized political and economic power (Braswell et al. 2002:25).

Conclusion

A prominent focus in Greater Nicoyan archaeology has been the search for evidence of contact with Mesoamerica, stemming from the ethnohistorical record and preconceived notions concerning the relationship between this region of lower Central America and the "core" cultural areas to the north. As Abel-Vidor (1986:89) stated, there has been a conspicuous tendency to ignore the "the uniquely innovative character of the archaeological and protohistoric cultures of Greater Nicoya." This culminated with the definition of Greater Nicoya as a cultural subarea of Mesoamerica during the 1960s. Recently, researchers began to explore other interests. In particular, they debated whether the region is a frontier between Mesoamerica and South America or an independent area whose cultural developments resulted from local factors (Lange et al.

1992). Attention has also been given to the utility of the cultural area concept itself (e.g., Lange et al. 1992; Salgado 1996; Braswell et al. 2002). Although the concept of Greater Nicoya does provide a framework for approaching the archaeological record and is a useful heuristic device, its emphasis on similarities over differences creates the illusion of bounded homogeneous cultural entities with a stable existence through time, an idea that also persists within ethnohistorical analyses of the region. However, as the amount of research conducted increased during the last two decades, it has become increasingly apparent that Greater Nicoya was not one homogeneous cultural zone. It consisted instead of different subregions, marked by differing sociopolitical developments, and distinct external relations. Although the Mesoamerican influences within Greater Nicoya were variable and much less than ethnohistory has led us to believe, this does not imply that the migration of Mesoamerican peoples did not occur nor that migration was not an important factor in the region's pre-Columbian development.

CHAPTER 4
MIGRATION AND CULTURAL CHANGE

Migration has played an important role in cultural development throughout human history. The peopling of the world, the spread of Homo *sapiens sapiens,* the emergence of farming and state formation, have all involved migrations on a variety of spatial scales and in a variety of different situations (Chapman and Hamerow 1997). Migration theory is "as old as tribal mythology; indeed, it is a rare corpus of myth that does not include at least one migration episode" (Adams et al. 1978:483). Nevertheless, migration remains poorly understood by most archaeologists and commonly viewed as something to be "invoked whenever local cultural change was perceived to have been too rapid or large-scale to be comfortably accounted for" by local processes (Chapman and Hamerow 1997:3).

Recently, there has been a renewed interest in the theoretical and practical aspects of migration (e.g., Anthony 1990, 1992; Burmeister 2000; Cameron 1995; Chapman and Hamerow 1997; Collett 1987; Renfrew 1987; Rouse 1986, Snow 1995; Sutton 1994). While new conceptual and methodological approaches can be used to re-examine known cases of migration, they can also be used to explore how migration shapes social and political development. This chapter discusses the study of migration from the nineteenth century to the present day and the ways in which archaeologists have attempted to identify migration within the material record. It also discusses other external explanations for cultural change besides migration including the frontier and boundary model, acculturation, the interaction sphere concept, and modified versions of Wallerstein's (1974) world-systems theory, that do not necessarily require population movements. The last section of the chapter presents a model that will be used for identifying the evidence for migration within the Rivas study area.

Early Migration Studies

Traditional cultural-historical archaeology viewed differentiation and diffusion, of which migration and invasion were important forms, as the primary processes of culture change. During the late nineteenth and early twentieth centuries, any significant change in the archaeological record was interpreted by archaeologists as being the result of the movements of large groups of people. Specific prehistoric trait lists were equated with specific cultures and attempts to define migratory change involved the comparison of: (1) "the cultural state before the change; (2) the input from another culture at the time of change; and (3) the development of a new state" (Childe 1947, as cited by Chapman and Hamerow 1997:3). A migratory event consisted of the one-way movement of people from one area into another; in certain cases, population replacement resulting from invasion or a less disruptive form of penetration occurred (Rouse 1986).

By the beginning of the twentieth century, migration and diffusion became the dominant explanatory paradigms of the period (Adams et al. 1978). However, as early as the 1940s archaeologists became increasingly dissatisfied with the overly simplistic explanation of cultural change offered by this approach (Adams et al. 1978; Anthony 1990, 1997). Migration was perceived as largely incompatible with the systemic approach of the New Archaeology that emerged in the 1960s and emphasized in situ development and internal change. External causes of change were virtually ignored and migration and diffusion were gradually replaced by technological and environmental explanations (Adams et al. 1978; Anthony 1990).

Several reasons have been proposed for the general turn away from migration during the 1960s. First, the "failings in the chronological framework supporting migration models were seen as failings in the models themselves" (Chapman and Hamerow 1997:4). The use of radiocarbon dating, for example, on "many European Neolithic, Copper, and Bronze Age phenomena assumed to have been Oriental or Aegean innovations (e.g., megaliths) demonstrated that the supposed derivatives were in fact earlier than their alleged prototypes" (Chapman and Hamerow 1997:4). Second, theoretical weaknesses of the concept of culture led to the rejection of migration models. The models were based on the cultural-historical view of culture that was no longer acceptable: bounded, normative, and homogeneous (Chapman and Hamerow 1997:4). Finally, archaeologists simply lacked a suitable theoretical framework and methodology for recognizing migration in the archaeological record (Anthony 1990; Chapman and Hamerow 1997). The traditional approach to identifying archaeological migrations was formulated by Haury (1958) and Rouse (1958). Their approach identified several specific conditions that would have to be met in order to confirm that a migration had taken place: (1) migrating peoples as represented by their material culture must be identified as an intrusive unit; (2) the archaeologist must identify the source area for the migrants; (3) the favorable conditions that caused the migrations must be established; and (4) factors (e.g., trade, etc) that might account for the sudden appearance of a new cultural assemblage must be eliminated.

This approach reflects the belief that the best way to identify migration is to focus on the "proper classification of archaeological data, the definition of valid chronological/ geographic units, the identification of culturally diagnostic traits, and…the linkages between these and ethnohistorical linguistic groups", all of which are subjective (Anthony 1990:897). By tracing the movements of artifact types characteristic of the home culture, a migration could be identified (Anthony 1990). This correlation between prehistoric archaeological cultures and actual ethnic groups, much like the normative view of culture, has been rejected by developments in archaeological method and theory. Archaeologists have suggested that material culture is not merely a passive reflection of ethnicity (e.g., Barth 1969) and that spatial variation in artifact assemblages is a result of a variety of different factors (e.g., Hodder 1982). As a result, the approach espoused by Haury and Rouse was flawed due to its assumptions regarding material culture and ethnicity.

Chapman and Hamerow (1997:3) argue that there is no reason "why migration models should not have generated testable, refutable hypotheses of the form 'If A, then B': viz, if a migration/invasion occurred, then it would be marked by changes in the cultural, linguistic, and skeletal data." This would have fit with the "new-found emphasis on scientific procedures, the nomothetic approach, and the importance of law-like generalizations" of processualism (Chapman and Hamerow 1997:3).

Notable exceptions to the so-called "retreat from migrationism" (Adams et al. 1978; Anthony 1990) include the works of Clarke (1968) and Schwartz (1969). Clarke (1968:411-431) characterizes twelve socio-archaeological processes, five of which involve migration or invasion: (1) cultural group re-patterning through imperial colonization; (2) cultural intrusion and substitution though military conquest or mass migration; (3) cultural assimilation through military conquest following acculturation; (4) subcultural intrusion and substitution of one subculture by another in deliberate action; and (5) stimulus diffusion through warfare as to produce a deliberate derivative development. Schwartz (1969:175) argues that there are identifiable "cross-culturally recurrent consequences of migration" that can be identified through the study of the ethnographic record and which are important to archaeological data collection and inference. He provides a review of the ethnographic literature focusing on cultural elements that he believes "currently lend themselves to archaeological examination" with the intention of later investigating migration within the Unkar Delta, a 300-acre area at the bottom of the Grand Canyon (Schwartz 1969:176).

Schwartz (1969:176) first defines migration as a relatively permanent "geographical movement of individuals or groups over a significant distance" under circumstances in which the "old territory is abandoned by the migrating group" and the intervening area is "ecologically unfavorable for occupation." While such a definition would have been appropriate for the American Southwest, where Schwartz applies his theories, unfavorable ecology between the departure and destination points in the chain of migration is not always present in many other parts of the world. The intensively occupied area between Mexico and Nicaragua, in particular, was definitely not ecologically unfavorable—although it may have been from a social perspective. In addition, to state that migration always reflects the complete abandonment of the old territory disregards the fact that migration is a behavior typically performed by defined sub-groups of a society that maintains contact with their former homeland (Anthony 1990:895-896).

Schwartz (1969:176-177) briefly mentions the reasons for migration, which include perceived threats to the community, economic factors, overpopulation, threats to core values (e.g., religion) and factionalism, but skips the process of migration to focus on post-migration culture. He considers the configuration of the migrant group during three stages of settlement (e.g., the pioneering stage, the consolidation stage, and the stabilization stage) and the changes in technology, social organization, and religion that can occur (Schwartz 1969:175). Most ethnographically documented migration groups in the pioneering stage are characterized by stronger solidarity and ethnocentricity than prior to migration (Schwartz 1969:178-179). However, groups are less likely to cooperate when material gain rather than escaping a threat provides the motive for migration. The archaeological correlates for the pioneering stage generally include utility-oriented structures, crude utilitarian artifacts and tools, and very little high-quality, decorated pottery. The consolidation stage is likely to be marked by "the development and crystallization of formal and informal social institutions and associations" (Schwartz 1969:178). The archaeological correlates for this stage are: (1) more non-utilitarian arts, crafts, and architecture than during the preceding stage; (2) evidence of population growth resulting from additional immigration and marked by the appearance of imported pottery and other artifacts; (3) technological change; and (4) increasingly complex social organization (Schwartz 1969:190-191). For the latter, Schwartz uses room sizes in pueblos as indicators of increasing social complexity. In Pacific Nicaragua, where structure foundations are not visible on the surface and only a minimal number have been encountered during excavation, it is more appropriate to use other indicators, such as settlement organization. In the final stabilization stage, the development of the community is no longer directly related to the migration and there are no specific archaeological correlates (Schwartz 1969:178).

Schwartz (1969) provides a useful model for investigating potential archaeological sites that may have been founded by Mesoamerican groups within Pacific Nicaragua. However, one critical weakness is the problem of subjectivity in interpreting the archaeological evidence. While it is logical that there may be a low frequency of nonutilitarian goods during the pioneering stage of migration, Schwartz does not provide a method for measuring what is "low frequency" and for identifying which artifacts should be considered specifically nonutilitarian.

Recent Models of Migration

Within the last decade, archaeologists such as Anthony (1990, 1997) and Burmeister (2000) have approached migration from new perspectives derived from sociology, geography, and demography in order to understand it as a process. Anthony (1990) argues that migration must be conceptualized as a structured behavioral process and not simply as the movement of a whole intact culture from the homeland to a new area. At the same time, it is necessary to recognize that migrant-native interactions within the destination area are strongly influenced by issues of social and economic power (Anthony 1997). Material culture plays an active role in the formation of new social identities and relations.

Drawing from geography, Anthony (1990, 1997) provides a model of the process of migration. He conceives of migration in terms of the actions of individuals, often typically structured by a network of kin-related groups and with specific goals. Moreover, he sees migration as targeted on a specific location and likely to follow familiar routes. Migration is most likely to occur when there are negative (push) stresses in the home region and positive (pull) attractions in the destination region and the transportation costs between the two are acceptable. Among the push factors that could trigger migration are political conflict, religious or ideological conflict, environmental stress, and population pressure on resources. Primary pull factors may be the presence of kin and information concerning travel routes and the conditions of the destination area (Anthony 1990, 1997). Anthony (197:25) notes that familiarity with the destination area through extensive previous contact may be enough to trigger migration: an "inertia effect" continues in the migratory flows between two locations long after the conditions initially prompting migration have changed. This inertia could explain why, according to ethnohistorical sources, the Nicarao, whose migrations are presumed to have postdated those of the Chorotega, ended up in the same part of Central America as the Chorotega (Steinbrenner 2002).

Important distinctions exist between the migratory processes of short-distance versus long-distance movements (Anthony 1990:901). Short-distance migration typically involves the movement within a restricted area by societies whose economic organization is based on a range of resources spread over a variety of environments. Examples of such societies are incipient gardeners, pastoral herders, and hunter-gatherers (Anthony 1990:901).

Long-distance migration involves movement across an ecological or cultural boundary. Often, it is just one particular subgroup that migrates and not the entire sociocultural group. Migrants, therefore, carry only those sociocultural elements related to their specific sociocultural experience. It also is possible for at least a segment of the migrant group to return back to the homeland. Some archaeological examples of long-distance trade may be due to return movement.

Long-distance migration involves patterns such as stream and chain migration (Anthony 1990, 1997). Stream migration involves movement along well-defined routes toward specific destinations. The first migrants establish a route to be followed by subsequent streams of migration. In this migration scenario, migrants carry highly restricted groups of cultural materials, producing a rapid and formal stylistic change in the destination area. During chain migration, migrants bypass certain territories to reach areas previously selected by scouts. Bypassed territory may include hostile environmental zones or areas occupied by societies unfriendly towards the migrants. The archaeological pattern produced by this type of migration should resemble islands defined by large extensions of bypassed area. Anthony (1997:27) states that coerced migration, in which "displaced persons, refugees, slaves, and social pariahs migrate not because they choose to, but because they are forced from their home ranges or regions", frequently takes the form of numerous episodes of chain migration, rather than "mass tribal movements". This is particularly relevant to the Chorotega and Nicarao, who reportedly left Mexico as victims of oppression (e.g., Chapman 1960).

Long-distance migration is constrained by several factors. These include the social and economic organization of the migrant group, the limits of transportation technology, and the information available about the destination. Also relevant to understanding patterns of migration is the social structure of groups along the migration route and in the destination area. Any migration is thus contingent upon historical developments and determined by structures of social power and social networks (Anthony 1990; Chapman and Hamerow 1997).

An important factor in migrant-native interaction is the social structure of the migrant group versus that of pre-existing local populations. Cultural change resulting from migration is not necessarily a density-dependent demographic phenomenon, but more a self-conscious intentional social strategy through which individuals and groups compete for social and economic power (Anthony 1997:28). Cultural change is essentially assertive style, as defined in its broadest sense as a "way of doing" (Sackett 1990:36). Material culture plays an active role in the formation of new social identities and relations. This occurs regardless of whether native and migrant groups remain distinct and is different than the changes evident in the archaeological record that reflect the arrival of migrant groups and which can reflect the number of people arriving. Such changes can be described as reflecting passive style. Stark et al. (1995) suggest that these changes are shown in the everyday realm of life, such as in domestic architecture and utilitarian ceramics.

One way to model cultural change triggered by migration and migrant-native interaction is to look at how a specific language comes to be spoken within a region. Renfrew (1987), exploring the prehistoric expansion of the Indo-European language group, describes three possible scenarios: initial colonization, replacement, and continuous development. He suggests that most cases of language replacement were caused by the migration of dominant elites or of cultivators, who simply outnumbered the indigenous population. In particular, a small, highly organized group moves into an area and achieves influence using such factors as military force, alliance and marriage with powerful local lineages, occupation of strategic economic places, wealth, or a powerful new ideology.

Burmeister (2000) has attempted to refine migration theory, focusing on the different transformations produced by migration and by other forms of cultural change. He distinguishes between an external and internal cultural domain:

> The world of the immigrants is twofold. The public or external domain is the zone of contact with the society of the immigration area. In contrast to this is what I would like to call the internal domain. The two spheres of social life correspond to different practices in the use of material culture: adaptation in the realm of the public sphere, and invariability in the realm of the private sphere, the internal domain (Burmeister 2000:542)

Burmeister notes that although a weak connection may exist between the material culture of the public, external domain and the migrant groups that use it, habitus ensures that the material culture of the internal private domain (e.g., the inside of a house) changes more slowly. It can therefore be used more reliably as an archaeological "proof" of migration. Burmeister suggests that migration research should focus on identifying the details of culture that would be more resistant to change and unlikely to be adopted by another group (Burmeister 2000:553). These include technological and functional elements that are free of symbolic meaning.

Burmeister (2000) places more emphasis than Anthony (1990, 1997) on the causes of migration, believing that, in some cases, causes may be identifiable. In the case of extreme involuntary migration, he suggests that a "singular event or chain of singular events can normally be substantiated as the trigger" (Burmeister 2000:544). He also describes micro-theoretical approaches that focus on how decisions made by individuals and small social units affect migration, as opposed to the more common macro-theoretical approaches that concentrate on "aggregates made up of weak-willed individuals which in their collective behavior are subject to self-contained mechanisms" (Burmeister 2000:546). For example, individuals always have insufficient information about alternative courses of action and thus their decision to migrate is often seen as the only available option (Burmeister 2000:547).

Burmeister (2000) explores the impact of migration on the immigration area. In agreement with Anthony (1990), immigrants tend to settle in the same areas as previous migrants, leading to particularly dense populations (Burmeister 2000:549). Enclaves of migrants of specific origin may also be apparent in larger centers where there is a spatial concentration of migrants of different origins (Burmeister 2000:549). This may be distinguishable on the basis of the material culture of the internal, private domain even if these groups are acculturated to one dominant culture. The selective nature of migration, as an activity more commonly participated in by younger males than by any other group, will likely affect the demographic structure of the migrant populations. This might be reflected archaeologically in burial mounds in the migration area that are deficient in women and which feature a higher percentage of younger individuals (Burmeister 2000:550).

Unlike Renfrew's elite dominance model, Burmeister argues that the arrival of a small group of elite conquerors is unlikely to have as lasting an influence on the material culture as a large group of common settlers (Burmeister 2000:552). Citing ethnohistorical sources, Beekman and Christensen (1999:4) suggest that it was common for Nahua groups in Mexico to take over the political leadership of the previously existing communities rather than to replace it. Although ethnohistorical sources from Nicaragua make no mention of elite replacement, this could explain the relatively homogeneous archaeological assemblages from sites associated with the Nicarao and from the Chorotega. This hypothesis is discussed in more detail in Chapter 11.

Alternatives to Migration

Interregional interaction is frequently recognized as an important mechanism in cultural change (e.g., Blanton and Feinman 1983; Chase-Dunn and Hall 1991; Goldstein 2000; Peregrine 1992; Salgado 1996a; Schortman and Urban 1992; Stein 1998; Wilcox 1999). Long-distance migration is a form of interaction but there are other explanations for cultural change within an area that do not rely on the movement of people. These include the interaction sphere concept, acculturation, the frontier and boundary model, and modified versions of Immanuel Wallerstein's (1974) world-systems theory (e.g., Chase-Dunn and Mann 1998; Kohl 1987, 1996; Peregrine and Feinman 1996).

The concept of the interaction sphere, which was first developed by Caldwell (1964), refers to "a one dimensional association of otherwise separate groups" (Creamer 1989:45). A specific activity, such as trade or a shared ideology, is found throughout the area. Creamer (1989:46) argues that this concept is valuable "in explaining the broad distribution of unique and exotic goods or items requiring special technology (like metallurgy)" that circulated throughout Mesoamerica and Central America. Smith and Heath-Smith (1980) apply the interaction sphere concept to explain the emergence of possible Mixteca-Puebla elements in the Nicoya region prior to their appearance elsewhere, a phenomenon that cannot be explained by the traditional "waves of influence" diffusion model.

The frontier and boundary model was first developed for the American West and describes the expansion of a well-established society into relatively undeveloped or "empty" territory (Creamer 1989:42). The shift from Mesoamerican to Central American cultural traits is one example of an archaeological frontier. A frontier is characterized by a combination of traits from the cultural areas on either side with no clear dominance of one area over another. A variant of the frontier model employs the concept of the buffer zone, which is an area between two frontiers. The buffer zone concept allows for cultural interchange between different groups while maintaining their distinctness. As noted in Chapter 3, Lange (1978, 1984) has applied this concept in Greater Nicoya.

The acculturation model refers to contacts between two groups that produce changes in one of them that results in a similarity between both (Creamer 1989:50). General factors involved in acculturation processes include trade and differences in wealth, prestige, and specialization.

Modified versions of Wallerstein's (1974) world-systems theory have had a particularly significant impact on the analysis of social interaction and change. Archaeologists have considered the long-distance exchange of preciosities, or material goods high in value per unit of weight, as serving important social and economic functions (e.g. Braswell et al. 2002; Brumfiel and Earle 1988; Chase-Dunn and Mann 1998; Kohl 1987; 1996; Peregrine 1992; Peregrine and Feinman 1996). In particular, Blanton et al. (1992) have highlighted the importance of long-distance relations for political purposes in Mesoamerica, while ethnohistorical studies have demonstrated the importance of the control of the access of exotic goods for the legitimation of elites in Lower Central America (Helms 1979, 1988, 1993; Ibarra 1994, 1995). In Central America, preciosities included jade, gold, and possibly fine polychromes.

The work of Helms (1979, 1988, 1993) highlights the role of the "foreign" in the construction and legitimation of social hierarchies. Helms (1988:4-5) explores the economic, political and ideological dimensions of long-distance relationships, arguing that precapitalist societies equate geographical distance with supernatural distance:

> ...just as the sky (heavens) above may seem to curve around and touch, even merge with, the land or sea at the far horizon, so geographically distant places and peoples may be included with celestially distant locales and beings in the overall cosmology of a traditional society.

Geographically distant places, as well as their people, material goods, and knowledge are attributed important political and ideological symbolism in these societies (Helms 1993). Individuals who have access to the foreign and distant are in turn associated with the esoteric realm. They are perceived as having the knowledge and skills to mediate between society and the supernatural and usually occupy higher ranks of the hierarchy of social power. Members of the political and religious elite, skilled artisans, and traders, such as the Aztec pochteca, are associated with geographical distance and esoteric knowledge. This explains why it is often the elite who are the first to receive representatives of new foreign faiths and customs, accept new charms and protective amulets, adopt foreign modes of personal adornment, and accept foreign advisors, new political ideologies and models of rule (Helms 1988:264).

Chase-Dunn and Hall (1991:7) define world-systems as "inter-societal networks in which the interaction is an important condition for the reproduction of the internal structures of the composite units and importantly affect changes which occur in these local structures." Their definition, although general, enables the inclusion of a variety of societal interactions. It does not establish that "internal" development was primarily determined by "external" factors, but asserts that these factors often are a significant part of the elements that mold the sociopolitical development of social systems. Moreover, the definition does not include the existence of core-periphery structures in all world-systems. In world systems, the integration of different regions in a common dynamic could be attributed not only to economy, but also to cultural or geopolitical factors (Schortman and Urban 1992; Wilkinson 1991).

Identifying Migration as a Source of Cultural Change

The differentiation of migration in the archaeological record from other factors influencing cultural change (e.g., diffusion, acculturation, etc.) has dogged archaeologists for more than a century. This is primarily due to the fact that the types of cultural changes that do occur are often regarded as unpredictable (Anthony 1990:895). Collett (1987), for example, explored the difficulties in recognizing migration through the analysis of a specific series of historically documented migrations—the Ngoni and Kololo of south-central Africa. He emphasized that: (1) migration need not result in a complete change in the material cultural of the area; (2) that the types of changes cannot "be arranged into a neat typology which links them to types of migration of the composition of the migrant group"; and (3) that the different patterns of change are instead correlated with the importance of different aspects of materials culture within different communities (Collett 1987:114). In the case of the Ngoni and Kololo, changes in the material culture did signify migration but only in those aspects of material culture associated with belief systems.

Recent approaches to the archaeological identification of migration have relied upon evidence pertaining to the point of origin, the migration route, and the destination area (e.g., Anthony 1990; Burmeister 2000). Potential push and pull factors have also been considered. However, detailed information concerning the emigration area, migration route, as well as push-pull factors is not always available, as is the case for Pacific Nicaragua. The following discussion of the archaeological correlates of migration is drawn primarily from the work of Anthony (1990, 1997) and Burmeister (2000). Other works are cited as used.

Emigration Area. Based on osteological evidence, there are measurable decreases in the overall population or specific demographic groups, such as males. Settlements and burial grounds are abandoned. Other clues resulting from social changes include signs of a general shortage of human resources, as indicated by abandoned craft production areas, cultivated land and settlements, and evidence of increased workload for women assuming traditionally male tasks (e.g., harvesting, for example). Connections to the immigration area are also apparent through the presence of trade wares, sourceable lithics, portable goods, stylistic similarities (particularly with regards to utilitarian items or activity sets), and persistent similarities in the spatial organization of households between emigration and immigration areas. The presence of new ideas and goods can be an indication of return migration. The evidence for a subsequent population increase is dependent on the number of migrants returning.

Migration Route. Chain migration or leapfrogging is indicated by "islands" of founder communities, such as fortresses, market towns, and seaports that are surrounded by large extensions of unaffected territory. Artifact types consist of highly specific items brought by the migrants. Stream migration is indicated by artifact distributions following a specific line of movement rather than widely distributed across an entire region between the point of origin and the destination area.

Immigration Area. Corroborating evidence for connections with the emigration region is important and consists of trade wares, stylistic similarities, household organization, etc. If a migrant population center develops, this would be reflected by the presence of densely populated "target" centers or migrant enclaves identified by their material culture and spatial organization (e.g., the Oaxaca barrio at Teotihuacan). Evidence for selective migration is indicated by demographic changes based on osteological data (e.g., youthful scouting populations). An elite conquest is represented by the sudden introduction of elements of foreign material culture followed by a subsequent decline in their influence (Renfrew 1987).

The scale of the migration can be one of the foremost factors in determining the extent to which a migrant group is identified in the archaeological record. However, even if existing populations are totally displaced geographically, it is reasonable to expect some degree of continuity in the material culture of previous periods. Changes should still be evident in the production technologies of artifacts, in the placement and patterning of burials, and in the settlement of new sites and the introduction of new architectural styles.

The evidence for migration will be most visible in the archaeological record in the case of newly arrived migrant groups (Stark, Clark and Elson 1995). Although it is possible that these groups may share some aspects of material culture with populations already in the area reflective of common ideological systems (e.g. decorated pottery, ritual items), patterned differences in the goods of everyday life remain evident, along with the ability, ideally, to link them to a place of origin (Burmeister 2000; Stark, Clark and Elson 1995).

In many cases, it is difficult to demonstrate that migration was a source of prehistoric cultural change. If migration is to be revealed in contrast to other internal or external factors of change, it must be understood as a structured behavioral process that is both historically contingent and heavily determined by structures of social power. Although Anthony (1990, 1997) and Burmeister (2000) describe some archaeological correlates of the migration process, the key to demonstrating migration is a rigorous particular and historical approach to the archaeological record itself. Since migration is embedded within the long-term processes of social change and continuity, the investigation of prehistoric migration in Rivas should be framed within the study of long-term social and political developments of the region.

Table 4.1 presents the archaeological correlates for long distance migration that will be used as the framework for this study. The correlates are drawn from the works of Anthony (1990, 1997), Burmeister (2000), Renfrew (1987), and Schwartz (1969).

4.1 Archaeological Correlates of Long-Distance Migration Within the Immigration Area.

	IMMIGRATION AREA
Interareal Connections	Evidence of trade with or knowledge of the emigration area (Mexico) as indicated by trade wares, sourceable lithics, or portable goods Stylistic similarities to the emigration area (Mexico) in local material culture, particularly utilitarian wares or activity sets Similarities in spatial organization of households with emigration area (Mexico)
Population Centers	Enclaves of migrants of specific origin within larger centers identified by material culture and spatial organization Presence of densely populated "target" centers
Settlement Stages	1) Pioneer Stage indicated by utility oriented structures, crude utilitarian artifacts and tools, low percentages of high-quality decorated pottery 2) Consolidation Stage indicated by higher frequencies of non-utilitarian arts, crafts, and architecture, population growth (reflected by settlement patterns), technological change (e.g., adoption of new subsistence practices/borrowing of technologies from nearby groups) 3) Stabilization Stage (no specific archaeological correlates)
Elite Conquest	Sudden introduction of elements of foreign culture followed by a decline

CHAPTER 5
RECONSTRUCTING SOCIAL ORGANIZATION

This chapter first discusses the classification of social systems and the theory and methods used to reconstruct social organization from the archaeological record. It then discusses the study of complex social patterns and the ways in which archaeologists have approached the study of social organization within Lower Central America. A framework for the reconstruction of sociopolitical organization is presented in the last section of the chapter.

Classifying Social Systems

Anthropologists have traditionally characterized social systems as simple or complex (Haas 2001). Simple societies (e.g., bands or tribes) were conceptualized as egalitarian in nature but with ephemeral social hierarchies based on age, gender, and personal prestige. Some form of institutionalized social inequality was considered integral within complex societies, which included chiefdoms, middle-range societies, and states. When compared to simple societies, complex societies showed higher structural and functional differentiation and political centralization (Haas 2001; Rowlands 1989).

The assumptions underlying these concepts of simple and complex societies have been questioned in recent decades (e.g., Bender 1990; Gledhill 1994; Rowlands 1989; Worsley 1984). Social differentiation also exists in so-called egalitarian societies including those of hunter-gatherers or foragers. Although every member of these societies has access to the means of production, social divisions based on age, gender, and aptitude may be more evident than those of a class society, where at least some degree of social mobility occurs (Worsley 1984:37).

Social complexity does not emerge from an intrinsic tendency of all societies to develop into more complex forms (Feinman 2000:7). In societies with ephemeral hierarchies, the tendency toward social differentiation is counteracted by strong leveling mechanisms that include constraints posed by kinship relations, practices of reciprocity, and the redistribution of wealth (Cobb 1993; Smith 1991; Trigger 1990). In particular, kinship relations structure the reproduction of society from the household level to the community (e.g., Sahlins 1976). The symbolic construction of kinship through marriage, consanguinity, and affiliation defines social relations and the access to resources both among kin and the remainder of the social group. Therefore, kinship can pose constraints to the emergence of differential access to wealth and power. It also has the potential to undermine these constraints by defining rules for the control of power institutions and the appropriation of social labor and surplus. Resistance to hierarchical forms of social organization occurs throughout human history and the emergence of highly centralized forms of political power, such as the state, has often been resisted by kin-based societies (e.g., Gledhill 1994; Pauketat 1994). But because contradictory interests are present in simple societies, under certain historic and techno-environmental circumstances, self-interested competition among individuals or kin groups vying for prestige can lead to pervasive social inequality (Clark and Blake 1994).

The transition to a hierarchical form of social organization is generally accompanied by surplus production and its restricted appropriation by a sector of the society, such as a kin group (Brumfiel and Earle 1988; Friedman and Rowlands 1977; Smith 1991; Wolf 1982). However, the emergence of centralization, political complexity, and wealth inequality do not necessarily correlate (Goldman 1993; Hastorf

1990). 'Political aggrandizers' are concerned with symbols of power and negotiate their social position (Clark and Blake 1994). In order to accomplish their goals, they require a surplus. Although social status is a significant component of power, it is not necessarily based on strictly economic factors. Nevertheless, wealth may be a prerequisite to joining a status group (Giddens 1971:166-168; Gledhill 1994).

Both social groups and individuals use diverse mechanisms of surplus appropriation to build social distance and a base of power (Earle 1991). Among the probable mechanisms utilized and manipulated to build power are: (1) to provide loans and to feast other members of the community; (2) to expand the population base of the polity and to promote nucleation; (3) to appropriate the existing principles of legitimacy or to create new ones; and (4) to improve and control the production infrastructure (Earle 1991). The latter often brings with it the control of wealth distribution and an expansion of external socioeconomic ties.

Inferring Social Organization

One way in which to define social organization through the archaeological record is to explore the spatial organization of the community. The sociopolitical relations between members of a society are reflected by the spatial patterning and relative sizes of activity areas within buildings, of buildings and activity areas within settlements, of settlements within regions, and of regions with respect to one another (Ashmore 1981, Chang 1968, Earle 2001; Parsons 1972, Trigger 1968, Willey 1956). The interpretation of site function, which is based on the analysis of intrasite features, artifacts, and ecofacts, is also essential to understanding spatial relationships. Other data, such as that concerning exchange patterns and mortuary practices, can also reflect aspects of social organization.

Settlement Patterns and Site Organization. Rapoport (1990) states that "built environments are created…to support desired behavior" and "to communicate and assert status, power, roles, etc." Public structures, for example, are frequently correlated with political centralization. Their size, construction materials, elaborateness, location, accessibility, and diversity can be used to help identify the presence of elite segments of society and of the social control or cohesion required for the labor necessary to build them (Sharer and Ashmore 1979). At the level of the dwelling, the size, configuration, and associated activity areas can be used to infer the size and nature of household units from nuclear families to lineages or clans. The positions of households relative to other structures provide for inferences concerning interactions and differentiation among residents.

Similar principles apply to the distribution of settlements within a region (Sharer and Ashmore 1979). Villages of equal size, distributed evenly, and of approximately equivalent function are considered to represent egalitarian social relationships. Hierarchical distributions, with a large central settlement surrounded by smaller satellite communities, are indicative of a more complex, multi-level society. Typically there are not only different-sized settlements but settlements that differ in function, such as hunting camps, quarries, religious centers, or farming communities. Together, they make up the settlement system.

Location theory, developed by economic geographers, can be used to investigate contemporaneous sites within a region. One frequently used model is central place theory, which predicts that (within a homogeneous landscape) settlements will tend to be spaced equidistantly along a hexagonal lattice and that larger centers will develop between smaller settlements at regular intervals to provide goods and services (Smith 1974). Alternative patterns to central place organization include solar systems, which are characterized by small settlements hierarchically organized around a higher-order center but poorly articulated with other such systems; dendritic systems, in which "all lower-level centers are tied to a single higher-level center in a chain that is entirely vertical without horizontal links" (Smith 1974:177); and linear systems, which might be constrained by the landscape, such as along river valleys.

Another model from economic geography is the concept of gateway cities (Hirth 1978). These are typically high-level communities located near the edges of regions through which long-distance exchange is carried out with other regions. They tend to be located along natural corridors of communication, such as rivers, at "critical passages between areas of high mineral, agricultural, or craft productivity…and at the interface of different technologies or levels of sociopolitical complexity" (Hirth 1978:37). Gateway communities are usually connected in dendritic or linear patterns to lower-level communities in their hinterlands.

Wealth Accumulation. The distribution of material goods across a settlement can be used to infer aspects of social organization. According to Brumfiel and Earle (1988), the acquisition, distribution, and accumulation of wealth are significant aspects of political economy. Wealth accumulation is reflected by the differential distribution of valuable artifacts and other remains in households (Smith 1991). Occupational specialization is also considered an indicator of wealth accumulation. Surplus production is necessary for the emergence of specialization. Elites often promote and control specialization because it permits wealth accumulation and control over long-distance exchange (Brumfiel and Earle 1988).

Long-distance Interaction. Long-distance interaction is important for the legitimization of political elites (Helms 1993). The appearance of exchange items, locally made artifacts that display iconography adopted from distant places, and technologies originating in distant places are all reflective of long-distance interaction and all may be differentially distributed across the built environment.

Mortuary Patterns. Additional theory and methods used to infer social organization within the archaeological record consider treatment of the dead and how it can be an indication of social relationships among the living community (Binford 1971:23; Saxe 1970). Most archaeological mortuary studies involve statistical correlations between the age and sex of individuals interred and attributes of body treatment, interment, and associated grave goods. This reflects the theoretical concept that an individual's social persona can be correlated with his or her burial treatment: the social personae evidenced in a burial population will mirror at least some of the social relationships present among the living members of that community (Saxe 1970). The spatial patterning of burials within cemeteries and of cemeteries within larger settlement patterns often mirror subgroup memberships among the living (Chapman and Ransborg 1981:14-19).

The Study of Complex Social Patterns

The concept of the chiefdom has been widely used within Lower Central America to describe and explain the first forms of political centralization (e.g., Carmack 1993; Creamer and Haas 1985; Drennan 1991; Fowler 1991; Lange and Stone 1984). Kalver Oberg originally developed the concept in 1955, defining chiefdom as an aggregate of villages under the centralized rule of a paramount political leader (Carneiro 1998). Subsequent definitions have included an important aspect, that of permanence by heredity, which distinguishes this form of political organization from that of the recently coined term "chieftaincy" (e.g., Redman 1998).

Chiefs or leaders emerge as "managers of internal interaction between components of the social unit, adjudicators of internal conflict, and managers of foreign affairs" (Creamer and Haas 1985:740):

> ...a decision-making bureaucracy coalesces around the chief, and the entire system comes to be organized in an integrated decision-making hierarchy. At the top of this hierarchy, the chief exercises a form of managerial power based primarily on controlling information coming in from different parts of the system.

In addition to political decision-making, authority in warfare, communal labor projects, religion, and exchange also characterizes chiefs (Earle 1987, Service 1962). Although subsistence activities remain in the hands of the general population, chiefs appropriate surplus (Creamer and Haas 1985, Earle 1987, Fried 1967, Peebles and Kus 1977). The latter is redistributed or used for the maintenance of the bureaucracy, and support of craft specialization. Craft specialists produce sumptuary goods for the chief and his kin group (Creamer and Haas 1985).

Chiefdoms are not stable over time (Anderson 1994). Instead, they tend to cycle from simple to complex with centers of power shifting from one community to another. Anderson (1994:9) states that

> ...cycling encompasses the transformations that occur when administrative or decision-making levels within the chiefdom societies occupying a given region fluctuate between one and two levels above the local community...(T)he recurrent process of the emergence, expansion, and fragmentation of complex chiefdoms (occurs) amid a regional backdrop of simple chiefdoms.

One of the most important factors in promoting cycling is competition for prestige and power between rival elites (Anderson 1994:50). A range of other factors exists such as variation in resource levels, subsistence production yields, boundary maintenance, prestige goods exchange, information flow, and population levels (Anderson 1994:32). The devolution from hierarchical to a more heterarchical system can also occur. This occurred in the sixteenth and seventeenth century southeastern United States, for example (Smith 1987). No general model has been developed, but it is presumed that major external or environmental stress was involved. If this were the case, the advantage of the more heterarchical system is that the decision-makers would be aware of a variety of solutions to the problem and likely make their choice by consensus (Crumley 2001:26).

Recent interpretations of the ethnohistorical record from Lower Central America have tended to emphasize the competitive aspects of chiefdoms. Chiefs are viewed as preoccupied with the acquisition and display of luxury goods from afar in status competition (e.g., Helms 1992, 1993) and at least frequently, if not continually, at war with one another (e.g., Carneiro 1998; Redmond 1998). Although the ethnohistorical record can illuminate the archaeological record, there is always the risk that "it may simply be substituted for careful archaeological reconstruction of prehistoric social patterns, thereby creating a false sense of knowledge and defeating any attempt at empirical investigation of the dynamics of the developments of these societies" (Drennan 1996:107).

Much of the criticism directed against the concept of the chiefdom has focused on the use of lists characterizing this type of social organization. Creamer and Haas (1985), for example, developed models for both the archaeological correlates of tribes as well as chiefdoms for use in the analysis of pre-Conquest societies in the Gulf of Nicoya and Central Panama (Table 5.1). After comparing data with the archaeological correlates of their models, they argued that tribal forms of social organization were present in the Gulf of Nicoya and that chiefdoms prevailed in Central Panama. It is ironic that their objective was to question the ubiquitous and uncritical use of the "chiefdom label" within lower Central America primarily based upon ethnohistorical information. Snarkis (1987, 1992) applied a similar approach to the study of social organization within eastern and central Costa Rica. He provided a list of attributes used to define rank/chiefdom (R/C) societies:

> 1. Environment: Most R/C societies occupy rich, varied, or otherwise desirable areas, while egalitarian societies tend to occupy marginal lands.
> 2. Demography. R/C societies have a much higher rate of population growth and a higher population density than egalitarian societies.
> 3. Subsistence Economy: R.C. societies have a more certain, concentrated, usually domesticated food supply. Redistribution of goods is key in maintaining the social order. Individuals carry out different tasks according to their age and sex, or according to the society's special demands.
> 4. Settlement patterns: Sedentism predominates. Among R/C societies, a give area has more, larger, and more densely concentrated sites than is the case for egalitarian societies.
> 5. External relations: Warfare, usually stimulated by competition for resources, is common. Middle- and long-distance exchange may occur. (Snarkis 1992:143-144)

Table 5.1. Archaeological Correlates for Tribes and Chiefdoms (from Creamer and Haas 1985:742-743).

ARCHAEOLOGICAL CORRELATES	TRIBE	CHIEFDOM
Settlement Pattern	Similar type sizes, dispersed	≥ 2 levels of site hierarchy, 1 center
Architecture	No differentiation in residential architecture	Differentiation in size and quality
Centralized Labor Organization	Communal labor carried out at the community level	Communal labor at regional centers
Surplus Production	Little surplus beyond household/community	Food production to create surplus
Storage	No communal storage beyond community	At least some central food storage facilities
Specialization	Production and religious specialization	Some specialized production (e.g., craft) at center
Rank	Limited evidence of status difference in burial goods	Rank ordered burials with clear status levels
Status Goods	Valuables will be infrequent	Caches or large graves with deposits, valuables removed from circulation
Trade: Regional	Exchange of subsistence goods	Extensive exchange of subsistence/value goods
Interregional	Importation of value goods, dispersed among community	Extensive import of value goods
Boundaries	Physical separation, change in material culture	More clearly defined than for tribes

Based upon an increase in the number and size of villages, possible public architecture, and the presence of elaborate burial offerings, he argued for the emergence of chiefdom social organization between 300 BC and AD 500 (Snarkis 1992:149-150).

One of the most complete archaeological chiefdom model was developed not within Lower Central America but for the Mississippian ceremonial center of Moundville, Alabama (Peebles and Kus 1977; Peebles 1971, 1978, 1987; Steponaitis 1978; 1983). Peebles and Kus (1977:421), in particular, developed a cybernetics-based model focusing on "mortuary differentiation, ritual-regulatory networks, subsistence autonomy, and part-time craft specialization" as indicators of the hierarchical social organization associated with chiefdoms. Moundville data supporting their model included: (1) evidence for ascribed ranking in the mortuary record and possibly in separate residential areas; (2) a hierarchy of settlement sizes and types; (3) settlement locations consistent with a high degree of local self-sufficiency in subsistence; (4) evidence for the use of communal labor (e.g., mound construction); (5) evidence of at least part-time craft specialization; and (6) evidence of society-wide activities that buffer environmental uncertainty (Peebles and Kus 1977:431-433). The latter activities consisted of food storage, mixed strategies for food production, defensive organization, and management of intersocietal trade depending upon which environmental variables were most uncertain. In essence, this model provided a very detailed trait list for comparison with other regions.

These works were based upon the conception of the chiefdom as specific social type, qualitatively different from what precedes it. This idea also persisted when the processes of the emergence of social complexity was the focal point of research.

Carneiro (1998), for example, argued that the importance of the chiefdom lay in the fact that for the first time in human history, village autonomy was transcended and a supravillage polity was established. He defined chiefdom as "an autonomous political unit comprising a number of villages under the permanent control of a paramount chief" (Carneiro 1998:20) and discussed an agent-based yet evolutionary model for the means by which a chief converts the temporary nature of leadership to a permanently institutionalized and hereditary one. His model stemmed from the basic presumption that a war leader, "grown more and more accustomed to exercising the power of his office as well as to enjoying its many fruits, would become increasingly reluctant to relinquish this power once hostilities ended" (Carneiro 1998:24). Carneiro presented concrete support of his hypothesis in the form of ethnohistorical data concerning the Caribs of the Guianas, Venezuela, and the Lesser Antilles as well as from the Tupinamba of the coast of Brazil (Carneiro 1998:25).

Comparisons between Lower Central American, and Mesoamerican chiefdoms have suggested that societies within these regions were on different developmental tracks from a very early point in time (Drennan 1996:109). Focusing his attention on the causes of societal divergences, Drennan (1991:284), in particular, argued that a key factor may well have been a community versus individual orientation. Societies in Mexico were characterized by modest internal differentiation with regard to wealth and status and mobilized their resources more toward public works such as communal ritual space. In contrast, societies in Panama mobilized resources "toward fierce status competition focused on the persons of the chiefs"; there were strong distinctions in internal wealth and status (Drennan 1991:284). Within Lower Central America, Drennan (1987, 1991) found that great variability characterized the patterns of sociopolitical centralization in terms of population growth and pressure as well as the use, or non-use, of imported luxury goods by elites. In addition, the control over prime agricultural resources and surplus food production was a key factor for the emergence of chiefs in some regions but not in others (Drennan and Quattrin 1995). Due to this variability, it was questioned whether the emergence of chiefdoms and centralized authority is an appropriate research focus within lower Central America (e.g., Lange 1992b; Hoopes 1992:73). Lange (1996c:312), in particular, suggested that a more productive analytical framework was that of "unranked, passively ranked, or actively ranked and complexly ranked" societies. He viewed passive ranking as "kinship based, where one's position within the social group is defined by abilities such as age, knowledge, hunting prowess, and so forth" and active ranking as the negation of the "importance of passive criteria in interpersonal relationships through the imposition of externally defined criteria" (Lange 1992b:109-111). However, Lange's focus remained on the "presence of social hierarchies, elites, and the nature of elite control over resources, which (were) among the central concerns of those who frame their research in chiefdom terms" (Drennan 1996:110).

The approach used here for the study of social complexity within the study area shifts the emphasis away from any monolithic concepts to the evaluation of the change trajectory. By adding time depth, it is possible to consider a society not only in terms of greater or lesser complexity, but also in terms of qualitatively different patterns of organization (e.g., Haas 2001:16). Haas (2001:16-17), in particular, discusses several cross-cultural patterns of change that will be used as a framework for social organization through time. He states that there is "no implication in any of these trajectories that evolution somehow involves ‘progress’ in any subjective or empirical sense”; each trajectory is internally complex and there can be divergences and even reversals (Haas 2001:17). The trajectories are presented in Table 5.2.

Table 5.2. Cross-cultural Patterns Associated With Cultural Evolution (from Haas 2001:16-17).

	TRAJECTORY OF CHANGE
Technology	The increased harnessing of energy. Technological strategies are developed for more efficient and effective extraction of resources from the natural environment.
Settlements	Populations settle in ever-larger villages, towns, and cities.
Social Integration	More formal alliances between different political, residential, and kinship units. The nature social integration becomes more complex.
Social Hierarchies	Trend from relatively egalitarian, nonhierarchical to social differentiation.
Power	Increasing centralization of power among some segments of society. Power holders differentiate depending on economic, ideological, physical and political bases of power.
Production	Increased specialization in production of goods and services and division of labor along more than age and sex.
War	War as organized violence appears at different times in different cultures. Once developed, the nature of war changes in patterned ways cross-culturally
Ethnicity	Increasing separation of ethnically diverse groups. Then from ethnic homogeneity to several or many different ethnic groups living under single centralized government.

CHAPTER 6
SURVEY

Settlement pattern studies have contributed greatly to the development of archaeological theory and to the understanding of political, economic, and ecological processes (e.g., Ashmore 1981; Billman and Feinman 1999; Chang 1968; de Montmillon 1988; Santley and Hirth 1993; Stark 1991a; Willey 1956). Diachronic reconstruction of the settlement pattern can reveal how economic, political, and ideological structures and processes are expressed through the spatial activities of a society (de Montmillon 1988). Each level of analysis, the region, community, and household, is shaped by factors that are unique to it. Site distribution across the landscape, for example, can reflect the impact of trade, defense, and administration. Studies of sites and communities can mirror the larger social organization, while households can reflect family organization. Other factors that may be responsible for settlement size, location, and pattern include changes in the natural environment, the role of demographics, or in this case, a change in demographics, economy, technology changes, and the influence of social and political organization on spatial distribution. Prehistoric social organization in the Rivas study area can be examined from both a macro-theoretical and micro-theoretical perspective. Cultural changes suggesting the arrival of Postclassic migrant groups can also be explored at a variety of levels.

A program of settlement archaeology consisting of survey and excavation was conducted within the Department of Rivas from November 1998 to August 2000. The program was designed to collect data with which to reconstruct changes in the sociopolitical organization of the area from approximately 1000 BC to the Spanish

Conquest. A second goal was to test hypotheses concerning prehistoric migration to Pacific Nicaragua.

The study area consisted of 270 km^2 located within the Isthmus of Rivas, which separates Lake Nicaragua and the Pacific Ocean, in the political department of Rivas. It extended from the Río Ochomógo 2 km south of the town of Rivas and was bordered by the Panamerican highway on the west and Lake Nicaragua on the east (Figure 6.1). A one-kilometer-wide strip was also included on the northern side of the river. In addition to Rivas, the present-day towns of San Jorge, Buenos Aires, and Potosí were located within this area.

As already noted, the Nicarao settlement, Quauhcapolca, was reportedly located in the vicinity of the modern town of Rivas (Fowler 1989:68). The Río Ochomogo also served as the border between their territory and the Chorotega, who occupied the lands to the north (Lothrop 1979:5 [1926]). The study area was designed to explore the social dynamics between this border and populations to the south and is longer north south (approximately 32 kilometers) than east west (no greater than 11 km); the Panamerican Highway was an arbitrary limit.

Physical Setting

The study area is located within the geological and physiographical province known as the Depression of Nicaragua, a large region of flatlands and rolling hills formed by a fork of the Central American volcanic axis (Healy 1980:9). The depression extends from the Cosgüina Peninsula in the north to the Río San Juan, which also demarcates

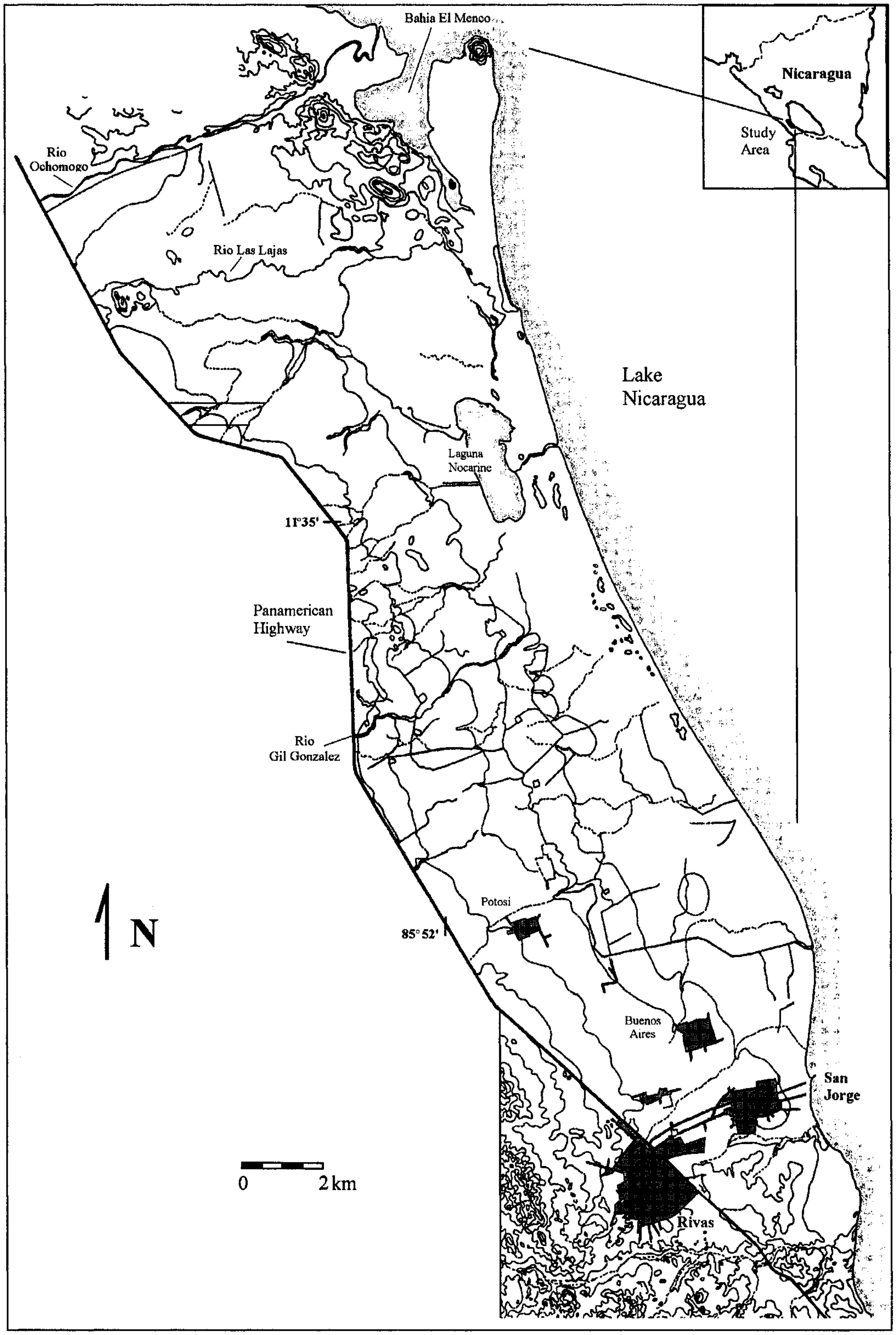


Figure 6.1. The Rivas Study Area.

Nicaragua's border with Costa Rica (Incer 2000:55). The eastern boundary of the depression runs parallel to the eastern coasts of lakes Nicaragua and Managua. The Pacific Cordillera defines the western edge of the depression approximately 16 to 32 km inland from the Pacific Coast

The principal natural feature is Lake Nicaragua, or Cocibolca (as it was originally known), which is approximately 160 km long and 72 km wide, with a surface area of 8,264 km² (Incer 2000:59). The lake is the largest fresh water body of water between the Great Lakes of North America and Lake Titicaca in Southern Peru and Bolivia (Incer 2000). The presence of several adapted marine species, including tarpon (*Tarpon atlanticus*) and the only known freshwater species of shark (*Carcharhinus leucas*), suggests that the lake was at one time connected to the sea (Healy 1980:11).

Hundreds of small islets are found in Lake Nicaragua, but there are two major islands, Ometepe and Zapatera, both of which, as already noted, feature important petroglyphs and other archaeological remains (Healy 1980:7). Ometepe Island is approximately 13 km east-northeast of the town of Rivas and formed by the twin volcanoes Concepción (active) and Madera (extinct). A narrow isthmus that is partially submerged during the rainy season connects the two volcanoes. The island figures prominently in the migratory myths of the Nicarao, whose "promised land" lay within site of the twin peaks (Healy 1980:22; Lothrop 1979:6 [1926]). Zapatera Island is also an extinct volcano and located farther north along the coast of the lake near the city of Granada.

The narrowest strip of land between Lake Nicaragua and the Pacific Ocean is 15 to 20 km wide and located just south of the modern town of Rivas (Incer 2000:59, 191).

Due to this fact, Lake Nicaragua was once championed as a possible component of the transoceanic canal that was eventually built through Panama (Squier 1852). The proposed canal would have stretched from the Río San Juan to Lake Nicaragua, and then would have continued via a short artificial canal built across the isthmus to the Pacific Ocean. The Río San Juan was a travel route between the Caribbean and Pacific Nicaragua and northwest Costa Rica from prehistoric to Colonial times (MacLeod 1973, as cited by Lange et al. 1992:5).

Soils within the study area consist of Cretaceous sediments, which lie adjacent to Eocene sediments to the west (Lange et al. 1992:136). Laminated clays having travertine, sand, marl and gravel insertions dominate the lake's fertile watershed (Teran and Incer 1964:91). The high clay content facilitates moisture retention and improves agricultural potential (Lange 1984). In spite of this, noticeable variation exists between the northern and southern portions of the study area. Soils in the northern half of the study area, for example, show a fair degree of erosion (Agronomist Mario Gallo, personal communication 1999). There is a lack of visible stratigraphy due to heavy seasonal rainfalls and periods of intense heat, which leach color from soils. This makes excavation by natural soil layers difficult, if not impossible, a fact also originally noted in Rivas by Norweb (Healy 1980:38-39) and encountered in Granada by Espinoza et al. (1999:18-20).

Two minor geologic features are found within the study area. A narrow wedge of andesite, known as Las Mesas, is embedded in the Cretaceous sediments approximately 325 m west of the town of Rivas (Teran and Incer 1964:91). The hills of Abejonal are also located at the mouth of the Río Ochomógo where it meets Lake Nicaragua (Incer

1964, as cited by Healy 1980:11). The hills range in elevation from 61 m to 147 m above sea level and consist of diorite masses interspersed with Eocene sediments. The remainder of the research region is flat to slightly rolling. Elevation ranges from 36 m to 61 m above sea level.

The study area drains into Lake Nicaragua, which in turn drains into the Atlantic Ocean through the Río San Juan (Incer 2000:55). The drainage system is composed of several seasonal rivers and streams that remain dry most of the year. Two exceptions are the Río Ochomógo and Río de Oro, which have water year-round. Perennial streambeds are filled when heavy precipitation occurs. A small estuary, Laguna Nocarine, is located approximately 15 km north of the town of Rivas. Water remains there year-round.

The climate of Rivas is tropical with definite wet and dry seasons (Healy 1980:11; Lange et al. 1992:4). The dry season extends from December to April and the rainy season from May to November. A short dry season in July separates the peak rainfall in June and September. The mean annual precipitation is between 1500 mm and 1800 mm (Healy 1980:11-12). During September, as much as 300 mm of rain may fall. The average temperature is approximately 27 C and humidity is usually above 50 percent (Healy 1980:11; Incer 2000:192). Breezes off the lake and ocean provide some cooling (Incer 2000:192).

Agricultural practices during the last five centuries have badly damaged both the natural vegetation and fauna, though relatively remote areas have been less affected. Haberland (1986:371), for example, reported wild deer living on the slopes of Concepción Volcano, Ometepe, as late as the 1960s. Few wild animals were observed during field investigations in the study area. These included rabbits, mud turtles, iguanas, and vultures. In addition, patches of the original "deciduous leafless forest", which becomes leafless during the dry, winter season (Healy 1980:14), were found in places not suitable for agriculture, such as surrounding the estuary and the rocky, topographic area near the mouth of the Río Ochomógo.

Important mammal species of the past included brocket and white-tailed deer (*Mazama Americana, Odocoileus virginianus*), jaguar (*Felis onca*), ocelot (*Felis pardalis*), wolf (*Canis lupus*), collared peccary (*Pecari tajacu*), coyote (*Canis latrans*), gray fox (*Urocyon cineoargenteus*), spider and howler monkey (*Ateles geoffroyi, Allouatta palliata*), rabbit (*Sylvilagus floridianus*), opossum (*Didelphis marspialis*), porcupine (*Coendu mexicana*), raccoon (*Procyon lotor*), armadillo (*Dasypus novemcintus*), tapir (*Tapirus bairdii*), and coati (*Nasua narica*)(Healy 1980:15-16). Reptiles include iguana (*Iguana iguana*), a variety of small lizards (*Anolis* sp., *Cnemidophorus* sp.), and serpents such as the rattlesnake and coral snake (*Micrucus nigrocinctus*)(Healy 1980:16). Although incidents involving rattlesnakes and coral snakes are rare, local residents advised caution during the archaeological survey. Lacustrine wildlife includes fish, shellfish, freshwater sharks (*Carcharhinus leucas*), turtles (*Kinosternon* sp., *Chrysemys* sp.), and crocodiles (*Crocodylus acutus*). Sea bass (*Centropomus nigicens*) and sawfish (*Pristis perotteti, Pristis pectinatus*) reach the lake through the Río San Juan (Healy 1980:16).

Common trees found within the study area include: ceiba (*Bombax ceiba*), laurel (*Cordia* sp.), cedar (*Cedrela odorata*), jocote (*Spondias purpurea*), tobacco (*Nicotiana* tabacum), papaya (*Carica Papaya*) mahogany (*Swietenia macrophylla*), sapote (*Pachira* sp.), mango (*Mangifera indica*), coconut palm (*Cocoas nucifera*), and rosewood (*Amyris* *balsamifera*). Cacao (*Theobrana cacao*) and sapodilla or *níspero* (*Zapota zapotilla*), two Pre-Columbian tree crops, are also found. Rivas was known as an important Pre-Columbian cacao-producing zone in the Americas (Newson 1987:139). After the Conquest, cacao production initially centered in Granada until it was again pushed south in the early 17th century (Newson 1987:139). Cacao never became an important export crop and eventually the demand for it within Nicaragua was met by imports from Costa Rica and contraband trade via the Atlantic Coast (Newson 1987:139). In spite of this, Rivas is locally known as the "Tierra de los mangos" in reference to the multitude of tall mango trees lining nearly every road around the modern town (Jaime Marenco, Director de Museo de Rivas, personal communication 2000). These mango trees, and others no longer extant, provided shade for the cacao plants.

The economy of the Department of Rivas is predominantly based on cattle ranching. However, within the study area the presence of fertile soils has led to the increased importance of crop cultivation. Maize, beans, squash, and various vegetables, such as green pepper and tomato, are the primary subsistence crops on small landholdings. Larger farms cultivate sugar cane, papaya, banana, and plantain. The largest land manager within the study area is the Ingénio Benjamin Zeladón, which processes sugarcane into raw sugar for export. The Zeladón plant is located five km north of the town of Rivas. During the 1970s, a canal was dug stretching from the plant east to Lake Nicaragua. The quantity of archaeological materials disturbed and destroyed by its construction is still recalled among the local inhabitants.

Survey Methodology

The superiority of full coverage survey vs. sampling as a basis for archaeological inference about settlement patterns is unassailable (Fish and Kowalewski 1990:2). Sanders et al. (1979:12) argue that it might be easy during sampling to miss central places or key resources such as obsidian or clay and that the value of negative data cannot be generated with confidence. Plog (1990:248) states that sample data also produce poorer maps. Opposition to full-coverage survey, however, often arises from practical considerations of rugged terrain or dense vegetation (Ziedler 1995). Surveys conducted in the tropics, for example, are rarely able to recover even representative samples of sites due to poor surface visibility (Ziedler 1995). Full-coverage survey also requires a high investment of time and resources (e.g., Sanders et al. 1979; Willey and Leventhal 1979).

An alternate strategy based on systematic transect sampling and opportunistic survey was developed for the Rivas study area. The sampling design is similar to that used in Granada and Masaya by Salgado (1996a) and Salgado et al. (1998). One research objective in these regions was to reconstruct prehistoric settlement patterns through time. The sampling design was effective in that it recorded the whole range of site types for each time period. Likewise, the use of transects has increasingly been used in archaeological surveys in Lower Central America (e.g., Cooke and Ranere 1984; Robinson 1986). Opportunistic survey, which relies in part on information about sites from local residents, can be used to provide more detailed reconstructions of the regional settlement pattern.

The Rivas transect survey was designed to cover 36 km^2 or 13.6% of the study area. Nine transects, each 500 m wide and oriented from east to west, were placed every 3 km throughout the study area (Figure 6.2). Parallel transects have proven to be a very efficient design for archaeological survey and are easy to follow in the field (see Judge et al. 1975; Robinson 1987; Salgado 1996a). A team of 3-5 persons, spaced up to 30 m apart, surveyed the transect areas. The spacing depended on the degree of surface vegetation: individuals were close together in areas of heavy vegetation and vice versa. Project members walked parallel to each other and relied on compasses, topographic maps (1:50,000 scale), aerial photographs (1:10,000 scale) and a Geographic Positioning System (GPS) for guidance. It was not possible to survey approximately 6.5 km^2 of the transect areas due to standing water or very dense surface vegetation (Figure 6.3). In the case of the former, road and stream or river cuts were used to look for exposed cultural materials within soil profiles.

In addition to systematic sampling, opportunistic survey was conducted in select areas based upon information gathered from local inhabitants and in areas considered favorable for human settlement. The field methodology was the same as the transect survey. Seventy-four km^2 (28%) were surveyed using opportunistic methods. Using both survey methods, approximately 110 km^2 were surveyed during the 1998-1999 field season (see Figure 6.3). This corresponds to 41% of the study area.

Once a site was located, its boundaries were based on when surface remains were no longer visible. Willey and Sabloff (1958:18) state that an archaeological site "may be anything from a small camp to a large city...it is in effect the minimum operational unit of geographic space." Although most sites are assumed to be associated

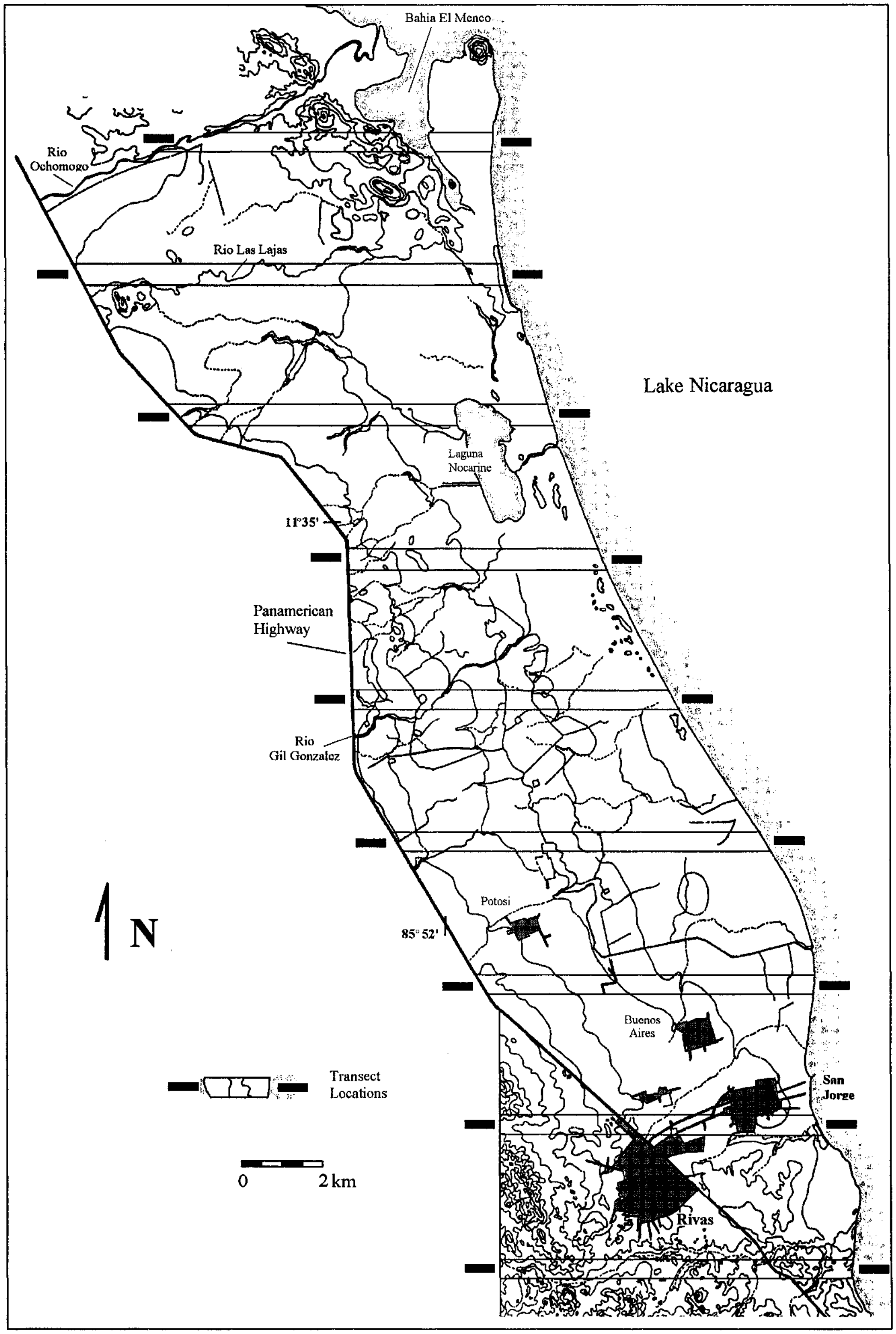


Figure 6.2. Study Area with transect locations.

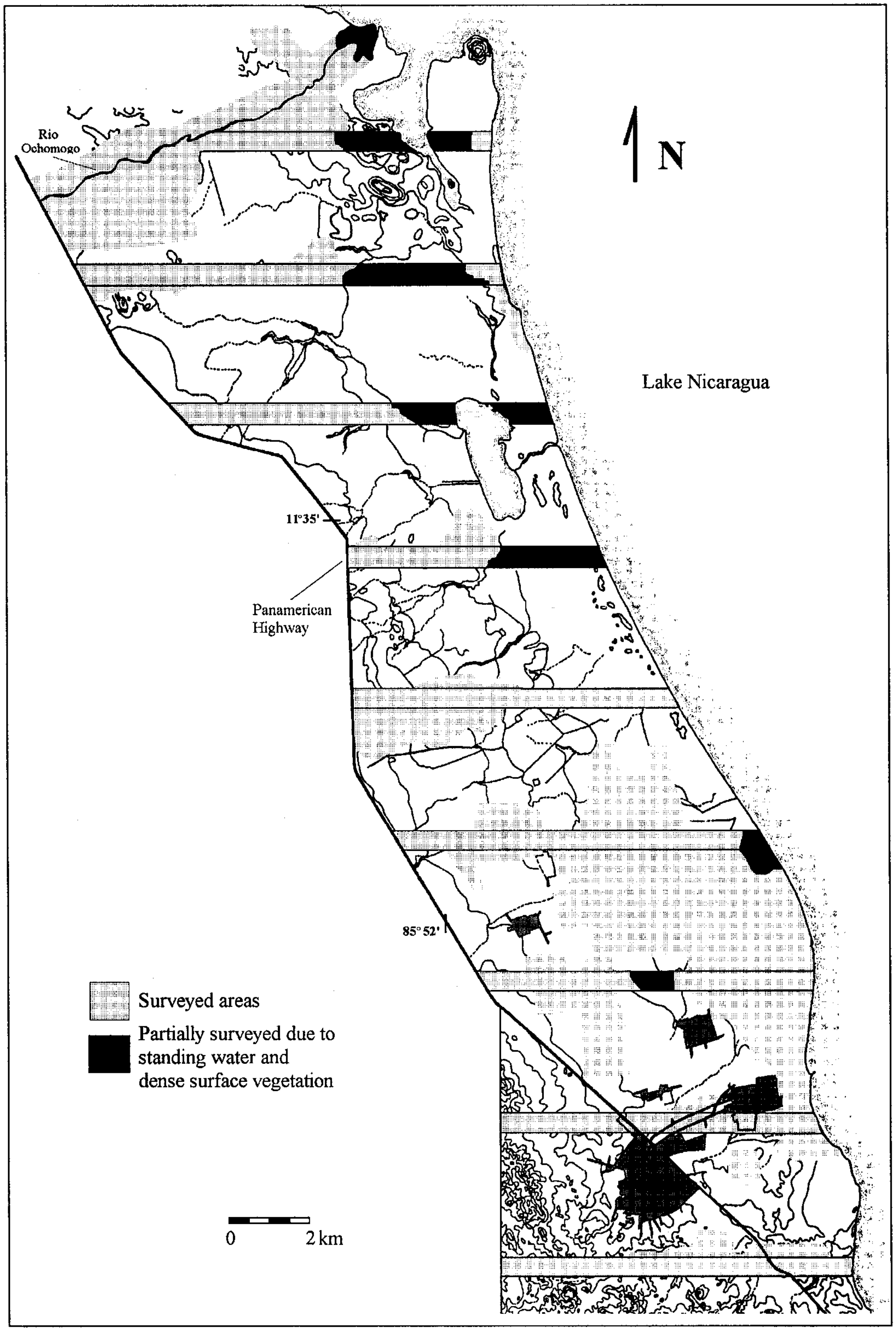


Figure 6.3. Sections surveyed within the Study Area.

with ancient habitation, areas used for refuse disposal, craft production, and other special functions are also included. There is a high degree of inconsistency in the application of the site concept within settlement studies. In the Maya area, for example, a site is defined as a cluster of collapsed structures (Stark 1991b:44). The emphasis on architecture is due to the fact that large populations through time have left cultural remains almost continuously distributed over some areas. Most sites in North America are defined on the basis of artifact scatters (Stark 1991b:44). The archaeological remains are very low-density and dispersed, reflecting the past activities of hunter-gatherers. In Pacific Nicaragua, the architectural remains of structures have vanished leaving no features visible on the surface. As noted in Chapter 2, structures at the time of Spanish contact were constructed of materials such as wood, cane, and grass, all of which quickly disintegrate when exposed to the elements. Temples and elite residences were supported by low, manmade mounds, which are still visible today. The mounds are typically two to six meters in height and up to 45 m in diameter (Healy 1980:51; Salgado 1996a). The multiple mounds found at the Tepetate site, in particular, were arranged around an open, plaza-type area (Salgado 1996a).

For the Rivas study area, the term site was defined as a surface artifact scatter separated by at least 100 m from the edge of another scatter and which may or may not be associated with mound features. The definition of a site is distinct from its interpretation, which is mostly based on artifact analysis. The latter is discussed in Chapter 10: Settlement Patterns.

Sites larger than 50 m^2 were divided into arbitrary sectors based upon local characteristics such as fences, unpaved roads, or streams for surface collection. Sectors ranged in size from 50 m-x-50 m to 150 m-x-150 m. Small sites (<50 m^2) were considered to be one sector. Most of the study area is rural and has changed very little since topographic maps were drawn in the 1970s and 1980s. The majority of tree lines, roads, and structures can be found on the maps, making it easy to establish the location of a site and its different sectors.

Each sector of a site was surface-collected individually. Project members were spaced 10 m apart or less in order to collect diagnostic ceramic artifacts and lithic artifacts. Diagnostic ceramic artifacts were considered to be all rimsherds and painted or otherwise modified bodysherds (e.g., modeled, incised, striated, etc.). Collection was opportunistic and emphasized assessing the overall range of artifact variation found at the site. Blanton et al. (1982:9) state that systematic surface collections consume greater time and energy in the field and laboratory than opportunistic collections. They argue that opportunistic methods (i.e., "grab-bag methods") are efficient and sufficient to determine the general surface characteristics of sites (Blanton et al. 1982:10).

The density of surface artifacts of each sector was determined while in the field and was based on the quantity of sherds per m^2. Three categories were used: one to five sherds per m^2 was considered low surface density; six to 50 sherds per m^2 was medium surface density; and 51 or more sherds per m^2 was high surface density. This scale was adopted from the Masaya and Granada survey projects (Salgado 1996a: 104; Salgado et al. 1998) and is an easy method to observe relative changes in artifact density while surveying a site.

An effort was made to identify specialized activity areas. These could be indicated on the surface by significant concentrations of artifacts related to pottery or stone tool production. At the Tepetate site in Granada specialized production was suggested by high quantities of ceramic figurine molds on the surface. Excavations at the site supported this interpretation (Niemel et al. 1997). Unfortunately, no specialized activity areas were found during survey. Information about site characteristics, location, current land use, soil quality, and artifacts collected was recorded in the field.

Survey Results

A total of 48 pre-Columbian sites were identified during the survey, 27 (56%) of which were located at least partially within transects (Figure 6.4). As will be shown in Chapter 10, the transect survey was effective in that the whole range of site types were recorded. However, the opportunistic survey was important to provide a more detailed picture of the settlement systems through time. It is probable that current land use biased the survey results: 66% of the sites were located in areas currently under cultivation. Sites that are still buried may be located in areas characterized by lower surface visibility (e.g., areas covered by low grass or scrub).

The sites range in size from 25 m^2 to 320 ha. The majority (70%) of the largest sites were located in the areas surrounding the modern towns of Rivas, San Jorge, Buenos Aires, and Potosí. This may reflect differences in soil fertility since soils in the northern section of the project area are shallow and somewhat eroded (Agronomist Mario Galo, personal communication 1999). In addition, 60% of all sites were 500 meters or less to a

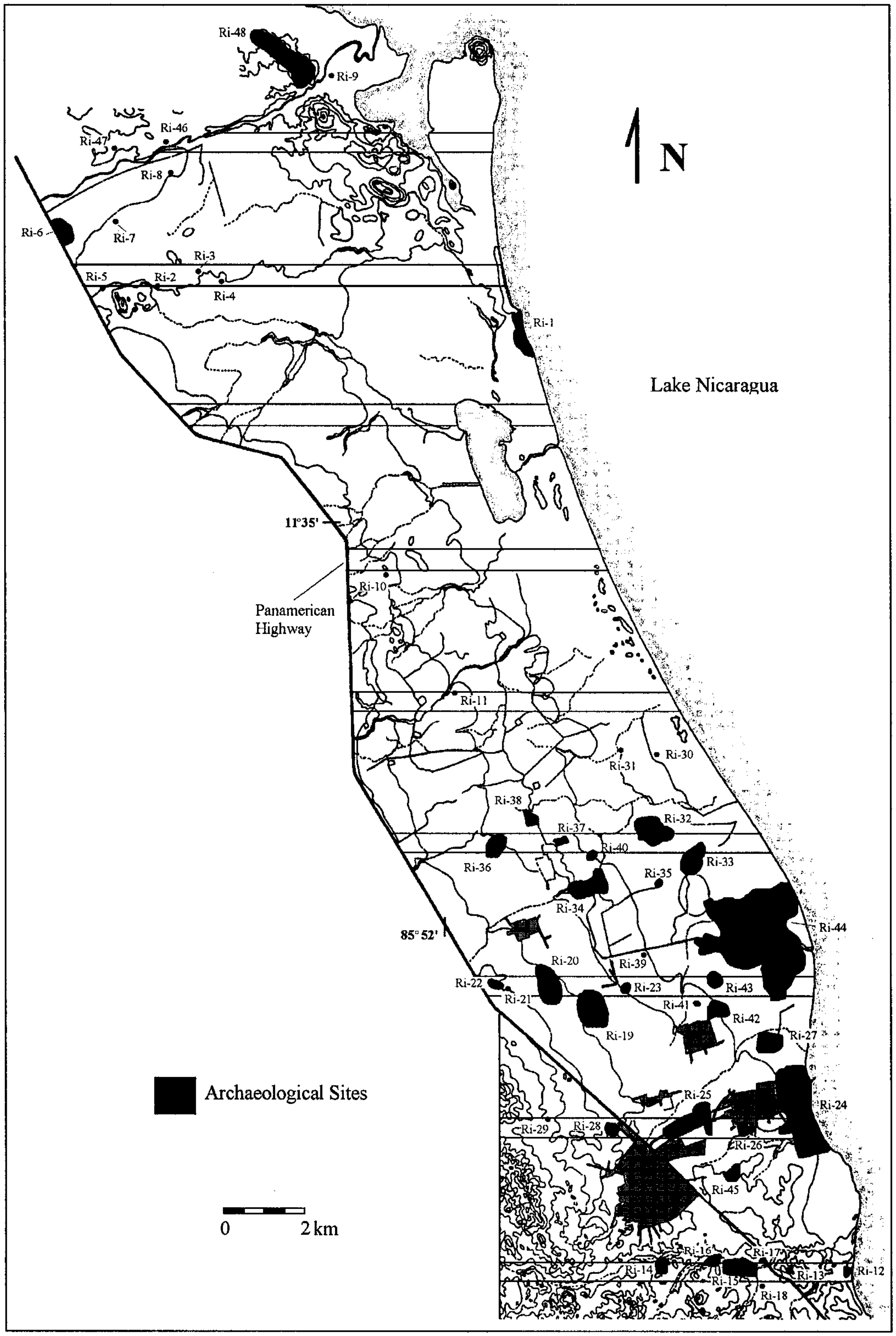


Figure 6.4. Archaeological sites located within the Study Area.

water source. The relative importance of this is diminished by the fact that the environment was more humid and plush than in the current day; early explorer's accounts describe Pacific Nicaragua as "Mohammed's Paradise", with abundant game and much heavier forestation than the present day (Salgado 1996a:14). Lake Nicaragua is also less than one-half-day's walk from any site. Table 6.1 is a summary of the site information. Appendix B provides more detailed descriptions of each site.

Table 6.1. Summary of Archaeological Sites Identified During Survey[1].

SITE	AREA	ARTIFACT DENSITY			FEATURES	ARTIFACTS			WITHIN TRANSECT?	SOIL QUALITY	CURRENT LAND USE
	(ha)	H	M	L	Mounds	Ceramics	Chert	Obsidian			
Ri-1, Las Piedras	27	X	X	X		X	X		N	Poor	Agriculture; scrub
Ri-2, Santa Rosa	<1			X		X	X		Y	Moderate	Low grass
Ri-3, Juan Martinez	<1			X		X	X		Y	Moderate	Scrub; low grass
Ri-4, Las Lajas	<1			X		X	X		Y	Moderate	Low grass
Ri-5, Humberto Bazarano	<1			X		X			Y	Moderate	Scrub; low grass
Ri-6, Ingenio Xavier Guerra	29		X	X		X			N	Moderate	Agriculture
Ri-7, Las Mesas	<1			X		X			N	Moderate	Agriculture
Ri-8, San Joaquín	<1			X		X			N	Moderate	Agriculture
Ri-9, San Ramón	<1*			X		X	X		N	Poor	Pasture
Ri-10, Salvador García	<1			X		X			N	Good	Agriculture
Ri-11, San Jeronimo	<1			X		X			Y	Moderate	Agriculture
Ri-12, El Corral	<1			X		X	X		Y	Poor	Pasture
Ri-13, El Castíllo	<1*		X	X		X	X	X	Y	Poor	Pasture
Ri-14, Santa Lucía	8		X	X		X	X		Y	Good	Agriculture
Ri-15, San Martín	30	X	X	X		X	X	X	Y	Moderate	Pasture
Ri-16, San Félix	7		X	X		X	X	X	Y	Good	Agriculture
Ri-17, Jose Rojas	<1			X		X	X	X	Y	Poor	Low grass; residential
Ri-18, El Vergel	<1			X		X	X		N	Moderate	Agriculture
Ri-19, Paco Rojas	45	X	X	X	X	X	X	X	Y	Good	Agriculture; pasture
Ri-20, Sabana Grande	40		X	X		X			Y	Good	Agriculture; low grass; scrub
Ri-21, Sergio Martinez	<1			X		X			Y	Moderate	Agriculture; residential; scrub
Ri-22, El Ojo de Agua	<1			X		X			Y	Moderate	Scrub
Ri-23, Santa Elena	4			X		X	X		Y	Good	Agriculture
Ri-24, San Jorge	195	X	X	X	X**	X	X	X	Y	Good	Agriculture; pasture; residential
Ri-25, Finca de Caña	60		X	X		X	X		Y	Good	Agriculture; scrub
Ri-26, Jose Mercedes	11			X		X		X	N	Good	Agriculture; scrub; low grass
Ri-27, La Conchita	24		X	X		X	X	X	N	Good	Agriculture
Ri-28, Miguel Mora	7			X		X	X		Y	Moderate	Agriculture; scrub; low grass
Ri-29, Sodelba Lopez	<1			X		X			Y	Good	Agriculture; scrub
Ri-30, El Capulín	<1			X		X			N	Moderate	Scrub; low grass
Ri-31, La Ceiba	<1			X		X			N	Moderate	Scrub; low grass

[1] Sites listed in bold type correspond to those also visited/excavated by Willey and Norweb (Healy 1980) and Lange et al. (1992).

SITE	AREA	ARTIFACT DENSITY			FEATURES	ARTIFACTS			WITHIN TRANSECT?	SOIL QUALITY	CURRENT LAND USE
	(ha)	L	M	H	Mounds	Ceramics	Chert	Obsidian			
Ri-32, Sucuyá	32		X	X		X	X	X	Y	Good	Agriculture
Ri-33, El Pital	36		X	X		X	X		Y	Good	Agriculture
Ri-34, San Fernando	35		X	X		X	X	X	N	Good	Agriculture
Ri-35, Santo Domingo	2			X		X	X		N	Good	Agriculture
Ri-36, La Esperanza	30		X	X		X	X	X	Y	Good	Agriculture; low grass; scrub
Ri-37, Yamil Ríos	5			X		X			Y	Good	Agriculture
Ri-38, El Paraiso	9		X	X		X			N	Good	Agriculture
Ri-39, La Nória	<1			X		X			N	Good	Scrub; low grass
Ri-40, San Jose	3			X		X			Y	Good	Agriculture
Ri-41, Alfredo Siazer	2			X		X			N	Good	Agriculture
Ri-42, Chata	14		X	X		X	X	X	N	Good	Agriculture
Ri-43, Chatilla	10		X	X		X			Y	Good	Agriculture
Ri-44, Santa Isabel	320	X	X	X	X	X	X	X	Y	Good	Agriculture; residential
Ri-45, San Francisco	15		X	X		X			N	Good	Agriculture; pasture
Ri-46, San Rafael	<1			X		X	X		N	Poor	Scrub; low grass
Ri-47, El Mojón	<1			X		X	X		N	Poor	Scrub; grass
Ri-48, El Brújo	99		X	X		X	X		N	Poor	Pasture

* These sites could be larger since boundaries were not clearly defined.
** Healy (1980:42) documents mounds at this site that have since been destroyed.

CHAPTER 7
EXCAVATIONS

Four sites, Jose Rojas, Paco Rojas, Santa Isabel, and El Brújo, were selected for test excavations. Based on their surface remains, the sites represent a variety of site types and date to different periods (Table 7.1). The excavations had two main goals: 1) to obtain ceramic material with which to refine the regional sequence within the study area and 2) to obtain data that could be used to support as well as refine inferences about settlement patterns, social organization, and migration drawn from the survey data. This chapter provides a summary of the field investigations at each site.

Field Methods

A total of 21 excavation units were conducted between 1999 and 2000: one at Jose Rojas, three at Paco Rojas, ten at Santa Isabel, and seven at El Brújo. In addition, 66 shovel tests were excavated. These include one shovel test at Jose Rojas and a series of 65 shovel test pits at 10-m intervals at Santa Isabel. The size of the excavation units varied from test pits to small trenches: 1 m x 1 m; 2 m x 1 m; 2 m x 2 m; and 3m x 1 m. Only one horizontal excavation was conducted to uncover a domestic structure that was found at El Brújo. All of the units, with the exception of El Brújo Unit 7, were placed in the central areas of the sites based on the surface remains. Unit 7 was located on the southwestern periphery of the site. Excavation levels were arbitrary due to the difficulty in seeing soil changes while digging. Beginning levels ranged from 10 to 20 cm in depth. The remaining levels were excavated in 10 cm increments. The shovel tests measured 30-40 cm in diameter and were excavated to a depth of 100 cm below ground surface.

Table 7.1. Temporal Periods Represented at Sites Selected for Testing.

SITE	**TEMPORAL PERIOD**			
	Tempisque	Bagaces	Sapoá	Ometepe
Ri-17, Jose Rojas	---	---	---	X
Ri-19, Paco Rojas	X	X	X	X
Ri-44,Santa Isabel	X	X	X	X
Ri-48, El Brújo	---	---	X	X

______Components excavated during 1999/2000.

Materials were recovered using 1/4-in mesh screens. Soil was identified by both type (e.g. silt, silt loam, sand) and color, which was determined using a Munsell Soil Color Chart. Excavation typically terminated after 10-20 cm of culturally sterile subsoil.

Cultural material recovered during excavation was separated into individual artifact classes (e.g., ceramics, lithics, faunal remains, and miscellaneous other objects) and placed in plastic bags labeled with provenience information. During the 2000 excavations, only sherds larger than the size of a large coin (e.g., a U.S. quarter) were collected for analysis due to large quantities of materials. Four carbon samples obtained in clear stratigraphic context in 1999 were submitted for radiocarbon dating analysis at Beta Analytic, Inc. The samples came from units excavated at the Paco Rojas and Santa Isabel sites. Carbon samples from the deepest units excavated in 2000 at Santa Isabel, which had sequential cultural deposits to a depth of over 2 m, are being tested to further evaluate the chronology at that site.

Jose Rojas Site (Ri-17)

The Jose Rojas site is the smallest selected for testing and has an estimated area of less than one ha. Low densities of surface remains characterize the site area. The site was chosen due to the recovery of three obsidian prismatic blade cores by the landowner, Jose Rojas, while removing fill from his property to make bricks. About 30-45 cm of fill had been removed prior to the 1998 survey. At the present time, the obsidian cores represent the only provenienced evidence for the manufacture of prismatic blades in Pacific Nicaragua. Since the Jose Rojas site is small in size, one objective of the excavation was to explore whether it could be a specialized activity area (e.g., a lithic workshop).

In February 1999, one shovel test and one 2 m x 1 m excavation unit were conducted at the site (Figure 7.1). The shovel test was in the approximate location where Sn. Rojas recovered the obsidian cores: 5 m west of the Panamerican Highway, 23 m east of the Rojas house and 6 m northeast of the large tree found in the front yard. The test was 40 cm x 40 cm and excavated to a depth of 100 cm below the current surface level. This would be approximately 130 cm below ground level if the uppermost soils had not been previously removed. Several pieces of monochrome ceramic and possible fragments of *bahareque*, a construction material used in wattle and daub structures, were recovered in the first 15 cm. One Ometepe Period sherd was encountered at a depth of 50 cm. After 80 cm, no artifacts were present. The soil consisted of a dark yellowish brown silt loam. No change in soil type or color was observed during excavation of the test.

A 2 m x 1 m excavation unit was then placed between the disturbed area and the Rojas house. Sn. Rojas was planning to extend his fill removal activities in this direction. The unit was excavated at 10-cm levels to a depth of 110 cm in its southern half and 120 cm in its northern half. No artifacts were encountered beyond Level 11 (100-110 cm). Only one soil stratum was evident (dark yellowish brown silt loam). Due to the lack of soil stratigraphy, no wall profiles were drawn for the unit.

Ceramics constituted the largest class of artifacts. A total of 1,738 ceramic artifacts were recovered from levels one through nine (Appendix B). Ceramic density peaked in Levels 3 (20-30 cm) and 4 (30-40 cm). Coarse, monochrome wares comprised 99% of the ceramics recovered. Other artifacts include one worked sherd; two ceramic beads; three obsidian fragments recovered from Levels 1 (0-10 cm) and 6 (50-60 cm); two worked shell pieces that may have functioned as earrings; a piece of unworked

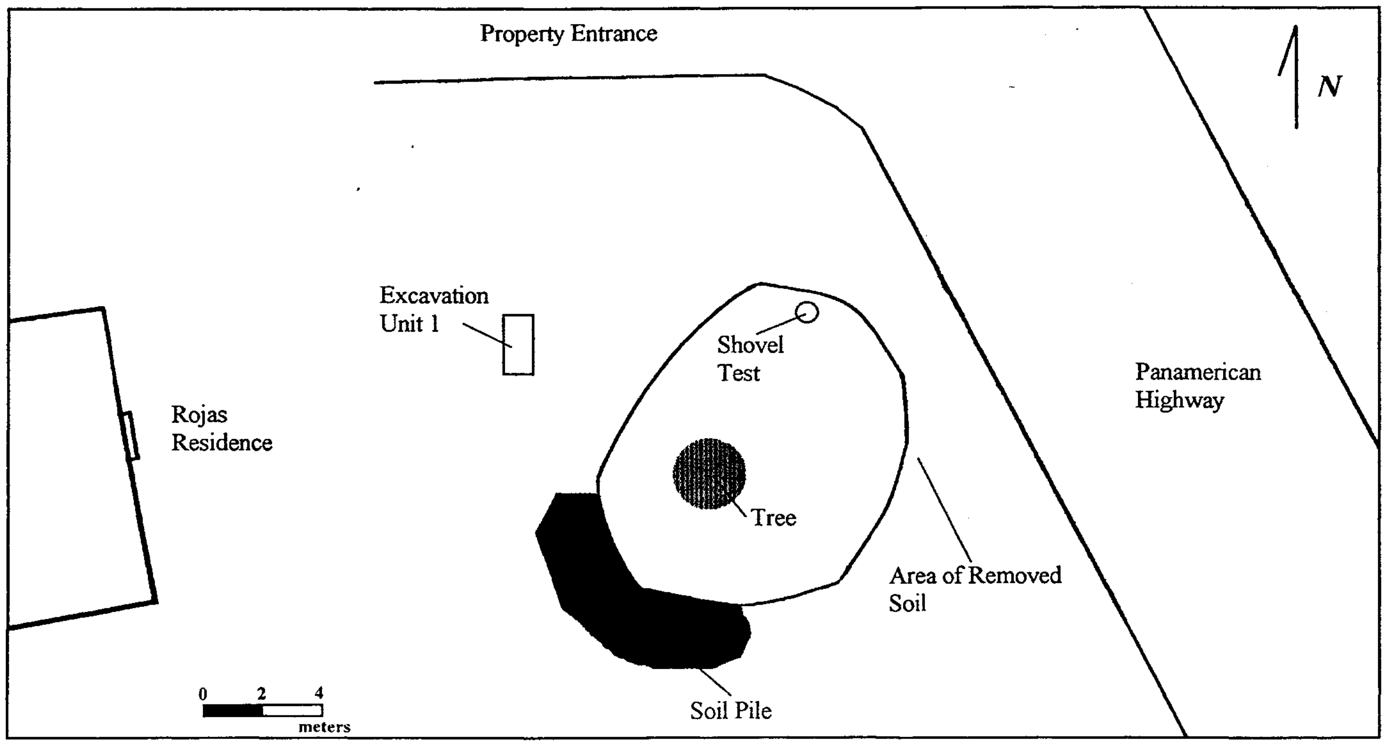


Figure 7.1. Map of the Jose Rojas site showing the location of the shovel test and Excavation Unit 1.

greenstone; one clay brick similar to those being manufactured on the property; and one square-headed cut nail (Appendix C, Appendix D, and Appendix E). Burnt clay was recovered from nearly all levels of the unit. The presence of clay and brick is not surprising given the current activities on the property. On the other hand, two pieces of burnt clay were characterized by cane (e.g., wattle) impressions. This may correlate with the piece of *bahareque* found during excavation of the shovel test and point to the existence of an earlier wattle and daub structure at this location. The recovery of imported obsidian artifacts from the site is a striking contrast to the types of ceramics that were found. In spite of this more intensive testing would be necessary to ascertain the types of activities conducted at the site.

Paco Rojas Site (Ri-19)

The Paco Rojas site is 45 ha in size and characterized by one large earthen mound in the center of the site. The mound, which has been impacted by plowing, is 1.5 to 2 m high and 20 m in diameter. Medium to high densities of surface remains are concentrated around the mound and to the east (about 30 ha in total). The remainder of the site consists of low surface densities. Three excavation units were conducted during July 1999 in the central part of the site (Figure 7.2). The majority of the surface remains at this site date to the Bagaces Period (Appendix A). The site was selected for excavation, therefore, in order to obtain artifact assemblages for comparison with later Sapoá and Ometepe Periods.

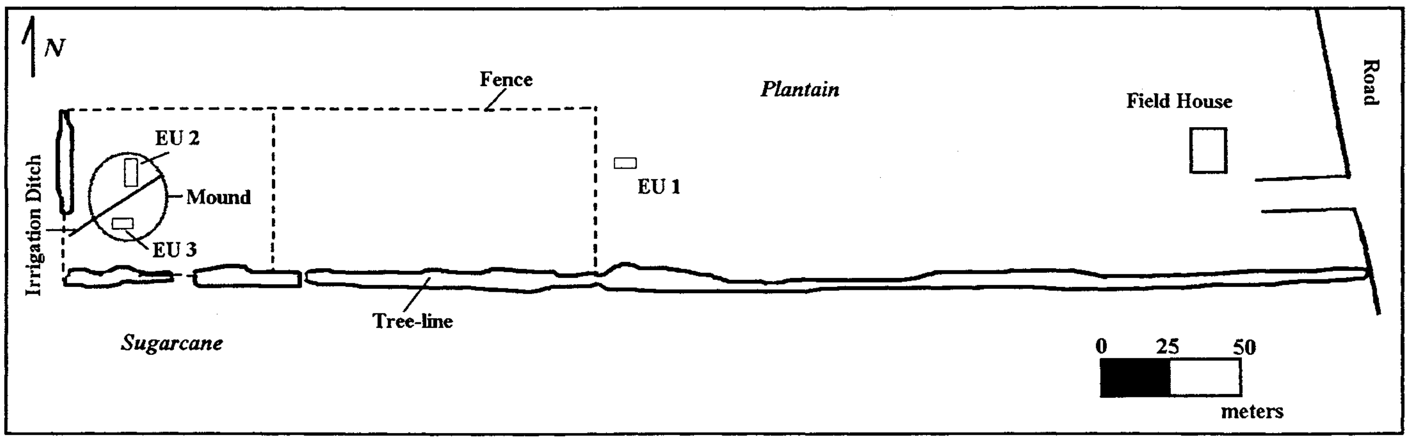


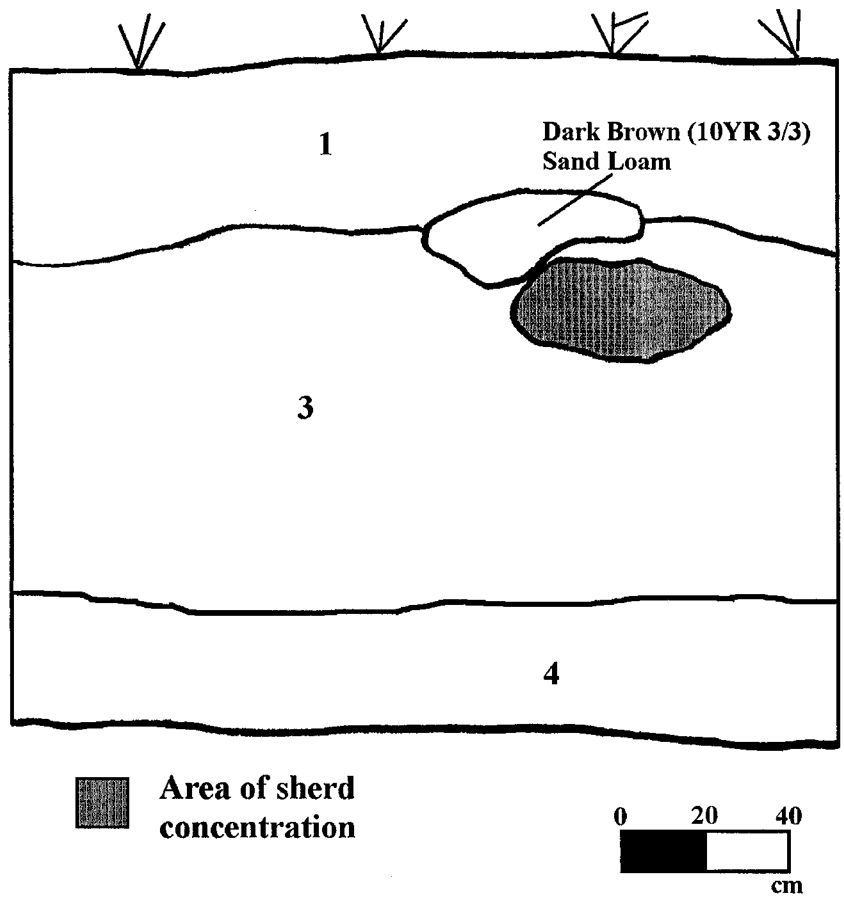
Figure 7.2. Central area of the Paco Rojas site showing the location of excavation units 1, 2 and 3.

Excavation Unit 1. This unit measured 1m by 2 m and was located approximately 200 m east of the mound on the edge of a field of banana trees (see Figure 7.2). The unit was oriented east west. Figure 7.3 provides a profile of the north wall of the unit.

Unit 1 was excavated to 165 cm below ground surface. All levels were 10 cm in depth with the exception of Level 1, which was 15 cm. No artifacts were recovered after 155 cm. Three soil strata were encountered. Stratum 1 consisted of a layer of very dark grayish brown silt loam that extended to approximately 49 cm below ground surface. Stratum 2 was dark yellowish brown silt loam from 49 to 82 cm and Stratum 3 (82-165 cm) was dark yellowish brown sand silt. In the north central part of the unit, there was a 50 cm-wide circular area of dark brown silt loam extending from 45 to 71 cm below ground surface. Immediately below this soil pocket was a sherd concentration. The association between the soil pocket and the sherds remains unclear. Pieces of modern era ceramic roofing tile were present in Levels 1 thru 3 (0-35 cm). This suggests that the plow zone at the site extends to at least to 35 cm.

A total of 6,015 ceramic sherds were recovered from Levels 1 thru 16 of the excavation unit (Appendix B). Ceramic density peaked in Level 4 (35-45 cm). Other artifacts include several ceramic earspools, one ceramic bead, one ceramic flute fragment, and 95 lithic artifacts from Levels 1 thru 16 (Appendix C; Appendix E). One hundred seventy-nine faunal fragments were recovered from the unit (Appendix D).

Excavation Unit 2. This unit measured 3 m by 1 m. It was located approximately 200 m west of Excavation Unit 1 on top of the earthen mound in the center of the site (see Figure 7.2). The length of the unit was oriented north south. The agricultural field in which the unit was located was fallow and covered with short grass. The entire unit



Stratum

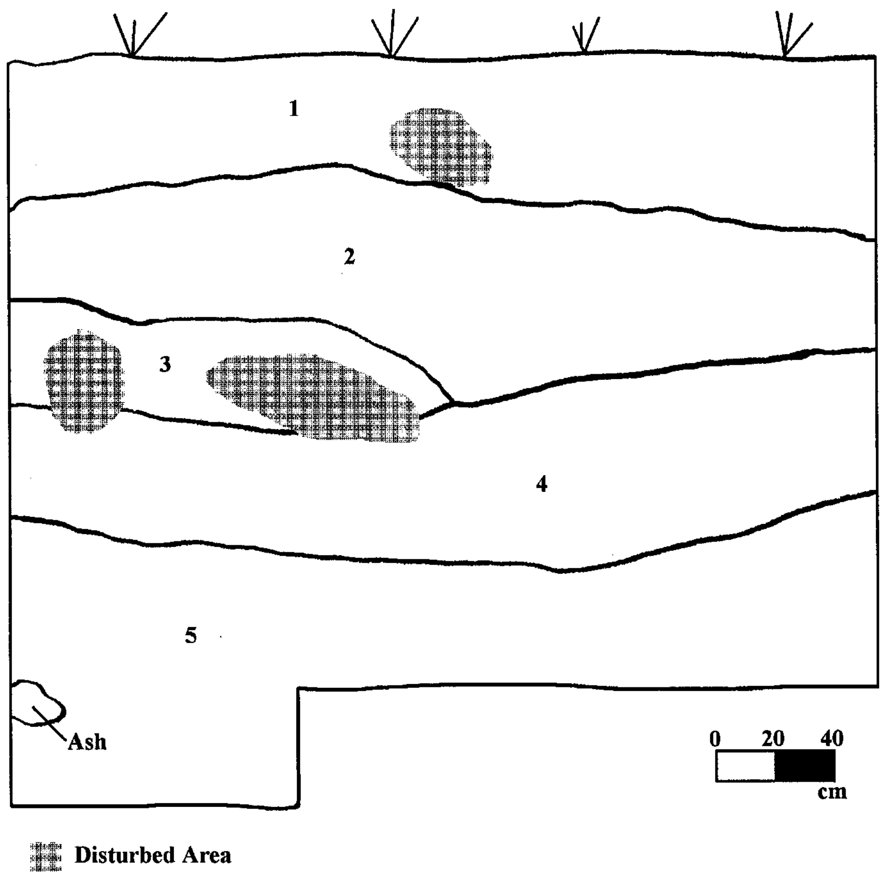
1	Very Dark Grayish Brown (10YR 3/2) Silt Loam
2	Dark Yellowish Brown (10YR 4/4) Silt Loam
3	Dark Yellowish Brown (10YR 4/6) Sand Silt

Figure 7.3. Paco Rojas site, Excavation Unit 1, north wall profile.

was excavated to 221 cm below ground surface (Figure 7.4). All levels were 10 cm in depth with the exception of Level 1, which was 20 cm. An additional 1m by 1m area in the northern part of the unit was excavated to a depth of 260 cm below ground surface. No artifacts were recovered after 221 cm. Five soil strata were encountered. Stratum 1 extended to a depth of 47 cm and consisted of dark olive brown silt loam. This was followed by a layer of brown silt loam (Stratum 2) that extended to about 103 cm below ground surface. The start of Stratum 2 probably marks the end of the plow zone within the unit. A layer of light olive brown silt loam, which was identified as Stratum 3, undercuts the northern half of Stratum 2 (see Figure 7.4). During excavation of Stratum 3, there was no noticeable change in the density of artifacts. It is not clear, therefore, if the soil stratum represents some type of disturbance. Stratum 4 consists of dark grayish brown silt loam extending from about 103 cm to 160 cm below ground surface. The final stratum excavated, Stratum 5, consists of mixture of strong brown and yellowish brown sand silt.

A concentrated area of gray ash was noted 230 cm below surface level in the northeast corner of the unit (see Figure 7.4). The ashy area was approximately 30 cm in diameter and 10 to 12 cm in thickness. It represents a burning episode of short duration located below the ground surface upon which the mound was constructed. Unfortunately, a lack of artifacts at this level prevents the attachment of cultural significance.

Excavation Unit 2 yielded the largest quantity of ceramic, lithic, and bone artifacts. A total of 25,538 ceramic sherds (Appendix B), 233 lithic artifacts (Appendix C), and 3,890 faunal remains (Appendix E) were collected. Ceramic density peaks in



Stratum

1	Dark Olive Brown (2.5 Y 3/3) Silt Loam
2	Brown (10YR 4/3) Silt Loam
3	Light Olive Brown (2.5Y 5/3) Silt Loam
4	Dark Grayish Brown (10YR 4/2) Silt Loam
5	Strong Brown (7.5YR 4/6)/Dark Yellowish Brown (10YR 3/6) Sand Silt

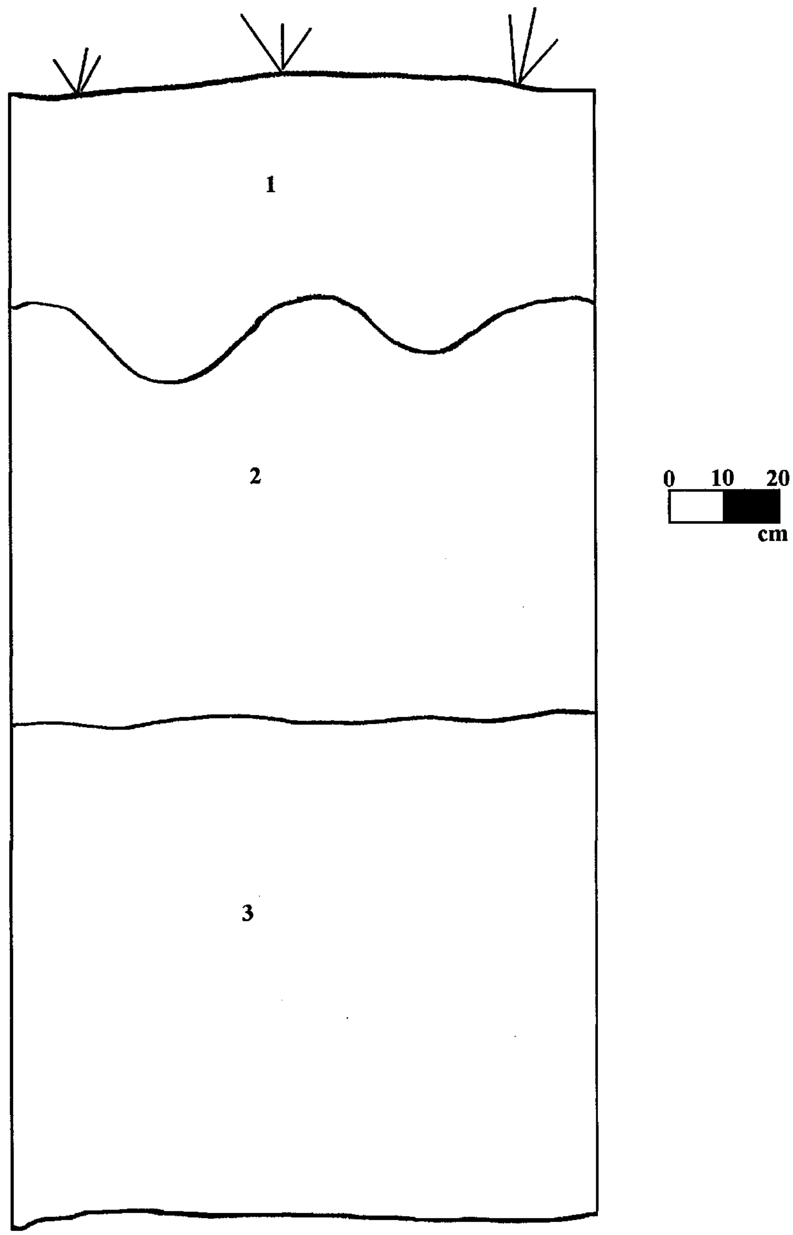
Figure 7.4. Paco Rojas site, Excavation Unit 2, east wall profile.

Level 2 (21-31 cm). Other artifacts included numerous ceramic earspools, worked sherds, and burnt clay (Appendix D). Three carbon samples were selected from this unit to submit for radiocarbon dating (Appendix F).

During excavation of the unit, local residents systematically removed all ceramic sherds showing in the wall profiles at night (see Disturbed Areas, Figure 7.4). The sherds were found the next morning in a pile alongside the open unit.

Excavation Unit 3. This unit was located approximately 20 m to the south of Excavation Unit 2 on the periphery of the mound (see Figure 7.2). The unit measured 1 m by 2 m and was oriented east west. Artifact density was comparatively less than the other units at the site and excavation ceased at a final depth of 175 cm below ground surface. A total of 3,733 ceramic sherds and 22 lithic artifacts were recovered from Levels 1 through 16 (Appendix B; Appendix C). Other artifacts include several ceramic earspools, worked sherds, and one fragment of burnt clay (Appendix E). No faunal remains were encountered. No artifacts were present below a depth of 160 cm.

Three soil strata were encountered (Figure 7.5). Stratum 1 extended to a depth of approximately 51 cm below ground surface and consisted of dark brown silt loam. The stratum profile is undulating, which may reflect agricultural crop furrows. Stratum 2 consisted of dark brown silt loam and extended to a depth of 118 cm below ground surface. Large chunks of yellowish brown sand loam inclusion were present. Stratum 3, which was dark brown sand silt, comprised the remainder of the unit. This stratum was mottled with yellowish brown sand inclusions.



Stratum
1 Dark Brown (7.5 YR 3/2) Silt Loam
2 Dark Brown (10YR 3/3) Silt Loam. Mottled with Yellowish Brown (5YR 5/8 Sand Loam chunk inclusions.
3 Dark Brown (10YR 3/3) Sand Silt. Mottled with Yellowish Brown (10YR 5/4) sand.

Figure 7.5. Paco Rojas site, Excavation Unit 3, west wall profile.

Santa Isabel (Ri-44)

The Santa Isabel site is the largest in the region, with an area of approximately 320 ha. The site has two areas of high-density surface remains (Figure 7.6). The areas date to different points in time, corresponding to Healy's (1980: 49-64) Santa Isabel "A" and "B". Santa Isabel "B" dates to the Bagaces Period (AD 300-800) and covers approximately 70 ha in the northwestern section of the overall site. The second nucleated area, Santa Isabel "A", dates to the Sapoá and Ometepe Periods (AD 800 to the Spanish Conquest). It is located to the east of the earlier center and covers a 90-ha area near the lakeshore. The rest of Santa Isabel extends largely to the south and is a mixture of medium- and low-density surface remains. A similar distribution of surface remains is recorded for the Ayala site in Granada (Salgado 1996a). Salgado (1996a:160) interprets this distribution as "representing, during certain periods, that of a village with a nucleated residential area surrounded by agricultural fields."

Sapoá- and Ometepe-period components at Santa Isabel Site cover an area of 271 ha. The center of the site is also characterized by at least 10 low mounds, 2 to 6 m in height and up to 50 m in diameter (Figure 7.7). All of the mounds have been impacted by agricultural activities and some are probably larger than their initial dimensions. The mounds may have been arranged around an open plaza. The remainder of the site extends to the east and south. Mounds do not characterize other Rivas sites dating to the same time period. Santa Isabel, therefore, has obvious potential for exploring social and political changes occurring during the post migration period.

In 1959 and 1961, Willey and Norweb excavated eight stratigraphic test pits at the Santa Isabel Site (see Figure 7.7). Healy (1980: 49-64) reports the results of their

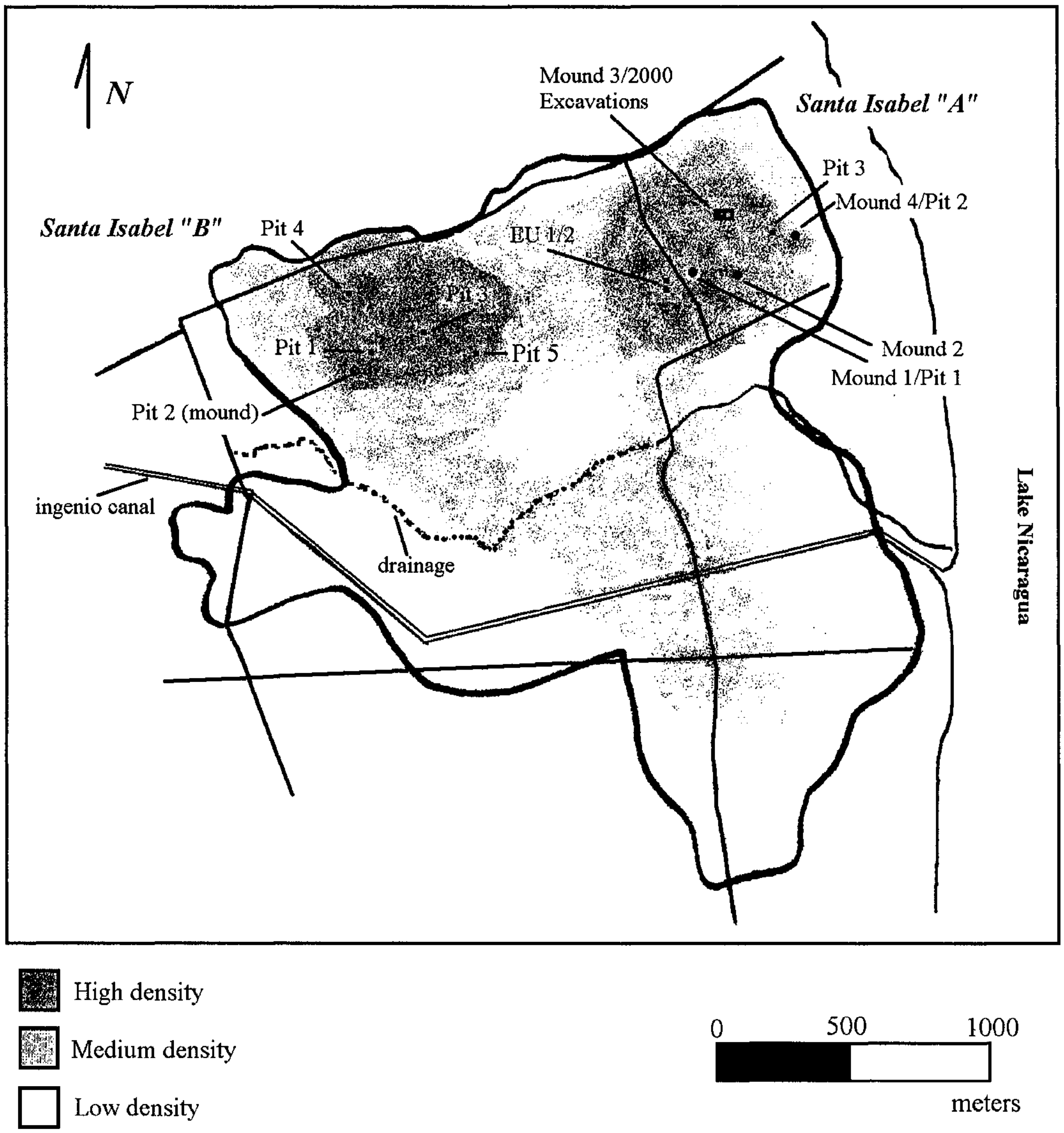


Figure 7.6. The Santa Isabel site showing distribution of surface artifact densities and location of test excavations.

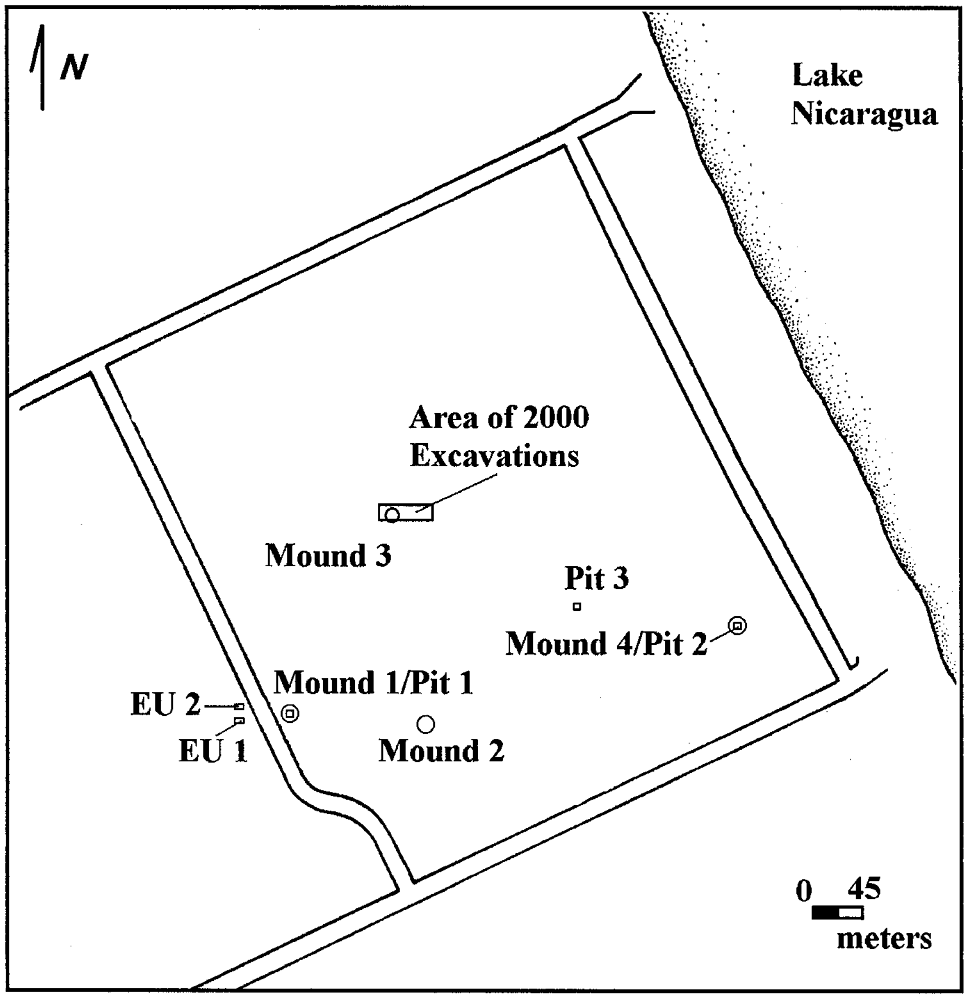


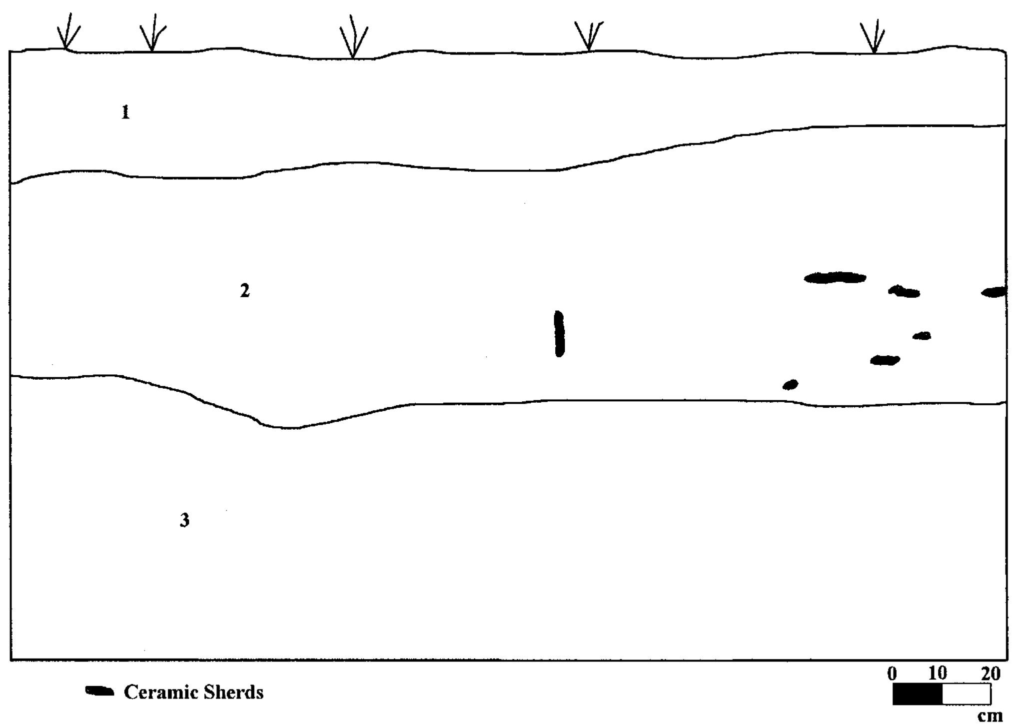
Figure 7.7. Santa Isabel “A” showing areas of excavation.

investigations. In July 1999, two excavation units were placed in a banana field approximately 50 m west of their Mound 1 (see Figure 7.7). Permission was not granted to excavate closer the mounds. However, the following year, a series of 65 shovel tests and five 1-m x 1-m excavation units in a fallow field approximately 50 m by 120 m that included their Mound 3 (see Figure 7.7).

Excavation Unit 1. Excavation Unit 1 measured 2 m by 1 m and was oriented east-west. Three soil strata were encountered (Figure 7.8). Stratum 1 extended to a depth of 21 cm and consisted of black silt loam. Stratum 2 was a layer of very dark brown sit loam extending to a depth of 67 cm below ground surface. The third stratum consisted of dark brown silt sand. The unit was excavated to a final depth of 120 cm. A total of 4,369 ceramic sherds (Appendix B) and 410 lithic artifacts (Appendix C) were recovered. Additional artifacts were limited to one worked sherd and one ceramic bead (Appendix F). Ceramic density peak in Levels 5 (40-50 cm) thru 7 (60-70 cm). One carbon sample was collected from Level 8 (70-80 cm) for radiocarbon dating (Appendix F).

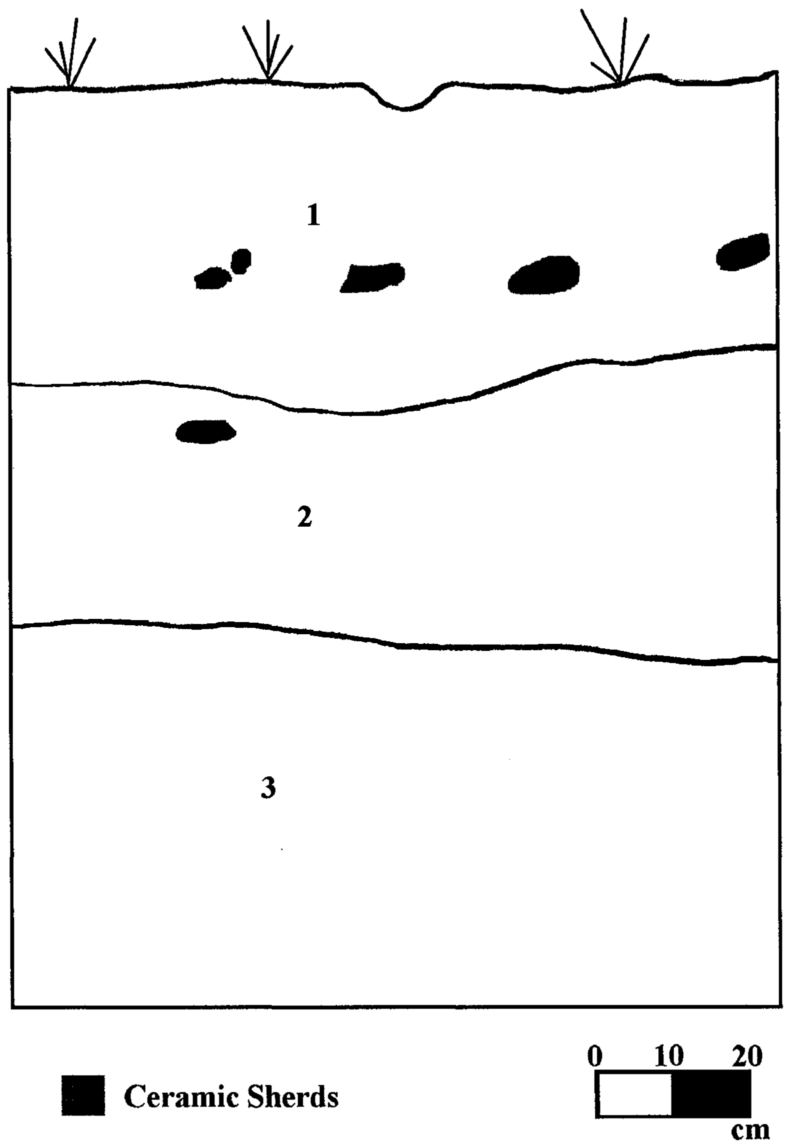
Excavation Unit 2. This unit was located 20 meters to the north of Excavation Unit 1 (see Figure 7.7). The unit measured 2 m by 1 m and was excavated to a final depth of 120 cm below ground surface (Figure 7.9). Artifact density was lower than that of Excavation Unit 1. Soils were consistent. A total of 3,482 ceramic sherds (Appendix B) and 79 lithic artifacts (Appendix C) were recovered. Other artifacts include several worked sherds, earspools, and one piece of *bahareque* (Appendix E).

2000 Excavations. In July and August 2000 excavations were continued at Santa Isabel "A". The excavations were conducted in collaboration with Geoffrey McCafferty



Stratum
1 Black (10YR 2/1) Silt Loam
1 Very Dark Brown (7.5YR 2.5/2) Silt Loam
2 Dark Brown (10YR 3/3) Silt Sand

Figure 7.8. Santa Isabel site, Excavation Unit 1, north wall profile.



Stratum
1 Black (10YR 2/1) Silt Loam
2 Very Dark Brown (7.5YR 2.5/2) Silt Loam
3 Dark Brown (10YR 3/3) Sand Silt

Figure 7.9. Santa Isabel site, Excavation Unit 2, west wall profile.

of the University of Calgary. A total of 65 shovel test pits were excavated at 10-meter intervals in a fallow field of about 50 m by 120 m that included Healy's described Mound 3 (see Figure 7.7; Figure 7.10). The field was bounded on its western side by an earthen cart track. Beginning in the southwest corner of the field, grid lines were numbered from N0 to N40 on the north-south axis, and from E0 to E120 on the east-west axis. Shovel tests were excavated to maximum depth of 100 cm below ground surface. Mound 3, approximately 50 meters by 50 meters in size, was located in the southwest corner of the grid. Roughly 10 meters of its longer east-west length was truncated by the cart track.

A preliminary examination of the cultural materials recovered from the shovel tests indicated a high concentration of artifacts upon the mound itself and a sharp fall-off in material moving away from the mound. Four excavation units measuring 1m x 1m were opened for excavation upon or on the edges of the mound in locations that appeared to feature significant concentrations of artifacts. These units were designated in the same way as the shovel tests (e.g., N10E30, N20E30, N30E10, and N30E40). Three of the units, N10E30, N20E30, and N30E40, were later extended an additional meter in order to explore features. The unit extensions are N11E30, N20E31, and N30E41. A fifth 1 m x 1 m unit (N16E16) was also placed on the approximate center of the mound, in an area that had been missed by the 10-m shovel test grid. All of the units were excavated in 10 cm levels with the exception of the first level. This level ranged from 10 to 20 cm in depth. The soil of Mound 3 was dark brown (10YR 3/3) sand silt. The soil was generally consistent through all levels. As a result, the individual units could not be correlated on the basis of soil stratigraphy.

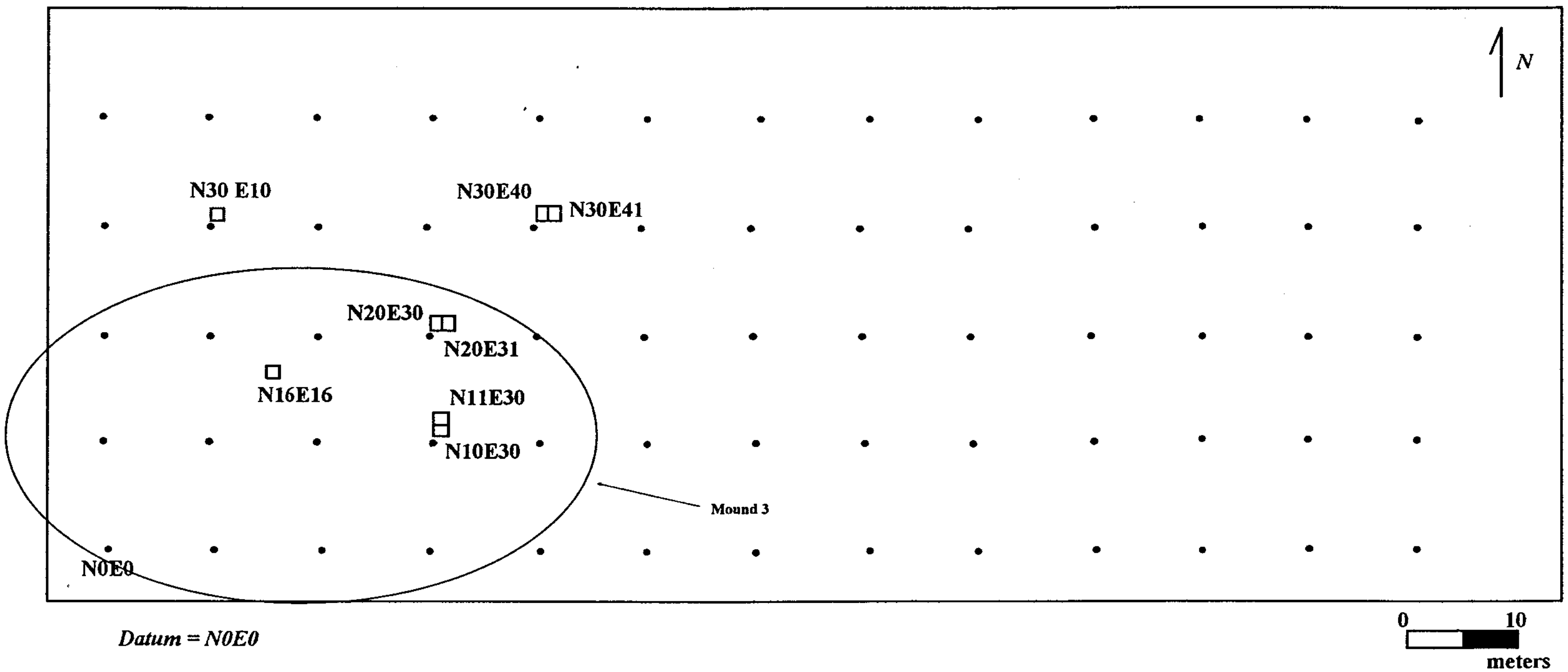


Figure 7.10. Santa Isabel "A" showing locations of the excavation units and shovel tests conducted during 2000.

One feature encountered during excavation consisted of irregular, consolidated grayish sand identified in units N10E30 and N11E30. The sand first appeared in the northwest corner of Unit N10E30 at a depth of 70 cm below ground surface and may represent a potential living surface. This surface sloped to a depth of 100 cm in Unit N10E30 and a depth of 94 cm in Unit N11E30. Excavation was terminated in the units in order to leave the surface intact for future excavation. Deposits of incongruous yellowish brown earth, up to 40 x 30 cm in size, were found in the levels above the consolidated layer. The deposits were interpreted as remnants of eroded *bahareque*. Similar concentrations of consolidated gray sand and *bahareque* were found on the top of the mound in Unit N16E16. The gray sand was encountered beginning at a depth of 50 cm and the *bahareque* started at 78 cm below ground surface. Consolidated sand material also formed a surface that covered the entire southern half of Unit N16E16, Level 9 (96-105). Unfortunately, time constraints prevented further excavation within the unit.

The deepest units were N20E30 and its extension, N20E31, located on the eastern side of the mound (see Figure 7.10). In both units, excavation terminated at a depth of 217 cm below ground surface. Although artifact density diminished greatly, sterile soil was not reached in either unit. The large concentration of diverse materials (e.g., ceramic, lithic, and faunal remains) from these units suggests that they may have been located on a midden. Concentrations of possible *bahareque* were present in both units between 87 and 97 cm (Level 9) in depth. No consolidated sand layer like that found on the top and southeast side of the mound was encountered. The soil in Levels 10 thru 13 (97-137 cm) of both units was very compact and could represent an analogous walking surface. The soil underlying this compact layer was very damp. This evidence, although limited, suggests that Mound 3 was constructed of earth and trash and then faced with *bahareque*. Evidence for similar construction techniques has been recovered at contemporaneous Central Mexican sites, such as Cholula (Geoffrey McCafferty, personal communication 2002).

In total, the excavations conducted at Santa Isabel in 2000 recovered 32,696 artifacts. The artifacts included 12,409 ceramic sherds (Appendix B), 1,400 lithic artifacts (Appendix C), 8,466 faunal fragments (Appendix D), and 182 miscellaneous objects (Appendix E).

El Brújo (Ri-48)

The El Brújo site extends approximately 99 ha over the summit of the two hills known as "Lomas del Brújo" on the northern side of the Río Ochomógo (Figure 7.11). Low to medium surface remains dating to the Sapoá and Ometepe Periods characterize the site area. The site was selected for test excavations based on its location and limited surface components. As noted in Chapter 2, the Río Ochomógo served as the border between the Nicarao and the Chorotega to the north. The occupation of a site in this location raises questions of its ethnic affiliation, relations to areas to the north and south, and whether it could have served a defensive function. Seven test excavations were conducted in June 1999 (see Figure 7.11). Unfortunately, artifact preservation was very poor. The soil strata were also shallow and bedrock was often reached at a depth of 50cm. One foundation of a structure was uncovered during excavation of Unit 5.

Excavation Unit 1. Excavation Unit 1 was located at N11°41'171", W085°54'697", ± 35.4 between the two highest hills of the site (see Figure 7.11). The

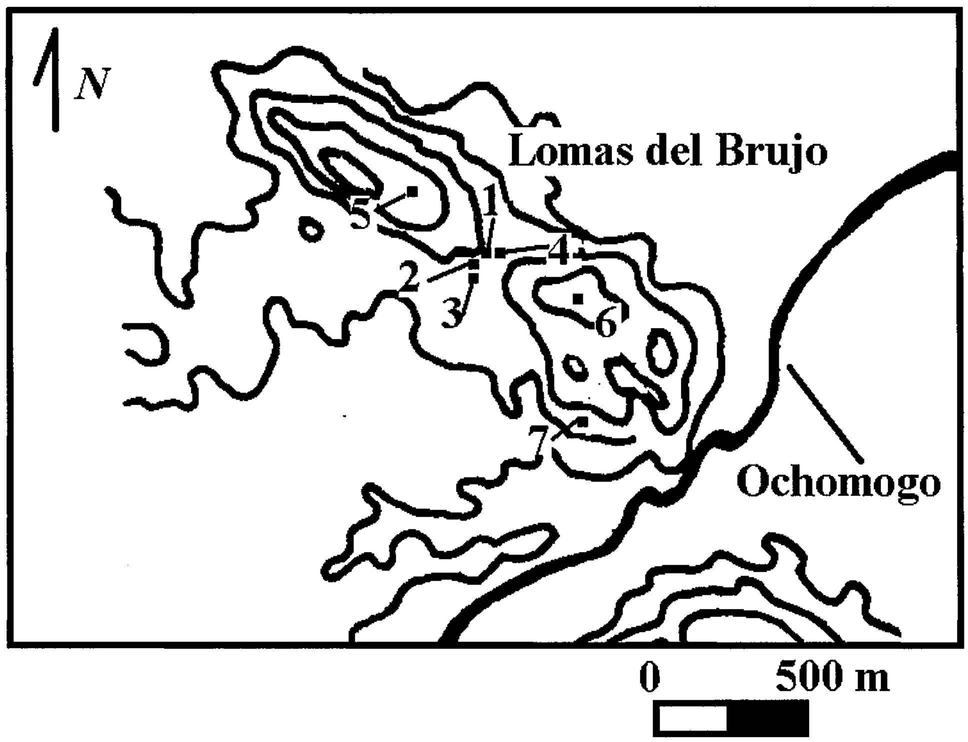


Figure 7.11. The El Brújo site showing the location of Excavation Units 1 through 7.

unit was exploratory in order to better understand the components at the site. It was oriented 290° from magnetic north and measured 1m by 1m.

The unit was excavated in 10 cm levels until a final depth of 70 cm below ground surface. Two soil strata were encountered. Stratum 1 consisted of a layer of very dark grayish brown silt loam that extended to a depth of 30 cm. The second stratum was dark grayish brown silt loam. A total of 46 ceramic sherds, 1 chert core fragment, and 1 chert shatter fragment were recovered from the unit (Appendix B; Appendix C). The majority of the artifacts were found in Stratum I.

Excavation Unit 2. This unit was located 30 meters southwest of Unit 1 and measured 3 meters by 1 meter (see Figure 7.11). The unit was oriented north-south. Level 1 was excavated to a depth of 15 cm below ground surface and consisted of a layer of weak red silt loam. The level terminated at a soil change. A very low density of artifacts was recovered (10 in total). Level 2 (15-25 cm) consisted of brown silt loam with few artifacts. No further cultural material was encountered after 25 cm. Unit excavation terminated at 50 cm below ground surface. Artifacts were limited to ceramic sherds; a total of 11 were recovered from the unit (Appendix B).

Excavation Unit 3. This unit was located 10 meters to the south of Excavation Unit 2 and also measured 2 m by 1 m (see Figure 7.11). The unit was oriented east west. The first level was excavated to a depth of 30 cm below ground surface. One fragment of *bahareque* and 20 ceramic sherds were encountered (Appendix B; Appendix E). Excavation continued to a depth of 50 cm without further cultural materials. Soil color and texture was consistent with Excavation Unit 2.

Excavation Unit 4. This unit was located 20 meters east of Excavation Unit 1 and measured 2 m by 1 m north south (see Figure 7.11). Level 1 extended to a depth of 20 cm below ground surface. A total of 345 ceramic sherds were encountered (Appendix B). One of the sherds had been notched (Appendix E). No artifacts were encountered after this depth. Excavation was terminated at 50 cm below ground surface. Soil color and texture was consistent with Excavation Unit 2.

Excavation Unit 5. This unit was situated northwest of the previous units, at the summit of the northernmost hill of the site (see Figure 7.11). During survey of the site, two perpendicular lines of stone were observed on the surface (Figure 7.12). The unit was designed with several sub-sections to explore this feature. Sub-unit 5-A measured 2m by 2m and had a section of the line of stones in its northwest. From Sub-unit 5-A, the excavation was extended to parts B, C, D, and E. Sub-unit B measured 3m by 1 m; Sub-unit C measured 2 m by 1 m; Sub-unit D measured 2 m by 1.5 m; Sub-unit E measured 1 m by .5 m; and Su-unit F measured .5 m by .5 m.

The soil encountered in Unit 5 was very shallow and excavation proceeded in only two levels: Surface-15 cm, and 15 cm –25 cm. A total of 62 ceramic sherds were recovered from the unit. Soils were consistent with Excavation Unit 2. Although the preservation was very poor, the line of stone appeared to be the foundation of a small structure (Figure 7.13). One complete ceramic urn (type Sacasa Striated) was found at a depth of 22 cm below surface. After completion of the rest of the unit, the urn was excavated. It extended an additional 35 cm to 57 cm below surface level. A fragment of human molar identified as belonging to a juvenile and a small, Sacasa Striated jar with a Tlaloc-like effigy face on both ends were inside the urn (Figure 7.14). Tlaloc, the Central

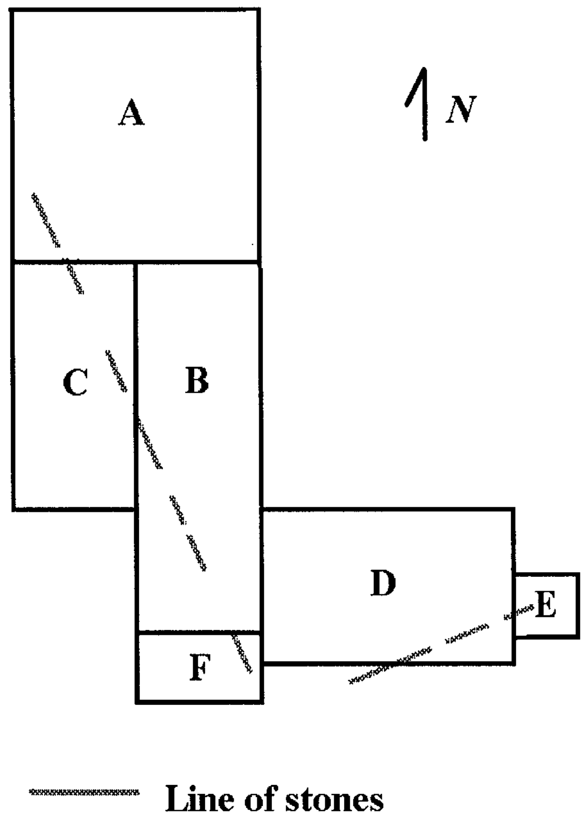


Figure 7.12. Plan view of El Brújo Excavation Unit 5 showing excavation sub-sections.

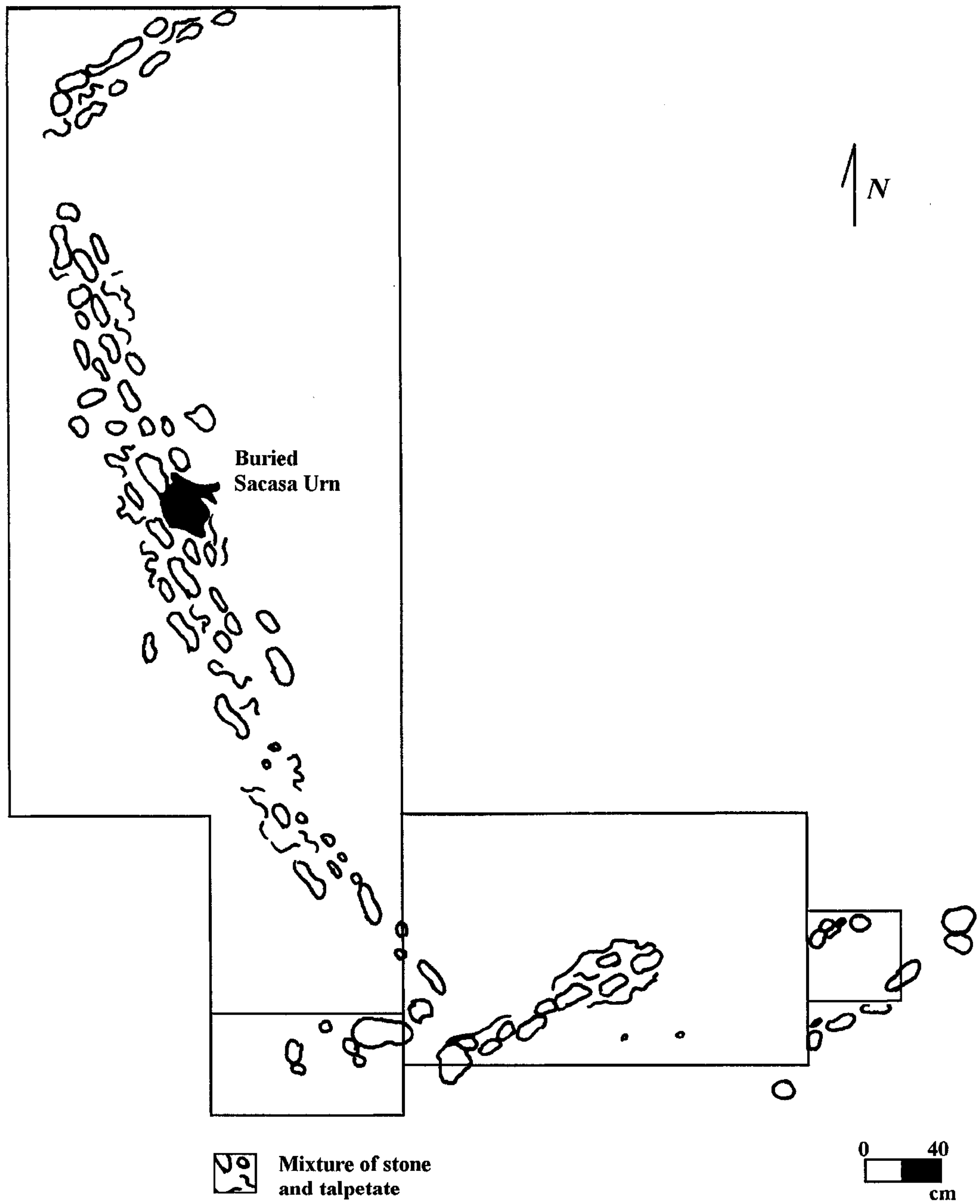


Figure 7.13. El Brújo site, Excavation Unit 5, ending level.

Figure 7.14. Effigy vessel recovered from the El Brújo site, Excavation Unit 5.

Mexican rain deity, was often depicted by concentric rings representing eyes, an upper lip turned up at the corners, and two long fangs at the sides of the mouth (Pasztory 1974).

Excavation Unit 6. This unit measured 1m by 1m. It was located on the summit of the southernmost hill at the site 600 m southeast of Excavation Unit 4 (see Figure 7.11). The unit was excavated to a final depth of 50 cm below ground surface. A low density of ceramic material was noted in the first level (0-20 cm). The soil was weak red silt loam. Level 2 (20-30 cm) had a moderate amount of ceramics, which dropped off again in Level 3 (30-40). No cultural material was recovered from Level 4 (40-50 cm). A soil change was encountered in the final level: reddish brown silt sand, which corresponded to *talpetate* or bedrock. A total of 810 ceramic sherds, one utilized chert flake and five chert shatter fragments were recovered (Appendix B; Appendix C)

Excavation Unit 7. This unit was located at the base of the southern hill, on the southwestern periphery of the site (N11°40'991", W085°54'688") (Figure 7.11). The unit was oriented north south and excavated to a final depth of 40 cm below ground surface. A total of 37 ceramic sherds were recovered from the first two levels (0-25 cm). Soils consisted of a layer of very dark grayish brown silt loam followed by dark grayish brown_silt loam. The change in soil occurred at approximately 30 cm below surface level. No artifacts were present after 25 cm.

Summary

Four sites were selected for test excavations between 1999 and 2000 (e.g., Jose Rojas, Paco Rojas, Santa Isabel, and El Brújo). A total of 21 excavation units and 66 shovel tests were conducted. Some differences in preservation were evident among the sites. Soils at El Brújo, for example, were shallow and leached, with resultant poor artifact preservation, while plowing had disturbed the uppermost strata at the Paco Rojas and Santa Isabel sites. The recovered artifact assemblages were otherwise considered relatively intact. All of the excavations units were situated in the central portions of the sites based on their surface remains with the exception of one unit at El Brújo. The recovery of cultural deposits of least two meters in depth from Paco Rojas and Santa Isabel confirms that the mounds at these sites were manmade. The components excavated at each site dated variously from the Tempisque through Ometepe Periods and are reflective of the materials found on the surface in the immediate vicinity of the excavations (see Table 7.1). Over 79,800 ceramic, lithic, and faunal artifacts were recovered as a result of the test excavations. The analysis of these materials is discussed in Chapters 8 and 9.

CHAPTER 8
THE CERAMIC ARTIFACTS

The analysis of the ceramic materials recovered during survey and excavation aimed to establish complexes reflective of both chronological and spatial variation. Spatial variation, in particular, is integral to inferences regarding social organization (Joyce 1991). Since any classification system has its relative advantage or disadvantages, the system used should be selected based upon the research goals. The type:variety classification system is well suited to discerning differences among ceramic assemblages and was used for this analysis. This approach has also frequently been used in Mesoamerica and in other regions of Greater Nicoya (Baudez 1967; Bonilla et al. 1987; Day 1994; Healy 1980; Hoopes 1987; Lange et al. 1984; Salgado 1996a). This chapter discusses the analysis and principal aspects of the Rivas ceramic complexes. Several types of ceramic artifacts, which included figurines, ocarinas, beads, pendants, earspools, spindle whorls, reworked sherds, and complete vessels were analyzed separately and are discussed in Chapter 9.

The Analysis of Rivas Ceramics

Any classification system at its simplest is a grouping of similar entities (Rice 1987:274). The goal of classification is to have high similarity within groups and a high dissimilarity between groups (Rice 1987:274). In pottery, commonly used attributes are color, thickness, surface treatment, form, and decoration (Rice 1987:275). An infinite number of attributes can theoretically exist so it is always necessary to limit the number of attribute categories used for classification. Different types of classification systems result from different relationships between groupings (e.g., hierarchical, equivalent and unordered, nonequivalent and ordered) (Rice 1987:276). The type:variety approach is a taxonomic classification system with a hierarchical structure in which varieties are the smallest unit recognized and are subsumed within ceramic types (Sabloff and Smith 1969). One or more types comprise a ceramic group, which is usually identified by a consistency in form and color; ceramic groups are subsumed into wares, which are defined by consistency with respect to gross technological characteristics, mainly surface finish and paste composition (Sabloff and Smith 1969).

The type-variety approach was first used within the Greater Nicoya subarea beginning during the 1960s (e.g. Baudez 1967; Coe and Baudez 1962). As implemented, the approach centered on the type and its varieties, which differed from the general focus on the ceramic group within Mesoamerican ceramic studies (Braswell et al. 1994; Hoopes 1987; Lange et al. 1992). Ceramic types are "usually distinguished on the basis of combinations of decorative, shape, technical, and design modes and are named after decorative modes such as slip, color, and surface manipulation" (Sabloff 1975:3). Surface and decorative treatments, in particular, are thought to be less reflective of technological and functional constraints, and more a cultural product (Gifford 1976). These ceramic features are, therefore, useful as an informal focus of categorization and identification.

The range of variation within a type always includes that of its varieties, recognized by one or a small number of attributes, and differs from the variety by the scope of its specific internal attributes (Gifford 1976). One disadvantage to focusing on the attribute cluster in defining a type and its varieties is that it masks variability (Beaudry-Corbett, Henderson, and Joyce 1993). Since attributes are not objectively chosen in systematic ways across types, any attribute not considered significant by the analyst is simply overlooked. Once the attribute cluster is "solidified", these attributes may become irrelevant in future identifications and makes the exact similarities or differences between ceramic types difficult to observe.

Healy (1974, 1980) substantially refined the ceramic types for the Rivas area. He also sorted the types into ceramic groups, wares, complexes, and spheres, and incorporated elements of modal analysis. In particular, he identified 15 ceramic decorated modes, a term used to describe an attribute such as a rim form, appendage, or decoration that occurs across types and varieties (Healy 1980:Table16). Modes are generally used to define ceramic phases or horizon styles and can also aid in the chronological placing of ceramic types that have not been previously described (Sabloff 1975).

Subsequent Greater Nicoya ceramic studies did not follow Healy's example and classification remained focused on the type and variety, avoiding the potentially useful placement of types into ceramic groups, wares, or other categories. While the NAA studies conducted during the 1980s, which examined 1,200 ceramic sherds from across Greater Nicoya, suggested the existence of ceramic production zones (e.g., Bishop et al. 1988), the analysis of ceramic wares, in particular, would allow further inferences about ceramic production techniques, location, organization, and trade distribution patterns. Regardless of the shortcomings of the type:variety approach as it has been used in Greater Nicoya, the standard ceramic typology continued to be refined in the 1980s and 1990s and has played an important role in chronology building (e.g., Bonilla et al. 1987; Day 1984; Hoopes 1987; Lange et al. 1992; Niemel et al. 1998; Salgado 1996a). In order to maintain comparability with previous research in Greater Nicoya, the type:variety approach was also used as the basis for this analysis.

The specific combination of factors influencing the categorization of ceramics in any given situation typically results in at least a slightly customized classificatory scheme. In terms of this study, the poor preservation of sherds collected from surface contexts was a factor. Therefore, it was helpful during classification to incorporate Healy's 15 ceramic modes as well as two additional ones. The first mode is a grooved rim found in combination with a red (10R 5/6) to maroon (10R 4/6) slip, which is characteristic of Bagaces Period ceramics (Figure 8.1). Ceramic types characterized by this mode include Rivas Red, Tola Trichrome, Chavez Red-on-White, and León Punctate.

The second mode is a particular paste color characteristic of Ometepe Period ceramic types. The paste ranges from a dusky red (2.5YR 3/2) to dark reddish brown (2.5YR 3/4), which results from a high ferrous content. It is distinct from the paste of ceramics such Papagayo Polychrome, which was first produced during the preceding Sapoá period. Ceramic types characterized by this mode include Madeira and Bramadero polychromes.

The ceramic data recovered during excavation is presented in Appendix B. Over 46,000 sherds were classified by type and variety. Due to time constraints, only polychrome and decorated rim sherds were analyzed during the 2000 field season. These were considered to be more diagnostic and useful for subsequent ceramic analysis. Ceramic body sherds were counted and then set aside. In 2001, Larry Steinbrenner, a graduate student from the University of Calgary, sorted the monochrome rim sherds

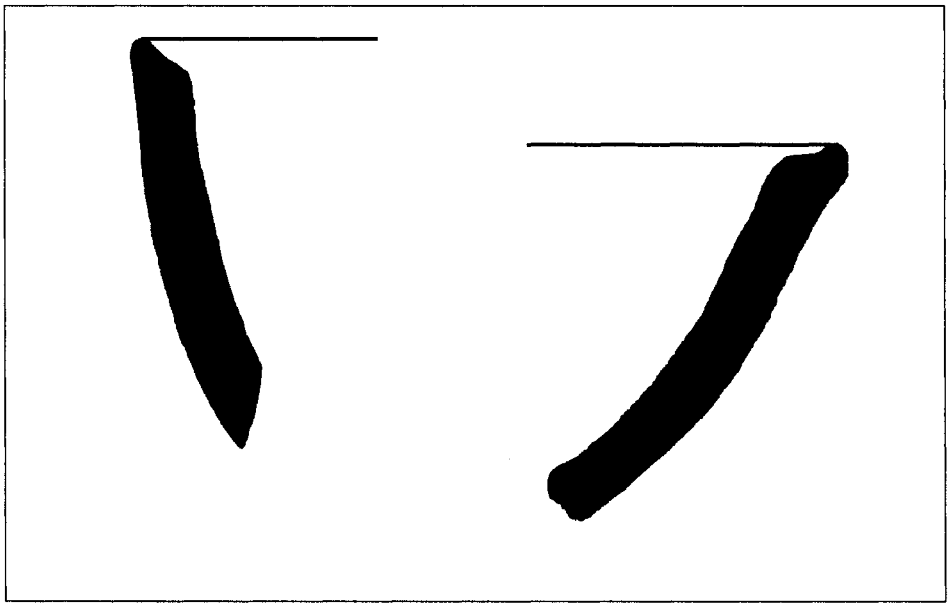


Figure 8.1. Grooved rim profiles dating to the Bagaces Period.

according to type and vessel form. The analysis forms the basis for his master's thesis. The ceramic data from the 2000 excavations at the Santa Isabel Site in Appendix B reflects rim sherd counts only. To maintain comparability, rim sherd data is also provided for Units 1 and 2 conducted at the site in 1999.

The Ceramic Sequence

Discussion of the Rivas ceramic sequence draws primarily the work of Baudez (1967), Day (1984), Haberland (1992), Healy (1980), Lange (1971), and Salgado (1996a, 1996b). Other publications that discuss Greater Nicoyan ceramics include Bonilla et al. (1990), Hoopes (1987), Lange et al. (1992), and Sheets and McKee (1994). In addition to describing chronological changes, the distribution differences of ceramic types are explored. Table 8.1 presents the main diagnostic types by phase and period recovered during survey and excavation. Only general characteristics are mentioned since the ceramic types have been previously described (see Bonilla et al. 1987; Healy 1980). Illustrations of select main types are included to provide a general idea of their surface features.

Phase divisions are based on Healy's (1980) Rivas sequence, a refinement of the ceramic sequence by Salgado (1996a, 1996b), and subsequent modifications proposed by Niemel et al. (1997). Modifications proposed by Niemel et al. (1997) apply to the last phases before contact. Healy originally divided the period from AD 1200-1522 into two phases, Las Lajas (AD 1200-1350) and Alta Gracia (AD 1350-1522). Niemel et al. (1997:677) argue that the difficulty in identifying later period components in many

Table 8.1. Ceramic Types of the Regional Sequence.

Date	Period	Rivas (Healy 1980)	Granada (Salgado 1996)	PHASE*	Diagnostic Types	Comments
1500	Ometepe	Alta Gracia	Xalteva	**LAS LAJAS**	Vallejo; Madeira; Combo; Castillo, Ometepe; Bramadero; Banda. Luna marks latter part of phase	Some continuity from previous phase including Sacasa, Papagayo, and Pataky.
1400						
1300		Las Lajas				
1200						
1100	--------	La Virgen	Cocibolca	**LA VIRGEN**	Pataky; Mora; Papagayo:Manta, Sacasa	Mombacho appears.
1000	Sapoá					
900		Apompua	Ayala	**PALOS NEGROS**	Delírio; Tenampúa; Momta Papagayo Culebra appears at end of phase	Velasco and Chavez decrease. Tola and Galo:Belo appear to peak.
800						
700	Bagaces	Palos Negros	San Antonio	**SAN ROQUE**	Rosalita	Charco and Espinoza overlap. Tola, Chavez, and Potosí appear.
600						
500						
400		San Roque				
300						
200	Tempisque	San Jorge	Sui	**SAN JORGE**	Charco:Puerto; Puchor; Obando; Huila	Espinoza Red-banded and Usulután-related ceramics peak.
100						
0						
100		Aviles	?	**AVILES**	Rosales Engraved; Schettel;	Usulután-related ceramics are present. Bocana may reflect earlier Orosí Period or date to this phase
200						
300		-----------		---------		
400						
500						

*Proposed phase divisions.

regions of Greater Nicoya stems partially from Healy's decision to combine materials from mainland Rivas sites with those of Ometepe Island. In particular, the Alta Gracia Phase is defined primarily by the presence of Luna Polychrome, which is common only on Ometepe, and the continuity of most types appearing in Las Lajas (e.g. Madeira Polychrome, Vallejo Polychrome and Castillo Engraved). Niemel et al. (1997) argue that the Alta Gracia Phase reflects local development on the island and that the Las Lajas Phase be extended to the end of the pre-contact period for main land sites (Niemel et al. 1997:679).

Consideration of the recent research conducted by Salgado (1996a, 1996b) resulted in proposed modifications to phases corresponding to the Bagaces Period and the early part of the Sapoá Period (e.g., San Roque, Palos Negros, and Apompua phases). The modifications correlate the Rivas sequence with the Granada sequence. This change updates the ceramic sequence with research that has been undertaken in adjacent regions since Healy's original 1974 analysis.

The ceramic sequence begins with the Aviles Phase, which dates from approximately 300 BC to 0 AD. It is probable that Bocana Incised Bichrome, which was identified at 13 sites within the study area (see Table A.1), dates prior to this period. Bocana is characterized by grooved, vertical incisions combined with red slipped zones on beige to orange unslipped surfaces (Figure 8.2) (Hoopes 1987:347). Unfortunately, the ceramic was recovered only from surface contexts.

In other areas of Greater Nicoya, Bocana has been dated variously from 800 BC through 0 AD (Haberland 1992; Hoopes 1987; Healy 1980; Lange 1980). It is present in

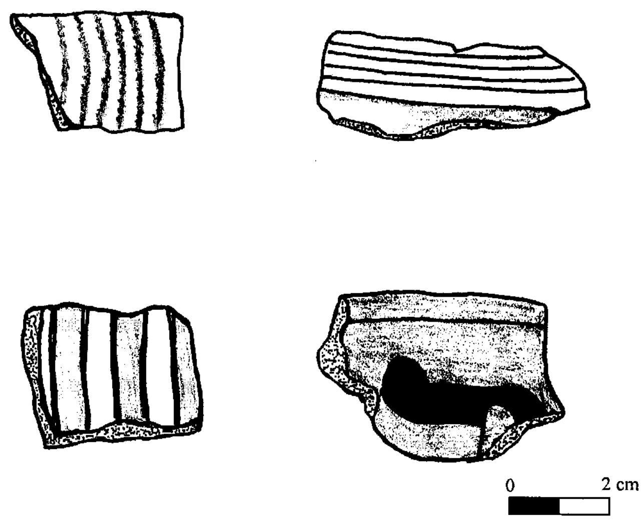


Figure 8.2. Usulután related, Schettel Incised, Rosales Engraved, and Bocana Incised Bichrome (clockwise from upper left).

components of the Los Angeles Phase (800 to 300 BC) at Ometepe (Haberland 1992:74-75), the Loma B complex (800-300 BC) at the Vidor site near the Bay of Culebra (Lange 1980), and the Early Arenal Period (500 BC - 0 AD) in the Arenal region (Hoopes 1994:74). Until further excavations are conducted, the chronological placement of Bocana remains unclear within the Rivas study area.

Aviles Phase (300 BC? – 0 AD)

Healy (1980:300) defines the Aviles Phase and the following San Jorge Phase by a series of general decorative techniques which include incising, engraving, ridging, or punctating used to outline black, red or unpainted zones, bichrome painting, and multiple-brush or resist painting. Vessel forms include outcurving and flaring rim bowls, curve-rimmed bowls, simple and pedestal base bowls, jars, tecomates, tripod bowls, and hemispherical bowls. Diagnostic pottery of the Aviles Phase includes Rosales Zoned Engraved and Schettel Incised (see Figure 8.2). Usulután-related ceramics are present but continue into the following phase (see Figure 8.2).

The Aviles Phase is roughly coeval with the Orso Phase on the Bay of Culebra, the Chombo Phase on the Santa Elena Peninsula, and the Sinacapa Phase (200 BC - AD 1) of Ometepe, whose primary diagnostic ceramics are Schettel and Rosales Engraved (Haberland 1992:75). Garcia Ridged is another major type at Ometepe. Salgado (1996a:213) considers the type diagnostic of the following phase (e.g., the Sui Phase [0-300 AD] in Granada). In Rivas, Healy includes Garcia Ridged in his Aviles Phase complex although it continues into the next phase. During survey of the study area, Garcia Ridged was recovered from surface contexts at two sites, Sucuyá and Santa Isabel, and from Paco Rojas, Excavation Unit 3, Level 1. As a result, the chronological placement of Garcia Ridged remains unclear. Salgado (1996a:212) begins the Granada sequence coeval with the following Rivas San Jorge Phase due to an absence of Schettel Incised and scarce quantities of Rosales Engraved. The total number of sherds is less than 10 within Granada assemblages.

Schettel Incised is characterized by a distinctive everted, downward-flaring rim with multiple concentric incisions (Healy 1980:225). Haberland (1992:78) considers Schettel to have "developed from the grooved and zoned ceramics of earlier times, where horizontal flaring and ornamental lips had already appeared." In particular, he uses a Bocana-related vessel from the site Los Hornos (Ometepe) as an example (Haberland 1992:78).

Black painted designs on bright red, polished slip and natural or unslipped zones distinguish Rosales Engraved. Engraved lines outline the black motifs, which are usually geometric or animalistic (Healy 1980:211). The latter includes representations of snakes, winged creatures, eyes, and tails (Healy 1980:212). Noting that the Rosales appears earlier in areas of Costa Rica than in Rivas, Healy (1980:214) considers the type to be "already well developed by the Aviles phase." Other Aviles types replicate this general pattern, leading him to conclude: "(1) that earlier assemblages remain to be unearthed in the region; or (2) that the Rivas Isthmus was, in fact, occupied relatively late (350 BC) in pre-Columbian times...and by groups bringing fully developed assemblages with them, including notions of what Rosales pottery should look like" (Healy 1980:214-215). Since evidence of early occupation is more plentiful from regions where intensive site excavations have occurred (e.g., Ometepe, the Arenal region), it would appear that Healy's second hypothesis stems from negative data.

Usulután-related ceramics are characterized by a distinct negative resist painting and paste texture and are found in both Aviles and San Jorge complexes (Healy 1980:240-241). Usulután pottery dates to the Late Preclassic and originates from southwestern Mesoamerica, specifically El Salvador and west central Honduras (Braswell et al. 1994; Joyce 1993). In the Madriz/Estelí region, Usulután-related ceramics are similar to types from central and northwestern Honduras, particularly Muérdalo Orange and Bolo Orange (Braswell et al. 2002:7-8). The ceramics are abundant in this region of Nicaragua, recovered in moderate quantities in sites near Managua and Leon, and constitute only a small percentage (about 1%) of the ceramic assemblages of Granada, Masaya, and Rivas (e.g., Salgado et al. 1998). In addition Usulután-related samples submitted for NAA analysis indicated a Nicaraguan source for manufacture. Based on the distribution of the ceramic, this source may be located somewhere in north central Nicaragua (Salgado et al. 1998:6). Approximately half of the Usulután samples submitted for NAA analysis from Granada grouped with that of the central Honduran type, Ulúa:Tenampúa. The Rivas samples, which totaled 64 from both excavated and surface contexts, have not been sourced but it is assumed that they represent imported artifacts.

San Jorge Phase (AD 0 – 300/400)

Diagnostic pottery of the San Jorge Phase includes Charco Black-on-Red: Puerto variety, Puchor Red Slipped and Punctated, Huila Zoned Punctate, and Obando Black-on-red (Figures 8.3, 8.4, and 8.5). Espinoza Red-banded, which continues into the following phase, and Usulután-related ceramics are also present (see Figures 8.2 and 8.3). Healy (1980:204) refers to "Puerto Black-on-red: Puerto variety", which is quite similar and has "nearly identical chronological duration" as Charco Black-on-red from Tempisque and first described by Baudez (1967). Neither are included within the *Vinculos* volume of Greater Nicoyan ceramics (see Abel-Vidor et al. 1987). Salgado (personal communication 1998) considers the two to be the same type, with differences arising from variety distinctions. Healy's Puerto:Puerto is thus Charco:Puerto variety. Some Charco ceramics have an unslipped, unpolished "grater" center that is encircled by a black line. This is generally interpreted as serving to grind peppers and chili (Healy 1980:205).

Charco and Obando Black-on-red are the "first of a series of black paint on red slip types from Rivas" (Healy 1980:205). One motif represented on Obando, a series of black undulating parallel lines oriented vertically and placed on the interior side of vessels below the rim, appears to be the local appropriation of designs commonly found on negative-resist Usulután or Usulután-related ceramics. Obando was recovered only in minimal quantities during the Rivas survey and excavations. A similar motif is found represented on Las Palmas Red-on-beige, which has been recovered from the Tempisque Valley and Pacific coastal areas in Costa Rica (Baudez 1967; Hoopes 1994:181; Sweeney 1975).

Red-painted and polished vertical bands on a natural buff colored base characterize Espinoza Red-banded (Healy 1980:115). Healy (1980:116-117) views

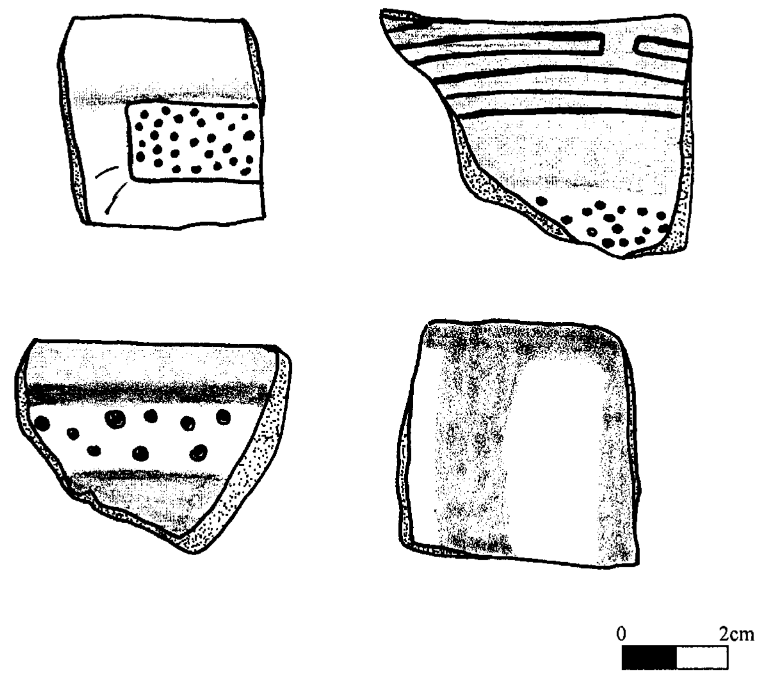


Figure 8.3. Huila Zoned Punctate, Velasco Black-Banded, Espinoza Red-Banded, and Puchor Red-Slipped and Punctated (clockwise from upper left).

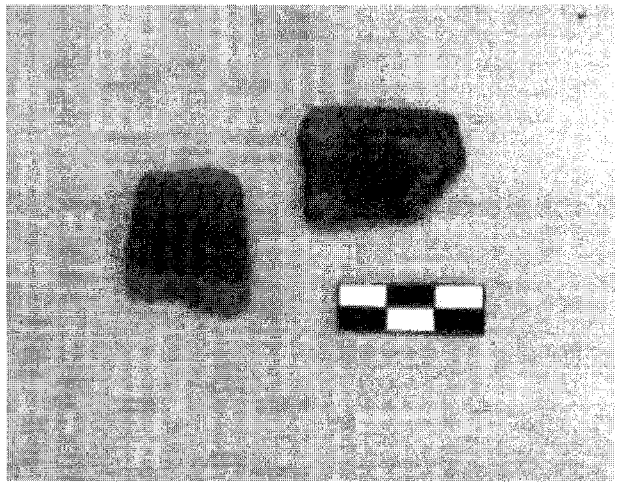


Figure 8.4. Obando Black-on-red.

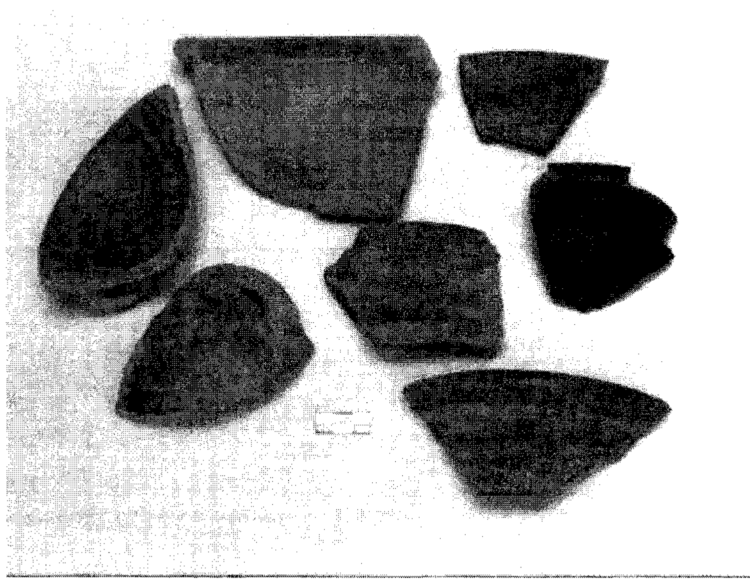


Figure 8.5. Charco:Puerto Variety, Chavez White-on-red, Leon Punctate (top row), Charco:Puerto Variety, Tola Trichrome, Unknown Black-slipped (middle row), Chavez White-on-red (bottom row).

Espinoza as related to Matazana Red-on-Brown, a type with similar banded decoration identified by Baudez (1967) from Tempisque. However, Hoopes (1994:188) states that Matazana is more similar to Las Palmas Red-on-Beige than Espinoza. Within the Arenal region, he identified Los Hermanos Beige:Espinoza variety, which is closely related to Espinoza Red-Banded in Rivas (Hoopes 1994:185).

Huila Zoned Punctate is characterized by: "(1) sets of small circular punctation marks; (2) set off in rectilinear zones by incised lines; (3) on an unslipped surface; (and)(4) collared jars" (Healy 1980:129). The type is not common in Greater Nicoya (Baudez 1967; Healy 1980) or the northwestern Cordillera (Hoopes 1994:167). Three sherds of this type were recovered from surface contexts at La Esperanza and one from Santa Isabel; Healy reports only one sherd from Santa Isabel "B", pit 4. Huila was not present at Granada or Ometepe (Haberland 1992; Salgado 1996a). Healy (1980:130) views the type as similar to a number of zoned punctated decorative styles from Mesoamerica while a possibly related ceramic, "Serpent Ware" is known from Chiriqui, Panama. In contrast, Hoopes (1994:167) suggests that, based on similarities in incised and punctate decoration, the type may be derived from Tigra Grooved-Punctate, a much earlier Tronadora Phase (2000-1000 BC) ceramic.

The San Jorge Phase roughly correlates with the Manantial Phase (AD 1-500) of Ometepe Island (Haberland 1992:80) and the Sui Phase (AD 0-300) in Granada (Salgado 1996a:213). The Manantial Phase is defined by a continuity of Garcia Ridged and the presence of Espinoza Red-Banded and Charco Black-on-Red:Puerto variety (Haberland 1992:81). The Sui Phase is defined by the presence of Charco, Potosí Appliqué (which appears slightly later in Rivas and Ometepe) and Garcia Ridged. Espinoza appears to peak in Granada but continues into the next phase. The last three centuries of La Colonia Complex in Managua also overlap with San Jorge. Espinoza is the only shared type between the two complexes (Espinoza 1995:22-23).

Red-slipped ceramics dominate coeval ceramic complexes to the north as well as south (Lange et al. 1992). Healy (1980:205), in particular, states that "black line decoration on a red base slip is a common Late Preclassic and Protoclassic trait (and) is apparent in various regions of Mesoamerica". He cites the regions Chukumuk I and II, Playa de lost Muertos, Cuyamel, Yarumel II, Chicanel, and Balam. To the south, red-slipped ceramics are found not only northwestern Costa Rica, but also in the Central Valley and in eastern Costa Rica (Salgado 1996a:215). The Santa Maria Complex of Parita, Panama also has related ceramics (Willey and Stoddard 1954: Fig. 89k-m, as cited by Healy 1980:205). In Chontales, minor types of the Mayales Phase (200 BC – AD 400) appear similar to ceramics of the Tempisque Valley (Espinoza and Rigat 1994:145; Gorin 1990). However there are no direct relations with the ceramics of Rivas, Granada, or Ometepe (e.g., Salgado 1996a).

San Roque Phase (AD 300/400-650)

The San Roque Phase marks the beginning of the Bagaces Period and is coeval with the San Antonio Phase in Granada. Bagaces Period ceramics are characterized by simple polychrome painted pottery, hollow anthropomorphic or zoomorphic mammiform supports, grater bowls, and the use of tan slips and graphite black paint for decoration (Healy 1980:301; Salgado 1996a:203). Deep and shallow bowls, simple hemispherical bowls, flared-wall and composite bowls, and two-piece covered incensarios are also found at this time.

Several new types emerge during this phase that include Chavez White-on-Red, Galo Polychrome (originally named Gonzalez Polychrome by Healy [see Abel-Vidor et al. 1987:138]), Velasco Red-Banded, Rosalita Polychrome, Rivas Red:Leon variety, Tola Trichrome, and Potosí Appliqué (Figure 8.6; see Figures 8.3 and 8.5). Leon, Tola, and Galo appear to peak during the following phase. Charco:Puerto and Espinoza Red-Banded are still present but in reduced quantities. As such, Rosalita is the only specific diagnostic. Healy originally set an ending date of AD 500 for the San Roque Phase. The current end date (AD 650) is based on the classification and dating of Rosalita (e.g., Salgado 1996b). Previously, Rosalita as well as Galo:Belo, Galo:Lagarto, Momta Polychrome, Birmania Polychrome, and Ulúa Polychrome were all considered by Healy to be Gonzalez Polychrome (Salgado 1996b). Radiocarbon dates associated with the emergence of Momta Polychrome in Granada and from Paco Rojas Unit 2 set the end date for the San Roque Phase.

Ceramic types present during this phase are also found in Granada and Ometepe but in lesser quantities to the north and south, suggesting increased regionalism (Salgado 1996a:203). Recent excavations in Managua did not yield Rosalita nor Galo (Lange 1995). Types also found in Costa Rica include Galo:Lagarto variety and Tola Trichrome. In spite of this, Galo:Belo is considered a northern sector or Pacific Nicaraguan, ceramic, while Tola is represented by the Tola variety in Nicaragua and the Lopez variety in the south (Salgado 1996a:226). Major diagnostic types in northwest Costa Rica include

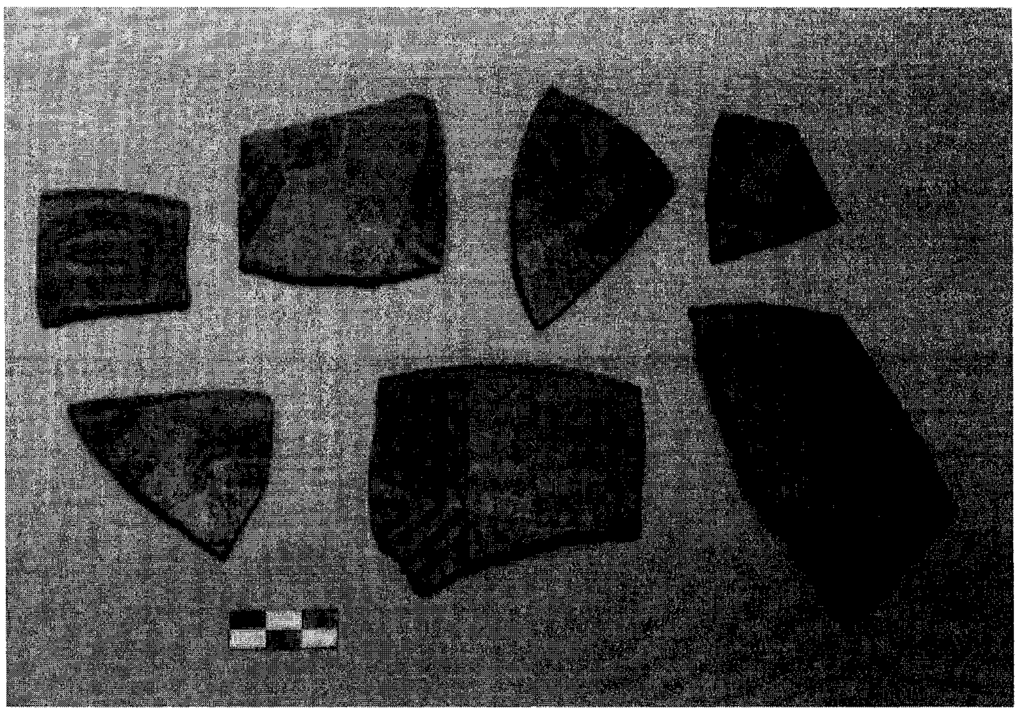


Figure 8.6. Galo Polychrome.

Zelaya Trichrome, Guinea Incised, and Mojica (Baudez 1967; Bonilla et al. 1987; Hoopes 1994). All of these are absent in Rivas, Granada, and Ometepe.

The tan-slipped polychromes of this phase (e.g., Rosalita and Galo), which are characterized by red and graphite black paint and highly polished surfaces, have chronological, technological, and stylistic parallels with the polychrome tradition of Honduras (Joyce 1993; Salgado 1996a). In Honduras, local Usulután-related pottery developed into a polychrome tradition. Red paint was first added around AD 200 (Joyce 1993:62). Additional colors were eventually added to create bichrome, trichrome, and polychrome types with polished surfaces. In addition to this parallel development, polished tan and orange surfaces are found in both two areas (Salgado 1996a:227) and the "profile silhouette monkey" stylistic motif is represented on Cancique Polychrome, Chamelecon Polychrome of the Naco Valley, Gualpopa Polychrome of Copan, Chavez White-on-Red, and Tola (Joyce 1993:89; Salgado 1996a:228). A zoomorphic motif characteristic of Rosalita Polychrome, possibly the "Alligator Motif Type A" defined by Lothrop, is also similar to representations found on Ulúa Polychromes, particularly those from central Honduras (Salgado 1996a:228).

Palos Negros Phase (AD 650-950)

The Palos Negros Phase corresponds to the later part of the Bagaces Period. Several types from the preceding phase including Velasco, Chavez, Tola, and Galo are present. Diagnostic types include Momta Polychrome, Papagayo:Culebra Variety Polychrome, and imported Delírio Red-on-white and Tenampúa Polychromes (Figure 8.7). Papagayo:Culebra, which Healy (1980:163) originally named "Paloma Black and

Red on White Polychrome", is present towards the end of the phase (AD 700/800). Delírio, which was produced in El Salvador, and Tenampúa, a class of Ulúa Polychromes from central Honduras, are associated with the Terminal Classic (AD 830/850- 950/1000) (Braswell et al. 1994; Joyce 1993; Salgado et al. 1999). It is primarily due to this association that the phase extends to AD 950.

The Palos Negros Phase, as originally defined by Healy, overlaps with the San Antonio (AD 300/400-650) and Ayala (AD 650-950) Phases in Granada. Salgado (1996b) determined the ending date of San Antonio and subsequent start of Ayala by the appearance of Momta Polychrome, Agurcia Polychrome, and Borgaña Striated. She defined all three types based on the analysis of materials excavated in Granada by Willey and Norweb in 1959 and 1961 (e.g., Salgado 1992). Salgado (1996a:229) notes a technological change in the polychrome: tan, matte surfaces characterize Agurcia and Momta has a light cream slip. The slip is badly preserved compared to the surfaces of Galo and Rosalita. Of the Ayala Phase diagnostics, only Momta was recovered in Rivas.

Healy (1980:302) apparently defined the Palos Negros Phase by the presence of Sapoá Black and Cream-on-red and San Juano Beige[1]. Salgado (1996b) later used the absence of these types in Granada to support the idea of intensified regionalism from the preceding phase. Neither type was identified during the Rivas 1998-2000 survey and excavations. However, Healy (1980:221, 224) states that San Juano Cream is still "rather vague as a type" and may be an import, while Sapoá Black and Cream-on-red does not have "positively identified" inter-site locations and contexts. In spite of this, the low

[1] Healy (1980:221-223) classified 120 sherds of Sapoá Black and Cream-on-red from San Jorge and Santa Isabel "B"; There were 133 sherds of San Juano Beige from San Jorge, Santa Isabel "B", and the Cruz site on Ometepe.

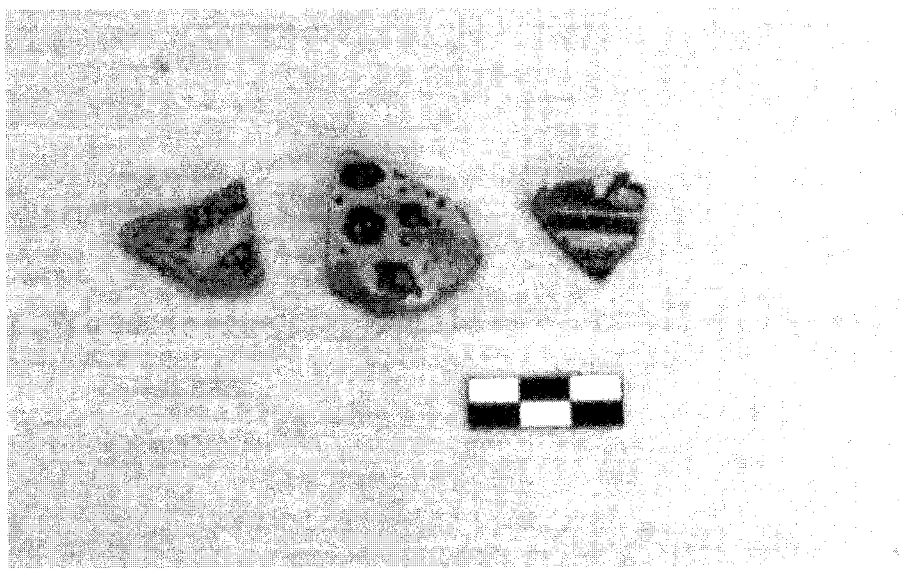


Figure 8.7. Tenampúa Polychrome.

frequencies of Momta and absence of Borgoña and Agurcia within Rivas do seem to support Salgado's (1996a) hypothesis. Her diagnostic types also appear to be largely absent at sites in northwest Costa Rica. She reports one vessel of Momta Polychrome from the Hacienda Tempisque but argues, on the basis of her own research with private and scientifically recovered collections, that if there were a significant presence, the ceramics "would have been easily set apart from established types" (Salgado 1996a:235).

The later part of this phase marks the appearance of a white-slipped ceramic tradition within Rivas. The first of these ceramics, Papagayo:Culebra, is limited to Rivas and northwestern Costa Rica (Bonilla et al 1990:187-188; Salgado 1996a)[2]. Culebra is characterized by a new motif, a masked warrior holding a spear and apparently engaged in battle with a jaguar (Bonilla et al. 1987; Day 1984). Several researchers (e.g., Melendez 1959; Ferrero 1977; Day 1984) interpret this motif as a scene out of Mesoamerican or even Mexican mythology, specifically "la Guerra Sagrada" (Sacred War)(Bonilla et al. 1987:192). The connection, if any, seems very general and has never been proven. Specific connections exist between Culebra and El Salvadoran and central Honduran polychromes. Accola (1978:88), for example, sees connections between the variety's cylindrical vases and Maya ceramics[3] while Salgado (1996a:236) argues that there is a strong relationship between Culebra and Tenampúa Polychrome. In particular, the two ceramics share formal and stylistic similarities that "include the use of a white/cream slip, black band with geometric motifs painted on white, and periform vases with ring bases" (Salgado 1996a:236). Tenampúa Polychromes have been recovered from sites in the Madriz/Estelí region of northcentral Nicaragua (Espinoza et al.

[2] Salgado (1996a:237) considers ceramics such as Momta Polychrome to be a local manifestation of the white-slip tradition within Granada.
[3] Accola does not specify the ceramics but Ulua Polychromes have similar forms (see Joyce 1993).

1996:103) and Granada (Salgado 1996a:236). In Rivas, Tenampúa was recovered in very limited quantities (5 sherds) from surface and excavated contexts at the Paco Rojas and San Jorge sites; it has not been reported at sites south of Rivas.

In western and northcentral El Salvador, pottery very similar to Papagayo:Culebra, referred to as "Nicoya" or "Nicoya-like" Polychrome, has been identified at Cihuatán, Santa María, Tacuscalco, and Cerro Ulata (Bruhns 1980; Fowler 2001; Kelley 1988). At Cihuatán, the ceramics comprised less than 1% of the recovered assemblages (Kelley 1988:48). Kelley (1988:63) considers the paste of the Nicoya/Nicoya-like polychromes to be local.

Contemporaneous with the Nicoya/Nicoya-like polychrome within El Salvador is Delírio Red-on-white, another white-slipped ceramic that was first identified at Quelepa (Andrews 1976:1140116). Delírio has been recovered from sites in northcentral Nicaragua, Granada, and at the Vidor site in the Bay of Culebra (Espinoza et al. 1996:103; Fletcher 1994:111; Salgado 1996a:237). The collection from Granada is the largest outside of eastern El Salvador (Braswell et al. 2002:17; Salgado 1996a:237). Delírio was apparently traded more frequently to regions south of Quelepa than to those to the west and north and has also been found at Copan, Seibal, Cerro Palenque, and Travesia (Braswell et al 1994; Joyce 1986). The context in which the type has been found at these sites suggests "the value of this ceramic as an elite status marker and the existence of an interelite exchange network" (Braswell et al. 1994:176). In Rivas, Delírio was recovered from surface and excavated contexts at the Paco Rojas, San Jorge, and Santa Isabel sites (11 sherds total).

La Virgen (AD 950-1150/1200)

The La Virgen Phase is marked by distinct developments in the ceramic complex. The shiny surfaces and tan-slip which characterize Palos Negros polychromes are replaced by less polished surfaces and white or cream slip decorated with red, orange, gray, and black paint (Figures 8.8 thru 8.13) (Salgado 1996a:239; Healy 1980:302). Paste is better oxidized and coarser, while common vessel forms include "some unusual and diagnostic egg- and pear-shaped vessels, zoomorphic or conical tripod feet, as well as annular or ring bases, support jars, and composite silhouette bowls" (Healy 1980:302). Although some continuity is present in the iconography, it is overwhelmed by the introduction of a new set of Mesoamerican-related motifs (Accola 1978:90; Day 1984; Healy 1980:169; Stone 1977).

There are several varieties of Papagayo (see Abel-Vidor 1990; Healy 1980), the majority of which continue into the next phase. Manta is the only variety that can be considered diagnostic of the phase (see Figures 8.8 and 8.9). Also appearing is a widespread monochrome ceramic, which has a distinct shoe-shaped form, red-slipped rim, and brushed exterior surface (Abel-Vidor et al. 1987:229). This ceramic type, Sacasa Striated, is both utilitarian and commonly found used as a secondary burial urn (Haberland 1992; Lothrop 1979[1926]). Non-mortuary use is clearly evident by the fact that on Ometepe Island, the rims of burial vessels were broken off in order to insert the deceased's bones (Haberland (1992:113). A Sacasa urn was uncovered during excavation at the El Brújo site (see Chapter 7: Excavations). The La Virgen Phase marks the beginning of the Sapoá Period and is coeval with that of the Cocibolca Phase in Granada.

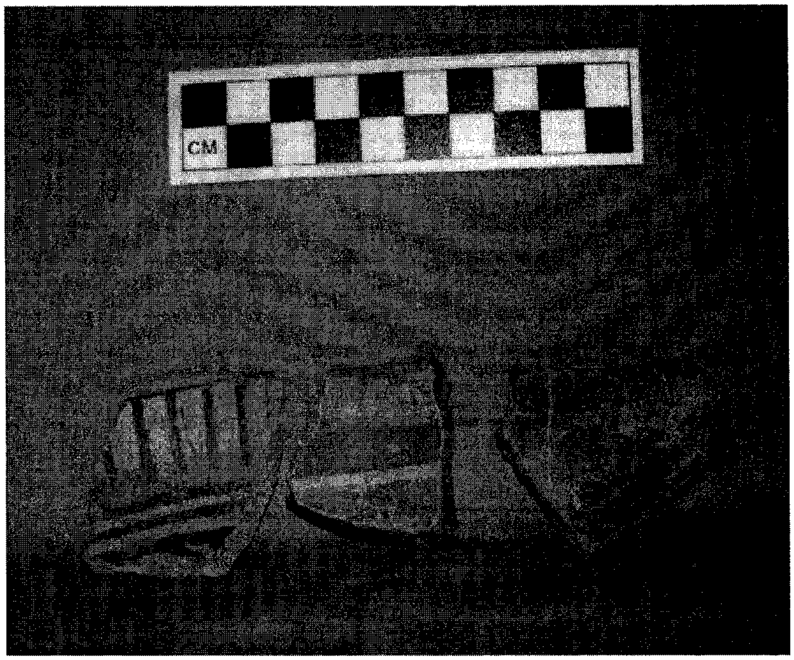


Figure 8.8. Papagayo:Manta Variety, interior view.

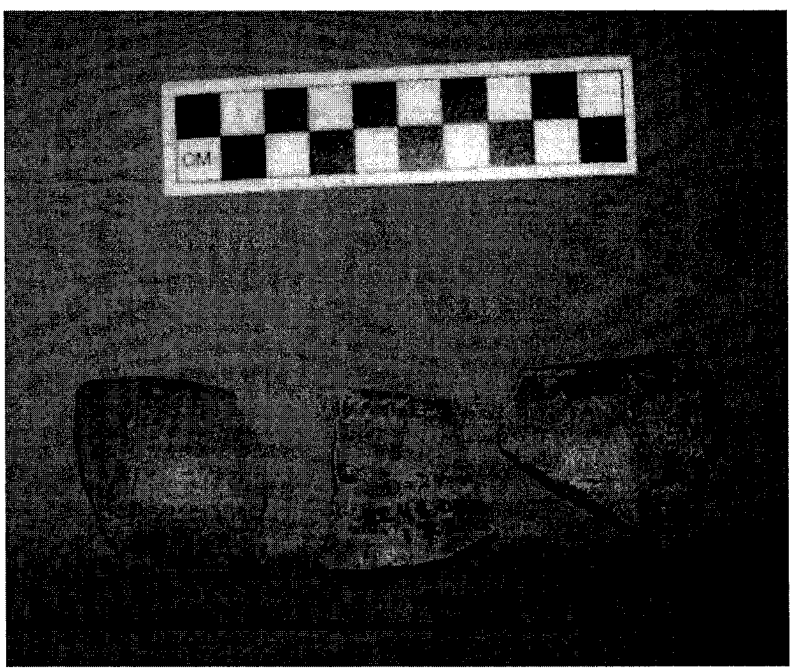


Figure 8.9. Papagayo:Manta Variety, exterior view.

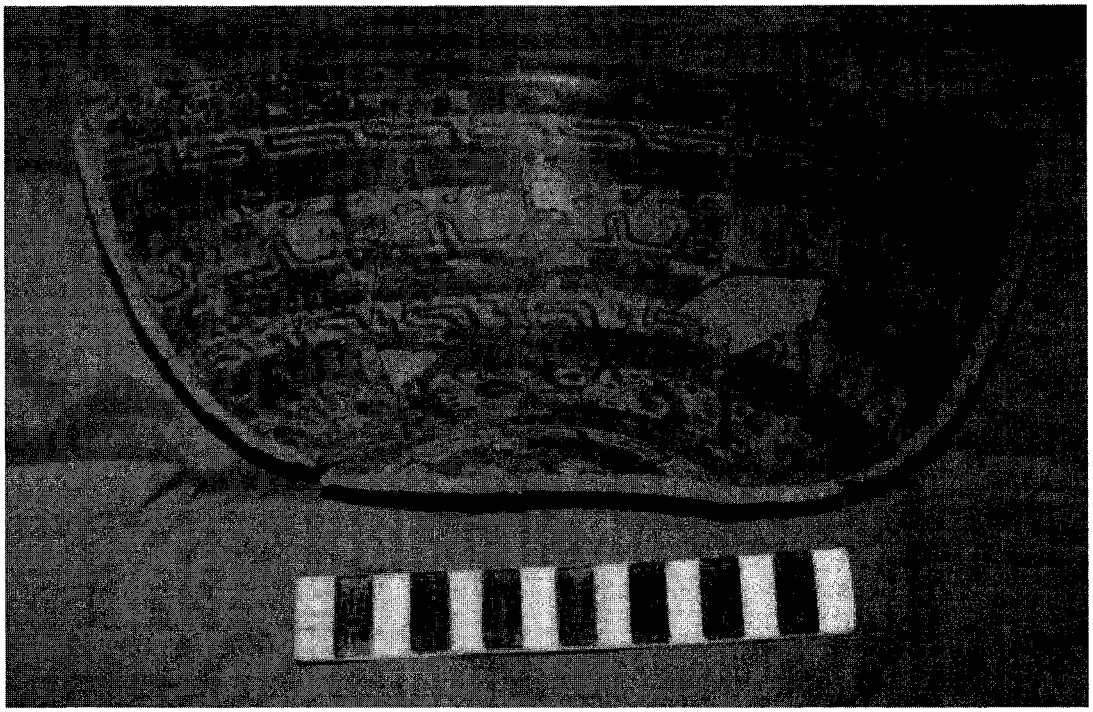


Figure 8.10. Granada Polychrome.

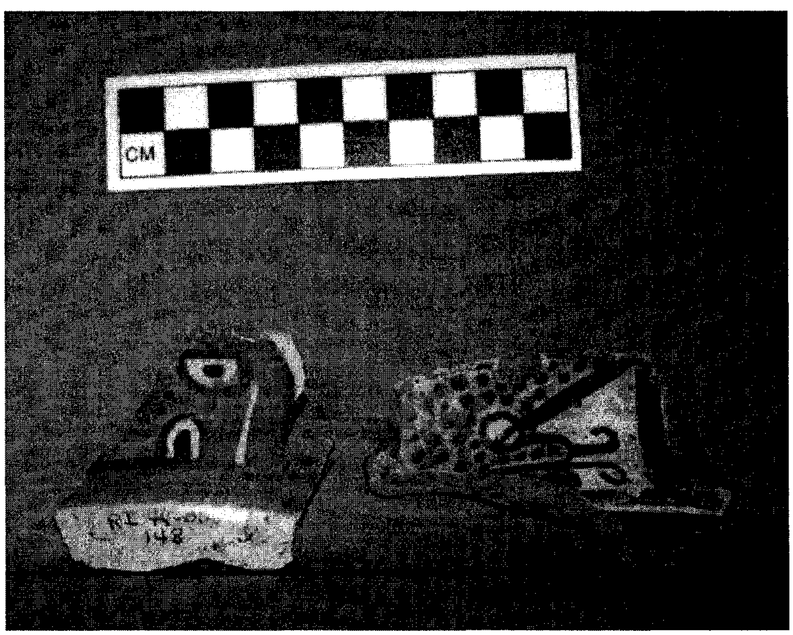


Figure 8.11. Papagayo:Mandador Variety.

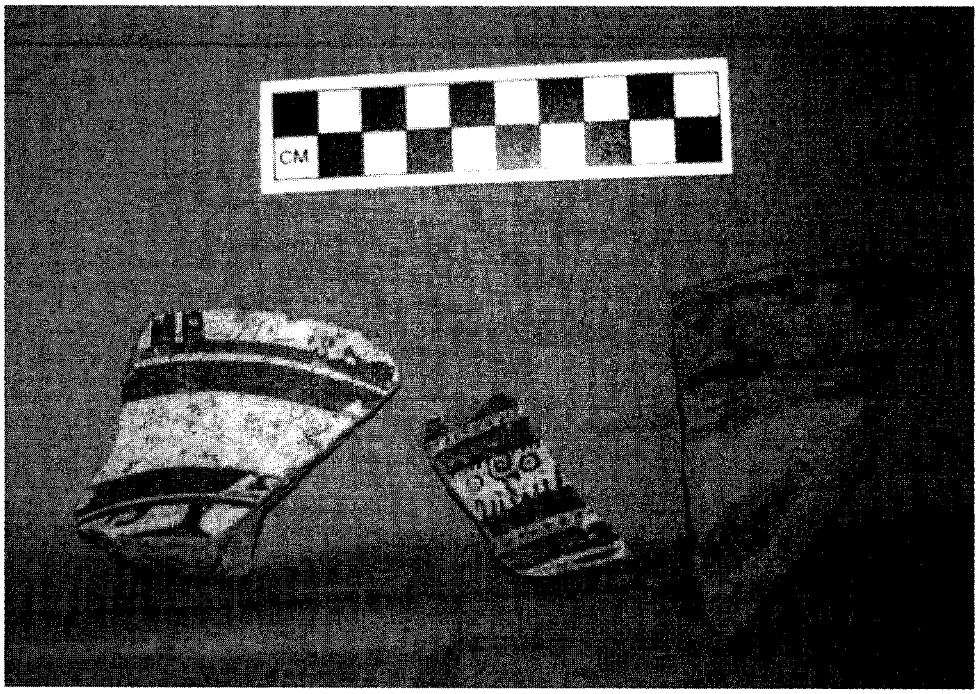


Figure 8.12. Pataky Polychrome

Figure 8.13. Papagayo:Cervantes Variety.

Salgado (1996a:240) noted differences in the distribution of Granada Polychrome, "which is an important type of La Virgen and Las Lajas complexes both in Rivas and Ometepe" (see Figure 8.10). The polychrome was barely present in Granada and constituted approximately 4% of the assemblages in Ometepe (Salgado 1996a:240; Healy 1980). Based on its distribution, Salgado (1996a) suggested that the type was imported to Granada from either Rivas or Ometepe. Whereas Healy (1980) recorded Granada Polychrome as comprising about 10% of his assemblages, the type was recovered only in scarce quantities during the 1998-2000 Rivas survey and excavation. It was not encountered during surface inspections at any of the 48 sites. Only 20 sherds were recovered from six Santa Isabel excavation units and five sherds were collected during shovel testing at the site. It would seem that, in the end, this ceramic was not produced in Rivas.

Researchers have commented on an asymmetrical relationship between Pacific Nicaragua and northwestern Costa Rica evident during the Sapoá Period (Lange 1984; Salgado 1996a). This is due to the significant presence of such types as Papagayo Polychrome in northwestern Costa Rica as far south as the Bay of Culebra and the near absence of important southern types, such as Mora Polychrome, in the northern sector. In Rivas, only six sherds identified as Mora were recovered at three sites (e.g., Paco Rojas, San Jorge, and Santa Isabel sites). Healy also reports one sherd from Santa Isabel "A" and one from La Cruz. The distribution of Sacasa Striated is also largely limited to the northern sector: Lange (1971:161) reports minimal amounts of Sacasa Striated at six sites in the San Dimas Valley. This raises questions of the trade network operating during the Sapoá Period between the two areas. Salgado (1996a:246) suggests that "perhaps perishable products were traded from south to the north, and they have not been preserved in the archaeological record."

The transition to the Sapoá Period in northwest Costa Rica is less distinct than in Rivas and areas to the north. There is no florescence of white-slipped pottery and tan-slipped polychromes comprise the majority of polychrome types (Abel-Vidor et al. 1987; Baudez 1967). Although this pottery no longer displays the glossy surface distinctive of the Bagaces Period, ceramic continuity in such types as Galo and Mora is reinforced by compositional data (e.g., Bishop 1994:32). Mora Polychrome also evidences continued connections with Honduran and even El Salvadoran ceramics. Joyce (1993:92) states that its seated human figure and profile silhouette monkey motifs both occur on Copador Polychrome and the closely related Arambal Polychrome of western El Salvador. Her comparison continues:

> Kan cross motifs, typical of Mora Polychrome, are not found on Copador, Arambala, or most Ulúa Polychromes. The kan cross is depicted within pendant motifs on a Nebla class Ulua Polychrome tripod cylinder from Ahuachapan in western El Salvador and alternates with a waterbird on a Tenampúa class footed dish found in Nicaragua, to Salvadoran vessels. Vessel forms and geometric motifs of Mora Polychrome, including cross-hatched diamonds, alternating vertical lines and dots, and the kan cross, bear closer comparison to the white-slipped, monochrome and polychrome painted ceramics of Lepa Phase Quelepa, El Salvador. ... Reciprocal influence of Quelepa's painted ceramics on the Ulua Polychromes is noted in the rare Tourmaline class represented only at Lake Yojoa, which features a stylized waterbird. (Joyce 1993:92)

These ceramic relationships might reflect networks between distinct ceramic production zones (e.g., the Copador-producing zone of western Honduras and El Salvador, the Tenampúa-producing zone of Comayagua, and northwest Costa Rica) connected through the intermediary of Quelepa (Joyce 1993:92). Pacific Nicaragua is tied in by the ceramic Papagayo:Manta, which has strong similarities with Las Vegas Polychrome of the

Comayagua Valley and Papalón Polychrome from the Gulf of Fonseca (Baudez 1976). These affiliations are not only phylogenetic (e.g., related to similarities between earlier Tenampúa-class Ulúa Polychromes and Papagayo:Culebra) but also reflect a continued parallel development of the white-slipped tradition within these areas (Salgado 1996a). Although no samples were recovered in Rivas, limited quantities of Las Vegas Polychrome have been found in Granada (Salgado 1996a). No imported ceramics were recovered from Rivas survey and excavation contexts.

Las Lajas (AD 1200-1522)

The Las Lajas Phase is marked by the appearance of Vallejo Polychrome, Madeira Polychrome, Banda Polychrome, Castillo Engraved, Murillo Appliqué, and Bramadero Polychrome (Figures 8.14 thru 8.19). Bramadero and Murillo, which are considered northwest Costa Rica types, were recovered in minimal quantities at San Jorge, La Conchita, and Santa Isabel (Appendix B). The latter half of the phase is characterized by the presence of Luna Polychrome (Figure 8.20). Some continuity from the preceding phase is shown by the presence of Sacasa, Papagayo, Pataky, and Mombacho ceramics. Vallejo Polychromes, in particular, display some motifs with no clear antecedents. These include painted and incised versions of central Mexican entities such as the fire serpent, the wind god *Ehecatl*, sun symbols, the earth monster, and various other elements identified with the Mixteca-Puebla style (Canouts and Guerrero 1988; Day 1982). The presence of Vallejo, Madeira, and Castillo is generally associated with the Ometepe period.

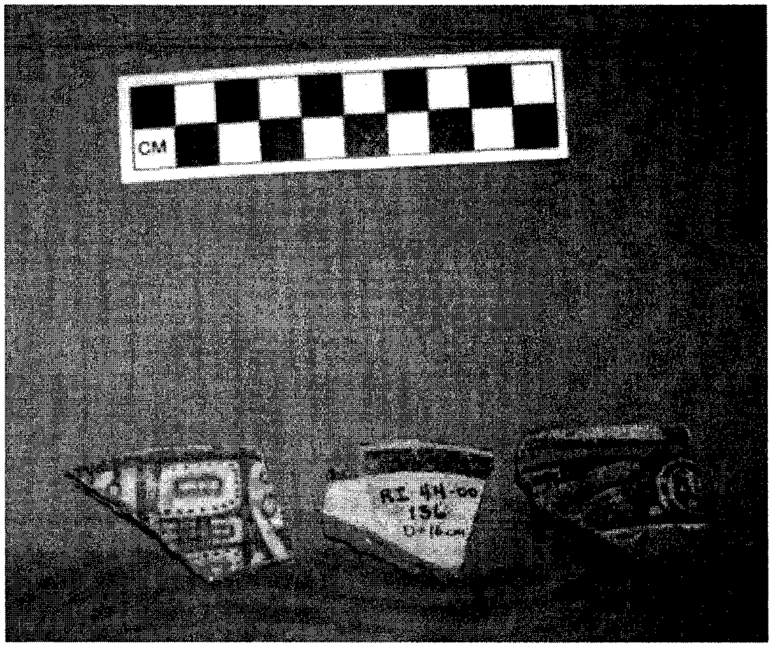


Figure 8.14. Vallejo:Vallejo Variety

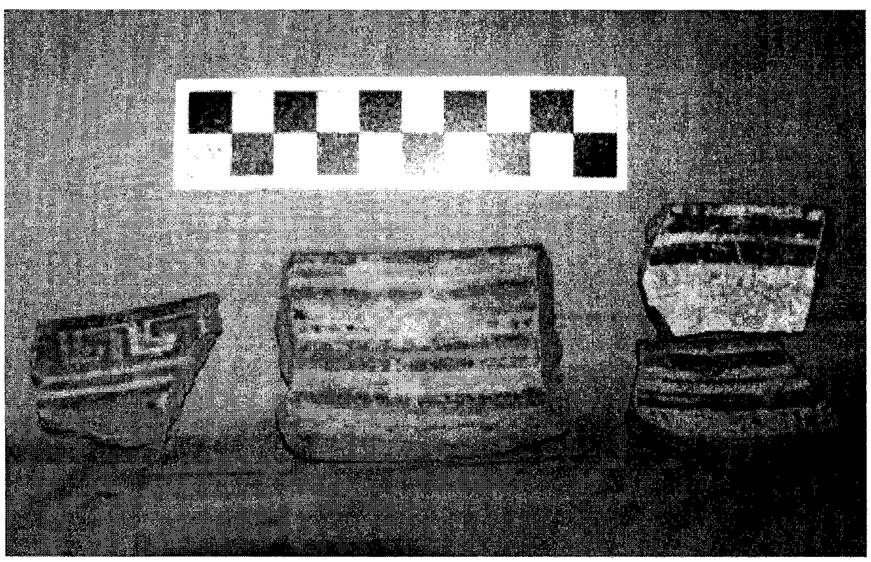


Figure 8.15. Banda Polychrome, interior view.

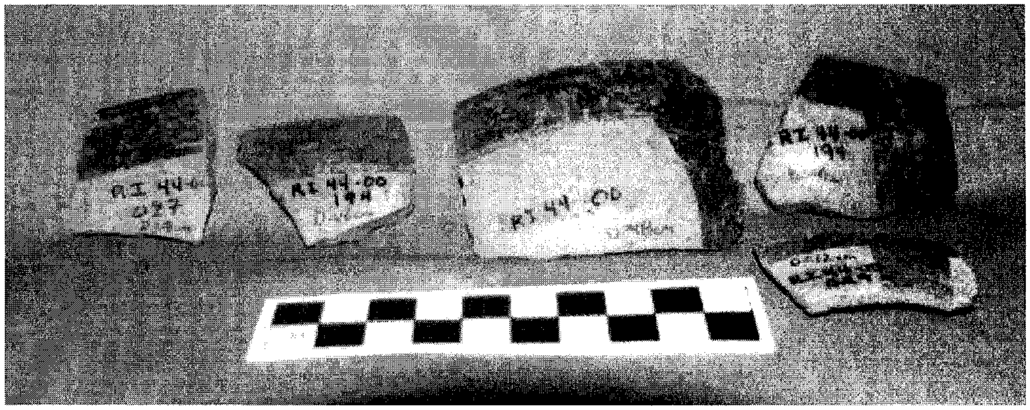


Figure 8.16. Banda Polychrome, exterior view.

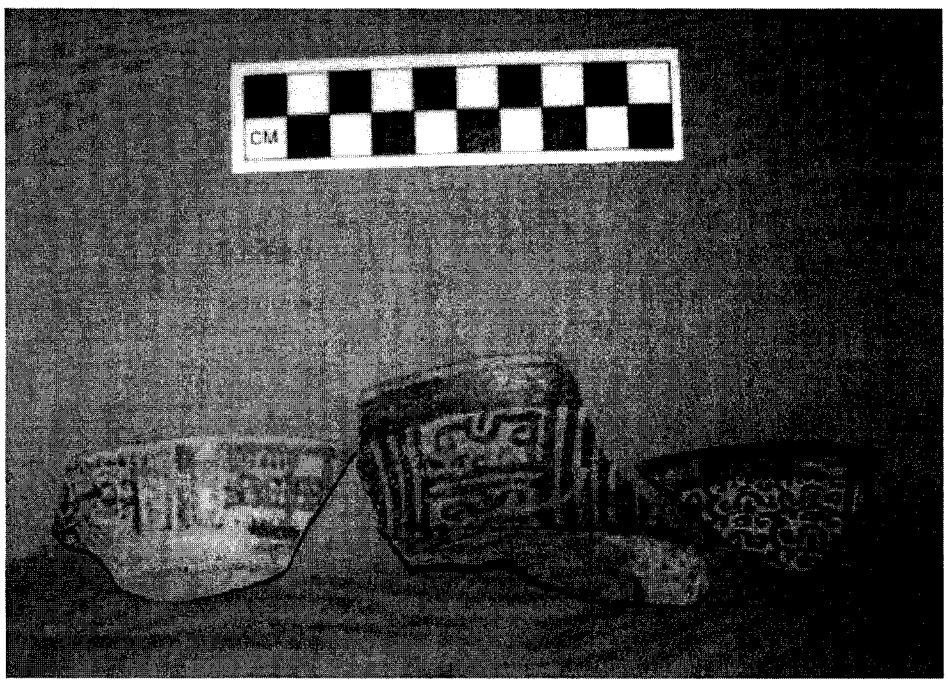


Figure 8.17. Madeira Polychrome.

Figure 8.18. Castillo Engraved.

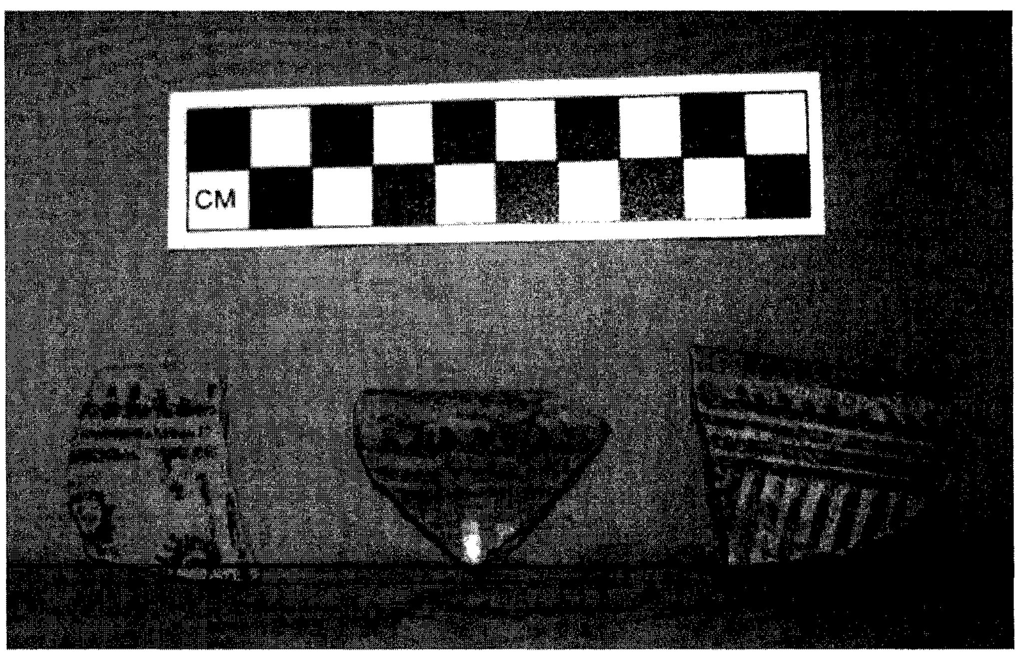


Figure 8.19. Bramadero Polychrome.

Figure 8.20. Luna Polychrome.

Compositional analysis and frequencies reported for Rivas by Healy suggest Vallejo Polychrome was manufactured in the Rivas region (e.g., Bishop et al. 1988; Healy 1980). However, during the 1998-2000 survey and excavations, minimal quantities of Vallejo were identified. Vallejo comprised only 4.6% of Ometepe contexts excavated in 2000 at the Santa Isabel. It constitutes 1% of the 1999 Ometepe material. In part this may have been due to preservation. Poor surface preservation prevented the identification of stylistic traits associated with the ceramic in most cases. At times, Vallejo paste can be tan in color and distinct from the cinnamon brown to orange-red of Papagayo. However this does not occur with enough frequency to separate the ceramic from Papagayo sherds. In addition, forms generally associated with Vallejo, such as small tecomate vessels, are oftentimes decorated in what appears to a very Papagayo-like style. It seems that the ceramic was distinct for only a short time and then blended with pre-existing ceramics and styles. Day (1994) has also argued for similar blending in iconography from the Sapoá through Ometepe Periods.

The asymmetrical relationship between Pacific Nicaragua and northwest Costa Rica continues in this phase, with the same lack of evidence for goods imported from southern areas (Lange et al. 1992; Salgado 1996a). An important type during this phase, Jicote Polychrome, shares some of the designs of Vallejo and its related types but they are apparently interpreted within the context of local traditions (e.g., Cannouts and Guerrero 1988). In spite of significant interaction between the northern and southern sectors of Greater Nicoya, this suggests that sites in northwest Costa Rica were not directly involved in the processes that led to the appearance of the Mexican iconography on Vallejo Polychrome.

Conclusions

The analysis of the ceramic materials reveals a general development from simple incised, punctuated, or bichrome-painted bowls and jars to more elaborate polychrome wares in a variety of forms including egg- and pear-shapes and composite silhouette bowls. During the Tempisque Period, ceramic types such as Rosales Engraved and Bocana Incised were shared with other regions of Pacific Nicaragua and northwestern Costa Rica. Imported Usulután and related wares were present, indicating long-distance interactions with either southwestern Mesoamerica or northern Nicaragua (possibly both).

The Bagaces Period was characterized by the appearance of simple polychrome-painted pottery and the use of tan slips and graphite black paint for decoration. The polychromes of this period parallel developments in central Honduras (Salgado 1996a). Ceramic types present during the Bagaces Period are also shared with Granada and Ometepe but in lesser quantities to the north and south. Major diagnostic types in northwestern Costa Rica are absent in Rivas, suggesting increased regionalism. This pattern is largely maintained through the remainder of the sequence.

The latter part of the Bagaces Period is marked by the appearance of the white-slipped ceramic tradition in Rivas. The first of these ceramics, Papagayo:Culebra, is limited in its distribution to Rivas and Guanacaste. Strong connections exist between this ceramic and Tenampúa Polychrome from Honduras; limited amounts of closely related pottery (e.g., Nicoya or Nicoya-like Polychrome [Fowler 2001; Kelley 1988]) was also found at sites in western and north central El Salvador. Long-distance interaction with both regions is reflected by limited quantities of Tenampúa and Delírio Red-on white (another white-slipped ware) within Rivas.

During the Sapoá Period, there is an increase in the types of white-slipped ceramics. The iconography evidences a strong Mesoamerican connection and a new utilitarian ceramic, Sacasa Striated, emerges. Although pottery from outside Greater Nicoya was not recovered, Papagayo:Manta exhibits similarities with Las Vegas Polychrome of the Comayagua Valley and Papalón Polychrome from the Gulf of Fonseca. Ceramics of the Ometepe Period demonstrate additional Mexican influence in terms of decoration. Vallejo Polychromes, in particular, are decorated with various Central Mexican motifs including the fire serpent, the wind god *Ehecatl*, sun symbols, and the earth monster (Day 1976).

The origin of the white-slipped ceramic tradition is not well understood. Within El Salvador, this tradition shows little or no continuity with the preceding ceramic complexes (Braswell et al. 1994:176; Bruhns 1980:103-106; Fowler 2001; Kelley 1988:14-16). The closest similarities appear to be with the Gulf Coast and central Veracruz (Andrews 1976; Braswell et al. 1994; Fowler 2001). Joyce (1993:247) also observes that the innovations evident in Tenampúa and Las Vegas Polychromes have no local precedent, something that is echoed by Papagayo Polychrome in Greater Nicoya. The distinctive decorative motifs found on Papagayo have been associated with the Mixteca-Puebla style that later fluoresced during the Late Postclassic in areas of Mexico (e.g., Day 1984; Healy 1980; Nicholson 1994; Salgado 1996a). McCafferty (1994:73) suggests that the "Mixteca-Puebla horizon may have originated during the Olmeca-Xicallanca occupation of Cholula," which could explain why there are at least superficial resemblances between Greater Nicoyan and Cholulan ceramic types: the Cholula types Cuaxila Matte (AD 1100-1300) and Aquiahuac Burnt Orange (AD 1200-1400) are similar to Papagayo:Casares and Castillo Engraved strongly resembles San Pedro Polished Red (AD 1000?-1500?)(Geoffrey McCafferty, personal communication 1999).

Various possibilities have been proposed for the development of this ceramic tradition within lower Central America: Day (1994), Healy (1980), and Salgado (1996a) link the emergence of Papagayo to the arrival of the Chorotega within Greater Nicoya; Fowler (2001) associates the changes in El Salvador with the immigration of Pipil-speaking groups; Day (1994) and Lange et al. (1992) imply that the tradition emerged in Greater Nicoya with a subsequent north to south diffusion; and Smith and Heath (1980) consider the shared features a result of trade networks linking together west Mexico and lower Central America. Although trade and migration are not mutually exclusive, the hypothesis presented here is that trade networks facilitated the immigration of groups from Mexico to lower Central America and the appearance of white-slipped ceramics is a result of such migration. This hypothesis is discussed in greater detail in Chapter 11, following evaluation of the remainder of the artifact assemblages and settlement data from Rivas.

CHAPTER 9
LITHIC, FAUNAL, AND OTHER ARTIFACTS

This chapter discusses the lithic, faunal, and other classes of artifacts recovered during survey and excavation within the study area. As with the ceramic materials discussed in Chapter 8, the emphasis of the analysis was the creation of artifact complexes reflective of both chronological and spatial variation. The data from the excavations conducted in 1999 and 2000 is presented in Appendices C, D, and E.

Ltihic Artifacts

The lithic complexes recovered from Bagaces, Sapoá, and Ometepe contexts are discussed here. Unfortunately, the sample size for all three periods is small—the total number of artifacts is 1,656—limiting the reconstruction and comparison of the lithic assemblages.

Lithic artifacts were first separated according to raw material. Raw materials include chert, obsidian, basalt, andesite, and slate. A category of "other" was created for infrequently used materials such as jasper and pumice. Afterwards, artifacts were placed into specific categories based upon morphological features and manufacturing techniques. Jorge Zambrana of the Museo Nacional de Nicaragua conducted the analysis of all the artifacts with the exception of those made from obsidian. Geoffrey Braswell of the State University of New York at Buffalo conducted the analysis and visual sourcing of obsidian artifacts, which is based on differences in color, texture, luster, and pattern of inclusions (see Braswell 1997:18). There is no known source of obsidian suitable for the manufacture of stone tools within Nicaragua (Braswell 1997; Salgado et al. 1998).

Obsidian artifacts, therefore, can provide information concerning prehistoric trade networks.

Chert Artifacts. Chert artifacts comprise 95% of all excavated lithic materials. Table 9.1 presents a summary of excavated chert artifacts by period. More detailed information is provided in Appendix C. Five different classes of chert were identified: chalcedony, white chert, red chert, other chert, and jasper. All of the artifacts were manufactured using simple core-flake techniques. Although a slightly higher percentage of Bagaces material revealed evidence of cortex, overall it would appear that the first stages of manufacture were carried out near sources of raw material. In addition to flakes revealing evidence of use wear, the only tools encountered were several drills and one stemmed projectile point. A number of the drills were rather small in size, approximately 2.2 cm in length and .9 cm in thickness, and limited to Sapoá and Ometepe Period contexts (Figure 9.1). Two small drills were also collected during surface inspection near Santa Isabel Excavation Units 1 and 2. It is possible that these artifacts were used to create holes in shell items or worked sherd "pendants". Chert microdrills have been associated with shell working in areas of Mesoamerica (Feinman and Nicholas 2000:135).

One projectile point was recovered from a Sapoá context (Santa Isabel Excavation Unit N20E30, Level 12). It was rather crude in form and made of yellow jasper. The possibility exists that the point was intrusive and dates to an earlier time period. A similar stemmed point was collected during surface inspection near the San Fernando site (Ri-34)(Figure 9.2). The source of the raw material is not known. During survey, three fragments of prismatic blades manufactured from white and red chert were

Table 9.1. Summary of Excavated Chert Artifacts by Temporal Period.

	BAGACES		SAPOÁ		OMETEPE		SAPOÁ/OMETEPE		TOTAL	
	#	%	#	%	#	%	#	%	#	%
Drill	3	1	1	10	8	.7	2	1.3	14	.9
Utilized Flake	1	.4	1	10	16	1.4			18	1.1
Utilized Flake w/cortex	41	15			2	.2	13	8	56	3.6
Unutilized Flake					197	18	1	.6	198	12.8
Unutilized Flake w/cortex					18	1.6	15	10	33	2.1
Core	10	4	1	10	15	1.4	5	3	31	2
Shatter	206	78	5	50	852	77	118	76	1181	76.7
Shatter w/cortex	4	2	1	10	1	.09			6	.4
Projectile Point			1*	10	1	.18			2	.1
Total	265	100	10	100	1110	100	154	100	1539	100

*Manufactured of yellow jasper.

Figure 9.1. Chert drills from Sapoá and Ometepe Period contexts.

Figure 9.2. Yellow jasper projectile point.

found, one each at the sites El Castíllo, San Martín, and San Jorge (Figure 9.3).

Obsidian Artifacts. Obsidian constitutes approximately 3% of all excavated lithic materials. A total of 171 obsidian pieces were collected from both surface survey (n=127) and excavation units (n=44). Table 9.2 provides the source distribution of the artifacts from surface and excavated contexts. Ninety-five of the surface-collected artifacts were tentatively dated based on associated ceramics (Table 9.3). A total of 69 obsidian artifacts were dated to the Bagaces Period, 39 of which were from excavated contexts at Paco Rojas. Thirty-seven of the excavated artifacts were sourced to Güinope, Honduras and two to Ixtepeque, Guatemala (Figure 9.4). During the Sapoá Period, the obsidian artifacts are more widely distributed (see Table 9.3). A total of 67 artifacts were dated to the period. Only one artifact was recovered during excavation of Sapoá Period contexts at Santa Isabel. It was sourced to Ixtepeque. Obsidian artifacts from El Castillo were assigned to both Sapoá and Ometepe Periods based on their technological characteristics (Geoffrey Braswell, personal communication 2000). Thirty-six obsidian artifacts were assigned to the Ometepe Period (see Table 9.3). Two excavated pieces from Santa Isabel were sourced to Guatemala; three obsidian cores from Jose Rojas were dated based on technological characteristics and sourced to Güinope; two excavated pieces also from Jose Rojas were sourced to Güinope and Ixtepeque.

The production types reflect mainly casual percussion flakes and cores (Appendix C). Of the pieces recovered from excavation, 28 were casual percussion flakes, four were

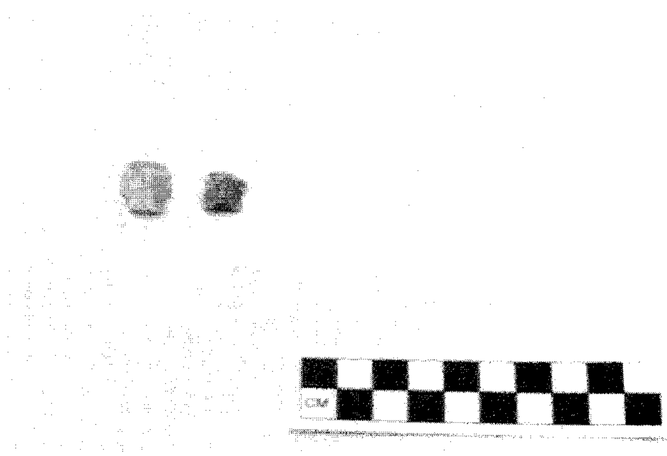


Figure 9.3. White and red chert prismatic blade fragments.

Table 9.2. Source Distribution of Surface-Collected and Excavated Obsidian Artifacts.

	EXCAVATED	SURFACE
Güinope	38	91
Ixtepeque	5	19
El Chayal	1	12
San Martín	0	3
Zaragoza	0	2
Total	44	127

Table 9.3. Summary of Obsidian Artifacts by Site, Source, and Temporal Period.

SITE	GUIÑOPE	IXTEPEQUE	EL CHAYAL	ZARAGOZA	SAN MARTIN JILOTEPEQUE	TOTAL
BAGACES PERIOD						
Ri-19, Paco Rojas	37	2	1		---	40
Ri-24, San Jorge	13	1	1		---	15
Ri-44, Santa Isabel	4	5	2		1	12
Total	54	8	5		1	69
SAPOÁ PERIOD						
Ri-13, El Castíllo	8	4	3	1		16
Ri-15, San Martín	21		1			22
Ri-16, San Félix	2	1			1	4
Ri-24, San Jorge	7	1				8
Ri-26, Jose Mercedes	1					1
Ri-27, La Conchita	1					1
Ri-36, La Esperanza	2					2
Ri-42, Chata	1					1
Ri-44, Santa Isabel	11	1				12
Total	47	7	4	1	1	67
OMETEPE PERIOD						
Ri-13, El Castíllo	8	4	3	1		16
Ri-16, San Félix	2	1			1	4
Ri-17, Jose Rojas	4	1	1			3
Ri-24, San Jorge	7	1				8
Ri-44, Santa Isabel	2	3				5
Total	23	10	4	1	1	36

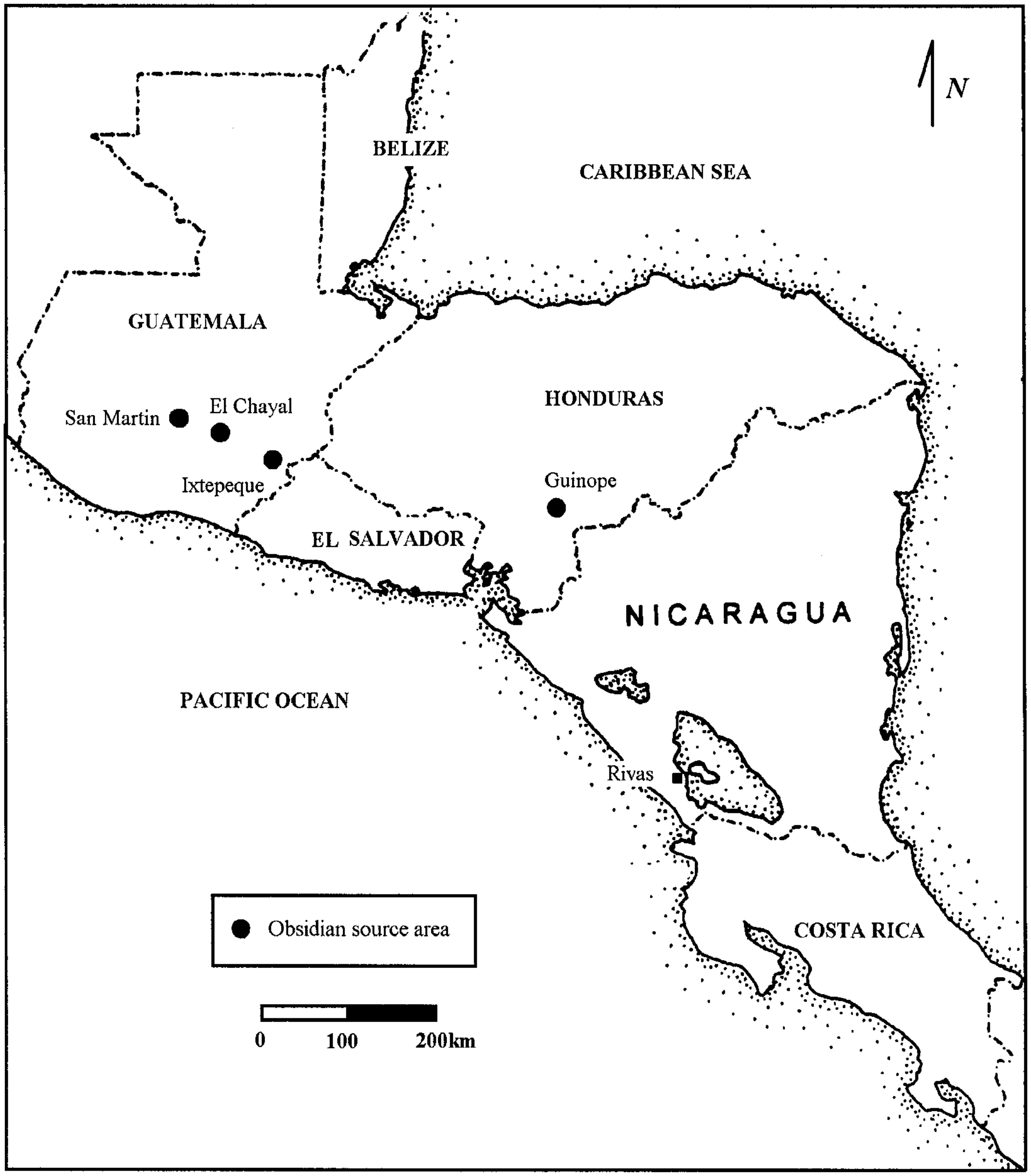


Figure 9.4. Location of obsidian sources mentioned in text.

prismatic blades, one was a prismatic blade point, and 11 were chunks. Three of the prismatic blades were made of Ixtepeque obsidian and related to the later Sapoá and Ometepe Periods. The dominant industry for Rivas region appears to be a casual flake technology. Some prismatic blades were imported, generally in final form. Of the pieces recovered from excavation, five Ixtepeque pieces had no cortex. Of the pieces recovered from both survey and excavation (excluding those from Güinope) only one piece of Ixtepeque obsidian had cortex. Of the pieces from Güinope, 13 of 38 had no cortex, 18 of 38 had less than 24% cortex, and seven of 38 had between 25 and 50% cortex remaining. The high percentage of pieces with cortex indicates that the material was imported as nodules and expedient tools were then produced at the site. Of the flakes recovered from excavation, 18 were produced using bipolar percussion techniques, while seven were produced using casual percussion techniques. Nine bipolar cores are also included in the assemblage.

Three exhausted prismatic blade cores were recovered during survey of Jose Rojas (Figure 9.5). The owner of the property encountered the cores while excavating fill to make bricks. The three cores were sourced to Güinope and are characterized by ground platforms typical of the late Postclassic (e.g., Ometepe period) (Geoffrey Braswell, personal communication 1999). This is the first provenienced evidence for the manufacture of obsidian prismatic blades in Pacific Nicaragua.

Basalt, Andesite, Slate, and Other Stone Artifacts. This category includes those stone artifacts manufactured by various techniques including abrading, grinding, and polishing. It constitutes approximately 5% of the lithic complexes recovered during the

Figure 9.5. Obsidian prismatic blade cores recovered from the Jose Rojas Site.

1999-2000 excavations. Table 9.4 provides a summary of ground stone artifacts by temporal period.

Fragments of beveled, flat slate choppers and chopper pre-forms make up 67% of the excavated Bagaces Period artifacts (Figure 9.6). All of the artifacts were recovered from Paco Rojas (see Appendix C). In addition, a total of 23 chopper fragments were recovered during survey at the following sites: Sucuyá (8), San Fernando (12), and the portion of Santa Isabel corresponding to Healy's Santa Isabel "B" (3). All of the artifacts were made of andesite(?) and averaged 4.5 cm by 8.8 cm and ranged 1.0 cm to 2.0 cm in thickness. Six choppers were reported from the 1959/1961 excavations at Santa Isabel "B" (Healy 1980:283). Healy (1980:283) provides the following description:

> These squarish, flat gray-black slate tools and fragments were carefully beveled, on one end only, to a bifacial edge. Whole tools range from 6 x 13 cm in size; width however is a mere 0.8-1.3 cm. The remainder of the body is rough and battered, with the biface ground and polished.

The artifacts recovered as part of this investigation evidenced a similar beveling technique. However, unlike Healy's description, some of them were beveled on at least two sides (see Figure 9.6: center and lower left corner) and the texture on the adjacent areas ranged from rough to smooth, presumably as a result of grinding. Haberland (1992:79) reports comparable artifacts from Ometepe Island that were 1 to 2 cm thick, averaged 15 by 25 cm in overall size, and were beveled on all four sides (Haberland 1992:79). Although Healy states that his "axes" were whole objects (he does not provide illustrations), and thus smaller than the choppers from Ometepe, they could have been broken and subsequently re-used before final discard. The specimens recovered during

Table 9.4. Summary of Excavated Ground Stone Artifacts by Temporal Period.

	BAGACES		SAPOÁ		OMETEPE		TOTAL	
	#	%	#	%	#	%	#	%
Basalt								
Metate	5	9.6			6	42	11	15
Mano	2	3.8	4	57	1	7	7	9.5
Pestle	1	1.9			1	7	2	2.7
Misc.	4	7.6					4	
Andesite								
Metate					2	14	2	2.7
Mano			1	14			1	1.3
Axe pre-form					1	7	1	1.3
Axe			1	14	2	14	3	4.1
Misc.	1	1.9					1	1.3
Slate								
Chopper perform	2	3.8					2	2.7
Chopper	35	67					35	47.6
Other								
Worked pumice	1	1.9					1	1.3
Misc.	1	1.9	1	14	1	7	3	4.1
Total	52	100	7	100	14	100	73	100

Figure 9.6. Beveled chopper fragments.

this investigation were all fragmentary, leaving the original size of the objects unknown. None of the choppers from Rivas or Ometepe reveal evidence of hafting, indicating that they were hand-held. Haberland (1992:79-80) suggests that the artifacts may have been "used for cracking open nuts or turtle shells or to mash something like tubers" and not (as Healy suggests) as axes or hoes; the fragmentary nature of the artifacts suggests that they were used for a task requiring a "great expenditure of force." Although the function of these artifacts still remains unclear, Haberland's hypothesis seems applicable to the artifacts recovered within the study area. Artifacts of this type appear to be limited to Rivas and Ometepe Island since Salgado (1996a) did not encounter any during her research in Granada and I have not seen reference to anything similar within the archaeological literature for Greater Nicoya.

In contrast to the Bagaces Period choppers, manos and metates were present during all periods. Carved metates, which are known from the region, were not recovered from excavated contexts. Several fragments were collected during surface inspection of San Jeronimo and San Martín. The owner of the finca, La Esperanza, which has a site of the same name, encountered three metates with manos during excavation of a water hole (Figure 9.7). The metates were carved with geometric designs similar to those found in areas of Guanacaste (see Chenault 1994:257-261; Hartman 1907) and probably date to the Late Tempisque or early Bagaces periods (Silvia Salgado, personal communication 1999).

Manos and metates are commonly associated with processing, especially of maize. During survey, several metates were observed at modern residences, apparently

Figure 9.7. Carved metates recovered at the La Esperanza site.

still being used for food processing. Carved metates have also been associated with agricultural rituals (Lange 1984; Snarskis 1984). Lange (1984), in particular, has suggested that the metates functioned as seats for upper status individuals. Other ground stone artifacts encountered during excavation and survey include celts, pestles, a fragment of worked pumice, and a few rounded smooth stones probably used in polishing activities (e.g., ceramic production). In particular, the worked pumice measured 4.6 cm x 3.1 cm and may have served as a spoke-shaver. With the exception of the beveled choppers, all the types of artifacts mentioned have been recovered at other sites in Greater Nicoya (see Baudez 1967; Chenault 1994; Haberland 1992; Healy 1980; Lange 1971, 1984; Lange et al. 1992; Salgado 1996a; Sheets 1994).

Faunal Remains

Animal bones and teeth were recovered from excavated contexts at Paco Rojas and Santa Isabel in 1999 and during additional excavations at the latter site in 2000. In July 2000, the remains were rough-sorted by class and Identifiable Specimens (NISP) quantification by Deepika Fernandez, a graduate student specializing in faunal analysis at the University of Calgary. Due to time constraints, it was not possible to examine any bone modifications, other than the most obvious ones. It was also not possible to identify the majority of the remains by specie in the field, preventing a more specific quantification (Fernandez et al. 2001:3). There is no comparative faunal collection within Nicaragua to use in analysis. While waiting for permission to take the remains out of the county for analysis, they were destroyed by Rivas museum workers.

The faunal remains allow for a limited, general comparison between Bagaces and Sapoá/Ometepe Periods in Rivas. The data can also be compared with Healy's earlier analysis of remains from Santa Isabel "A" and La Cruz on Ometepe (Healy 1980:287). Healy's data dates primarily to the Sapoá and Ometepe Periods. Although the relative percentages are not available for her faunal classes, Salgado (1996a:274-278) has analyzed Bagaces Period remains from Ayala in Granada. Garcia and Espinoza (1999:66-72) provide faunal data recovered from an Ometepe Period context from Malacatoya (also in Granada) and Gutiérrez (1984: 128) discusses the preliminary results of primarily Bagaces Period materials from Nacascolo, near the Bay of Culebra. Table 9.5 presents a summary of faunal remains from the Paco Rojas and Santa Isabel excavation units by faunal class; Appendix D provides more detailed information as well as the shovel test data.

The Paco Rojas faunal remains are from Excavation Units 1 and 2. The units were located approximately 200 meters from one another. Based on associated ceramic material and two radiocarbon dates (see Appendices B and F), the faunal remains date primarily to the Palos Negros Phase (late Bagaces Period).

The Santa Isabel faunal materials were recovered from excavation units N16E16, N30E10, and N30E40 and shovel tests conducted in the central area of the site. Excavation Unit N16E16 was located on top of a mound, the other units were situated at its base. All of the remains are associated with both Sapoá and Ometepe ceramics.

Table 9.5. Summary of Faunal Remains from the Paco Rojas and Santa Isabel sites.

	RI-19 EU 1 AND 2		RI-44 EU N16E16, N30E40, AND N30E10						TOTAL	
	Bagaces		Sapoá		Ometepe		Sapoá/ Ometepe			
	#	%	#	%	#	%	#	%	#	%
Mammal	142	14	75	4	256	17	115	12	466	10
Bird	4	.4	31	2	25	2	21	2	77	2
Reptile	226	22	206	10	382	25	59	6	647	14
Amphibian	32	3	0	0	0	0	0	0	0	0
Fish	214	21	537	27	444	29	647	68	1628	36
Gastropod	2	.2	1098	55	174	11	0	0	1272	28
Other	0	0	0	0	1	.06	34	3	35	.8
Unclassifiable	413	.40	30	2	236	15	75	8	341	8
	1033	100	1977	100	1518	100	951	100	4466	100

Comparison of the faunal remains by periods reveals a striking lack of amphibian remains from Sapoá and Ometepe Period contexts. Amphibian remains are also lacking from Healy's materials and only one amphibian fragment (indeterminate specie) was recovered during excavations at Malacatoya (Garcia and Espinoza 1999:71). Amphibian remains were recorded from the Bagaces assemblages from Granada (of unknown quantity) (Salgado 1996a) and a scarce quantity from Nacascolo (Gutiérrez 1984:123).

The highest percentage specie categories during the Bagaces Period in Rivas are reptile (22%) and fish (21%). During the Sapoá and Ometepe Periods, fish (36%) has the highest percentage followed by shell (28%) and reptile (14%). Shell is over-represented because it breaks into many pieces. The high percentages of fish and reptile, therefore, are consistent over time. In contrast, Healy's (1980:290) earlier analysis of materials from the same general area of Santa Isabel mentioned the lack of fish bones, possibly due to poor preservation. Fernandez et al. (2001:4) suggest that the lack of fish remains in the earlier analysis was due to less fine-grained excavation and recovery techniques.

Other remains from Sapoá/Ometepe contexts include a large concentration of apple snail shell (*Pomacea flagellata*) in Excavation Unit N16E16, unworked deer antler, scutes of small turtle species, and crab claws. Crab claws, in particular, are associated with rituals in the Maya area (Fernandez et al. 2001). The size of the turtle remains recovered from Excavation Unit N16E16 correlates with Healy's identifications of pond turtle (*Chrysemis*) and mud turtle (*Kinosternon* sp) (Fernandez et al. 2001). Excavation Unit N30E40, which was further away from the mound than N16E16, contained a large concentration of gar-like fish scales and caiman-like scute. This probably reflects a differential disposal of faunal types across the mound.

Other Artifacts

A range of additional tools, items of personal adornment, and miscellaneous objects were recovered from survey and excavated contexts. Table 9.6 presents a summary by temporal period of the artifacts; more detailed descriptions are presented in Appendix E.

Several tools were made from bone and ceramic. Small fishhooks were recovered, together with modified sherd netsinkers (Figure 9.8), indicating fishing activities. Bone awls and needles relate to textile production, as do bone and ceramic spindle whorls (Figure 9.9).

Artifacts of adornment included polished stone or ceramic ear spools and beads made from stone, bone, and shell (Figures 9.10 and 9.11). Larger ceramic pendants were made from reworked potsherds and perforated with two holes for suspension. The most interesting ornaments were a pendant with an oval design, probably representing a cacao bean, and a large clay bead with the goggle eyes and fangs similar to the central Mexican rain deity, Tlaloc. The two artifacts were found associated with late Sapoá Period materials. A significant difference between Bagaces and Sapoá/Ometepe Periods is the high percentage of Bagaces earspools, which represent 71% of the sample; earspools comprise 2-4% of the artifacts during the following periods. Healy (1980:271) distinguishes between earspools and lip plugs based on a smaller diameter size (1.5-2 cm

Table 9.6. Summary of Excavated Miscellaneous Artifacts by Temporal Period.

	BAGACES		SAPOÁ		OMETEPE		SAPOÁ/OMETEPE*		TOTAL	
	#	%	#	%	#	%	#	%	#	%
Clay										
Worked Sherd	19	10	30	64	52	52	22	47	123	32
Earspool	136	71	1	2	4	4	1	2	142	37
Flute	1	.5							1	.2
Burnt Clay	10	5			11	11			21	5.1
Bahareque	8	4			7	7	1	2	16	4.1
Pipe	1	.5								
Spindle Whorl			2	4	4	4	2	4	8	2.0
Bead	1	.5	3	6	4	4	1	2	9	2.3
Ceramic Ball			1	2	7	7	6	13	14	3.6
Figurine	11	6	7	14	5	4	10	21	33	8.6
Brick					1	1			1	.2
Shell										
Pendant			1	2					1	.2
Bead			1	2	1	1			2	
Bone										
Fish hooks							2	4	2	.5
Pendant	1	.5							1	.2
Worked Bone	1	.5							1	.2
Needle			1	2	1	1			2	.5
Pick					1	1			1	.2
Awl					1	1	1	2	2	.5
Stone										
Bead					1	1			1	.2
Metal										
Nail					1	1			1	.2
TOTAL	189	100	47	100	101	100	46	100	383	100

*This column includes artifacts recovered from shovel tests and Excavation Unit N30E40.

Figure 9.8. Ceramic netsinkers.

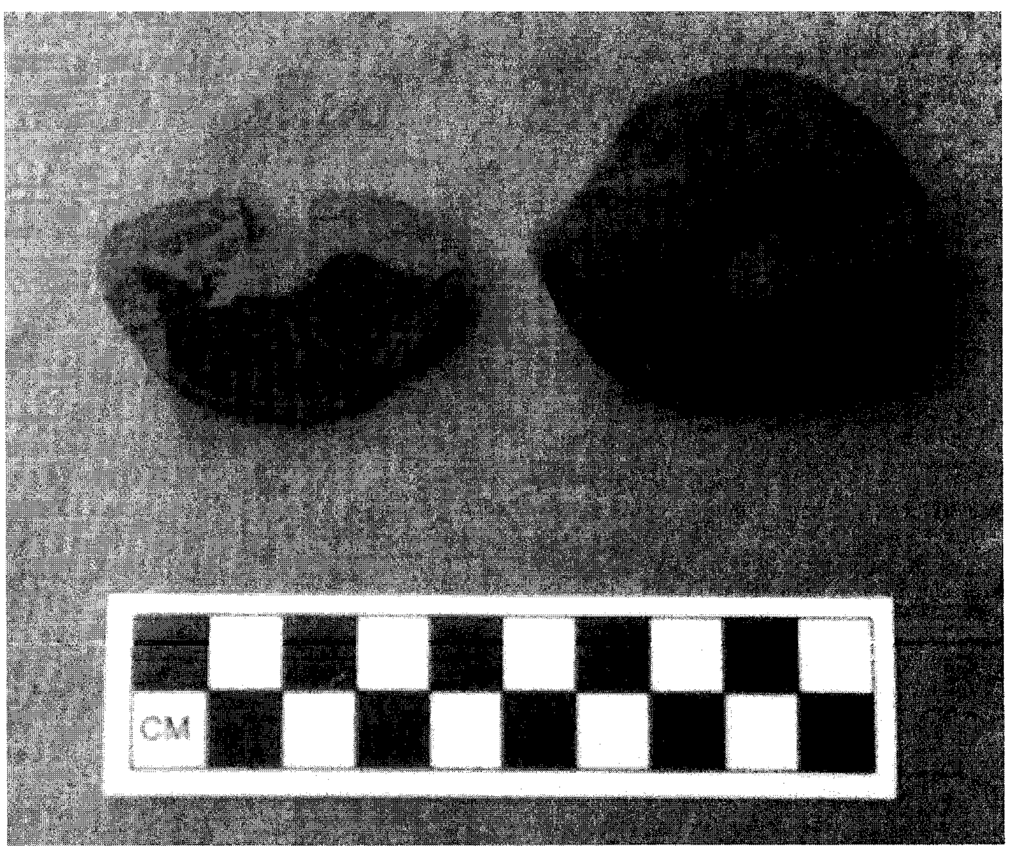


Figure 9.9. Ceramic spindle whorls.

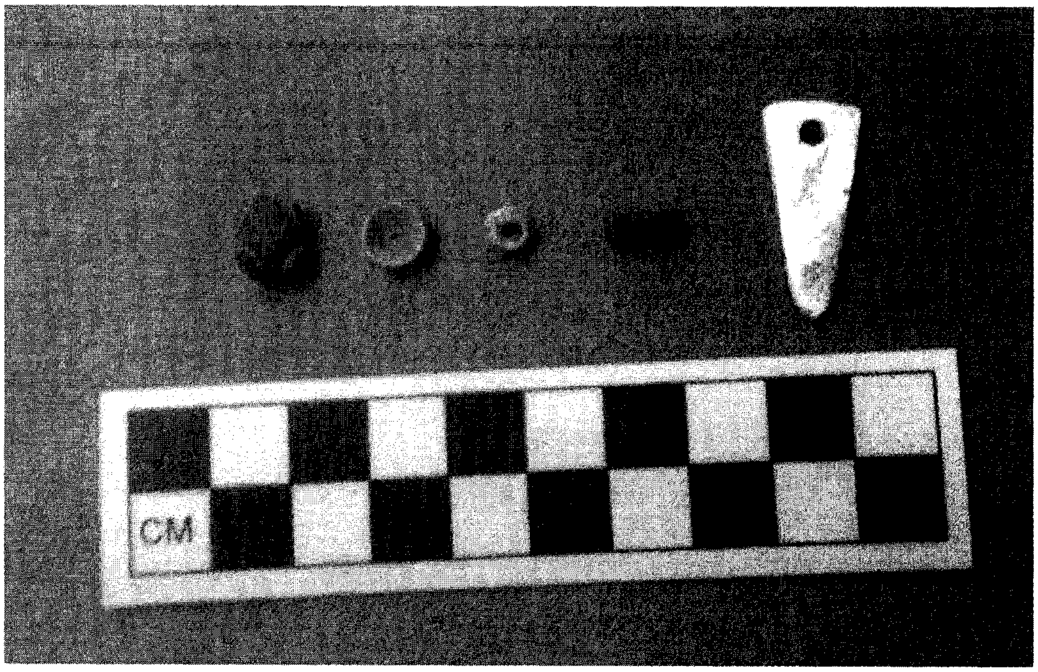


Figure 9.10. Stone, bone and shell beads and pendants.

Figure 9.11. Ceramic earspools.

versus 2.2.5 cm). This arbitrary distinction was not made with the 1999/2000 materials. A higher percentage (47%-64%) of worked sherds are noted for the Sapoá and Ometepe Periods. This category includes "notched" sherds, rounded sherds, and rounded, perforated sherds. The majority of the artifacts in this category are netsinkers and may reflect a shift in fishing methods over time. Another difference in artifact type distribution is the absence of spindle whorls and needles in the Bagaces materials. A square-headed nail was recovered during excavation at the Jose Rojas site; it obviously dates to the Early Colonial Period at the earliest.

Conclusions

A wide range of lithic, faunal, and miscellaneous artifacts were recovered during survey and excavation within the study area. Analysis of this material suggests that significant technological changes occurred with the transition from the Bagaces to later Sapoá and Ometepe Periods. Recovered chert materials suggest the growth of a bifacial industry, while exhausted polyhedral cores and prismatic blade fragments provide some evidence for the development of a core-blade industry. Beveled slate axes, which may have been used for mashing tubers or cracking open nuts or turtle shells, are limited to Bagaces contexts. Unless tubers, nuts, and turtles were no longer a part of subsistence practices, this suggests different processing methods were used during proceeding periods. Turtle remains, at least, are abundant from Sapoá/Ometepe contexts.

Sapoá and Ometepe assemblages are also marked by a 97% decrease in the number of earspools, a higher percentage of reworked sherds, notched sherds, spindle whorls, and needles, and the apparent absence of amphibian remains. Although the data is limited, these differences could indicate changes in personal preferences (e.g., the earspools), subsistence practices (or preferences) (e.g., the lack of amphibian remains), and an apparent intensification of fishing and textile manufacturing activities.

As discussed in Chapter 4, technological changes can be a correlate of migration (see Table 4.1). However, the differences shown between the Bagaces and Sapoá/Ometepe Periods within Rivas do not necessarily point to the arrival of Mesoamerican groups to the region. Increased fishing and textile manufacture could, for example, represent attempts at surplus production, with an associated historically-rooted change in social complexity, while the presence of blade-core technology—something that is specifically associated with Mesoamerican societies—may just as easily result from diffusion. Although the argument for migration is stronger if these changes are considered in combination with those in the ceramic complexes, it becomes stronger yet if there are concurrent developments in the settlement pattern (i.e., the abandonment of some sites, the settling of new ones, changes in intrasite organization, etc). A diachronic reconstruction of the settlement pattern is discussed in the following chapter.

CHAPTER 10
SETTLEMENT PATTERNS

This chapter presents the results of the analysis of the settlement data. The archeological sites are first ranked from a synchronic perspective in order to develop a working typology. Temporal information based on the analysis of materials collected from the sites was then incorporated to reconstruct settlement patterns and, using the working typology, settlement hierarchies through time. The current Greater Nicoya chronology was used: Orosí Period (1000-500 BC); Tempisque Period (500 BC - AD 300); Bagaces Period (AD 300-800); Sapoá Period (AD 800-1350); and Ometepe Period (AD 1350-1522). The temporal classification was based on the presence or absence of diagnostic ceramic types. Table 10.1 provides a listing of components present at each site.

Regional Site Hierarchy

Survey data can be categorized and ordered according to a number of variables. Population estimates, measures of architectural volume, and the presence of certain features believed to have sociopolitical importance are frequently used to produce site hierarchies (Ashmore 1981; de Montmillon 1989). All 48 sites identified as a result of survey were ranked according to three criteria: size, volume, and the presence of indicators of elevated sociopolitical importance (Table 10.2). The last two factors are particularly important for identifying the presence of elites.

Site area was used as a surrogate variable for population size. Other researchers have estimated population based on site size, surface artifact densities, and ethnographic

Table 10.1. Components Represented at Archaeological Sites.

SITE	CHRONOLOGICAL PERIOD			
	Tempisque	**Bagaces**	**Sapoá**	**Ometepe**
Ri-1, Las Piedras		X	X	X
Ri-2, Santa Rosa			X	
Ri-3, Juan Martinez				
Ri-4, Las Lajas				
Ri-5, Humberto Bazarano			X	
Ri-6, Ingenio Xavier Guerra		X	X	
Ri-7, Las Mesas	X			
Ri-8, San Joaquín		X	X	
Ri-9, San Ramón			X	
Ri-10, Salvador García		X		
Ri-11, San Jeronimo		X		
Ri-12, El Corral			X	X
Ri-13, El Castíllo			X	X
Ri-14, Santa Lucía	X	X	X	
Ri-15, San Martín	X	X	X	X
Ri-16, San Félix	X	X	X	X
Ri-17, Jose Rojas				X
Ri-18, El Vergel	X			
Ri-19, Paco Rojas	X	X	X	X
Ri-20, Sabana Grande	X	X		
Ri-21, Sergio Martinez		X		X
Ri-22, El Ojo de Agua				
Ri-23, Santa Elena	X		X	
Ri-24, San Jorge	X	X	X	X
Ri-25, Finca de Caña	X	X	X	X
Ri-26, Jose Mercedes	X		X	X
Ri-27, La Conchita	X	X	X	X
Ri-28, Miguel Mora	X	X	X	
Ri-29, Sodelba Lopez				
Ri-30, El Capulín				
Ri-31, La Ceiba		X		
Ri-32, Sucuyá	X	X	X	
Ri-33, El Pital	X	X	X	X
Ri-34, San Fernando	X	X	X	
Ri-35, Santo Domingo		X	X	X
Ri-36, La Esperanza	X	X	X	X
Ri-37, Yamíl Ríos	X	X	X	
Ri-38, El Paraiso	X	X		
Ri-39, La Noria				
Ri-40, San Jose		X	X	
Ri-41, Alfredo Siazer	X	X	X	
Ri-42, Chata	X	X	X	
Ri-43, Chatilla	X	X	X	
Ri-44, Santa Isabel	X	X	X	X
Ri-45, San Francisco		X	X	X
Ri-46, San Rafael			X	X
Ri-47, El Mojón			X	
Ri-48, El Brújo			X	X

Table 10.2. Synchronic Site Rankings.

Site Ri-	Area Rank	Feature Rank	Imported Goods Rank	Total Score	Site Type
1, Las Piedras	2	0	0	0.6	I
2, Santa Rosa	0	0	0	0.0	I
3, Juan Martinez	0	0	0	0.0	I
4, Las Lajas	0	0	0	0.0	I
5, Humberto Bazarano	0	0	0	0.0	I
6, Ingenio Xavier Guerra	2	0	0	0.6	I
7, Las Mesas	0	0	0	0.0	I
8, San Joaquín	0	0	0	0.0	I
9, San Ramón	0	0	0	0.0	I
10, Salvador García	0	0	0	0.0	I
11, San Jeronimo	0	0	0	0.0	I
12, El Coral	0	0	0	0.0	I
13, El Castíllo	0	0	1	1.0	I
14, Santa Lucía	1	0	0	0.3	I
15, San Martín	2	0	1	1.6	II
16, San Félix	1	0	1	1.3	I
17, Jose Rojas	0	0	1	1.0	I
18, El Vergel	0	0	0	0.0	I
19, Paco Rojas	2	1	1	2.1	II
20, Sabana Grande	2	0	0	0.6	I
21, Sergio Martinez	0	0	0	0.0	I
22, El Ojo de Agua	0	0	0	0.0	I
23, Santa Elena	0	0	0	0.0	I
24, San Jorge	2	2	1	2.6	II
25, Finca de Caña	2	0	1	1.6	II
26, Jose Mercedes	1	0	1	1.3	I
27, La Conchita	1	0	1	1.3	I
28, Miguel Mora	1	0	0	1.3	I
29, Sodelba Lopez	0	0	0	0.0	I
30, El Capulín	0	0	0	0.0	I
31, La Ceiba	0	0	0	0.0	I
32, Sucuyá	2	0	1	1.6	II
33, El Pital	2	0	0	0.6	I
34, San Fernando	2	0	1	1.6	II
35, Santo Domingo	0	0	0	0.0	I
36, La Esperanza	2	0	1	1.6	II
37, Yamíl Ríos	1	0	0	0.3	I
38, El Paraiso	1	0	0	0.3	I
39, La Nória	0	0	0	0.0	I
40, San Jose	0	0	0	0.0	I
41, Alfredo Siazer	0	0	0	0.0	I
42, Chata	1	0	1	1.3	I
43, Chatilla	1	0	0	0.3	I
44, Santa Isabel	3	2	1	3.0	III
45, San Francisco	1	0	0	0.3	I
46, San Rafael	0	0	0	0.0	I
47, El Mojón	0	0	0	0.0	I
48, El Brújo	2	0	0	0.6	I

analogy (e.g., the Basin of Mexico). However, ethnohistorical population estimates for the Rivas region are vague and generally refer to the "Isthmus region." As stated in Chapter 2, there were six large settlements within the region, each 8.5 to 11 kilometers from one another, with the smallest having at least 2,000 inhabitants (Abel-Vidor 1986:392; Fowler 1989:133). This implies little more than a minimum population estimate of 12,000 for Rivas. The apparent abandonment of the lands between Granada and Guanacaste by 1529 also obscures the issue (Pedrarias 1953:I:447 [1529], as cited by Abel-Vidor 1986:398).

It was assumed that intra-site population densities were approximately constant. Site-area values, in hectares, were turned into integral area ranks from 0 to 3: a rank of 0 was assigned to sites under 5.0 ha in area, 1 to sites measuring 5.0 to 24.9 ha, 2 to sites ranging from 25.0 to 124.9 ha, and 3 to sites ranging 125.0 ha or more (see Table 10.2). An exponential scale based on powers of 5 was selected since the range of observed values is large (from 0.0 to 320.0 ha) and clusters at the low end of the scale (Figure 10.1). Fletcher (1986:63) states that site size distributions of the hollow curve type are to be expected:

> From experience we expect that small entities will be numerous and medium-sized ones relatively common. There will be few large cases and very large examples will be rare. The likelihood of a system producing large entities of aggregates is low. The general operational constraints of competition, information transmission, and energy supply limit their occurrence.

Given small sample sizes, a definitive curve for all distributions is not to be expected (Fletcher 1986:62). Instead, the frequency of the site and settlement sizes within broad classes of small, medium, large, and very large should be considered.

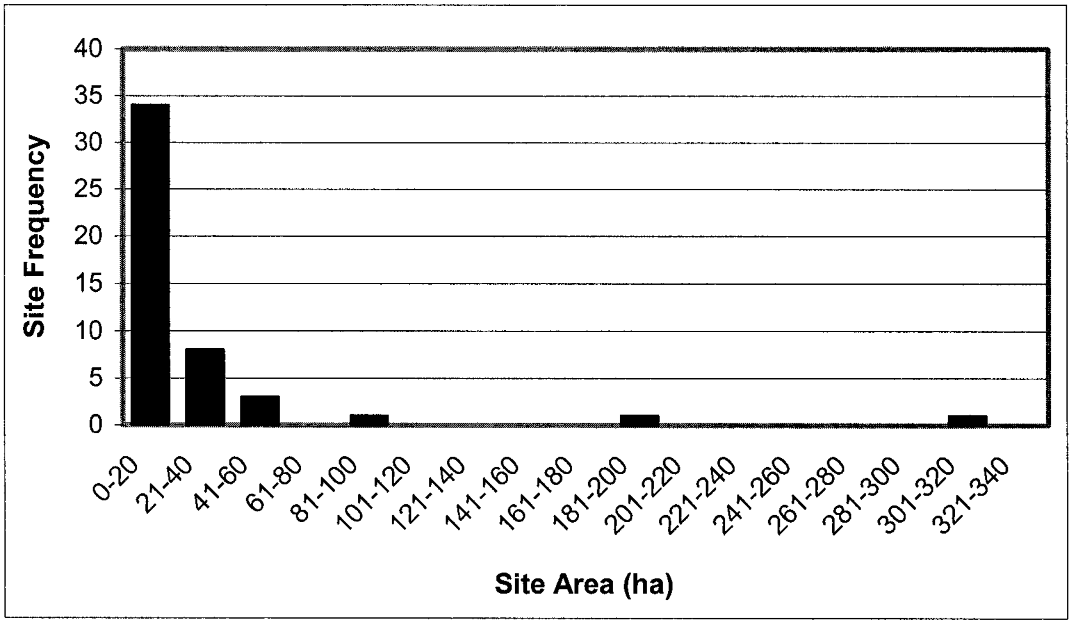


Figure 10.1. Size distribution of archaeological sites identified during survey.

Although conditioned by preservation or destruction, the volume of mound architecture at a site reflects energy invested. Architecture, therefore, is indicative of the ability to control labor, one of the signifiers of elite individuals or groups within a society (see Chapter 5: Reconstructing Social Organization). Architectural volume in this study was relative and not based on actual measurements. A scale of 0 to 2 was used (see Table 10.2). Ninety-three percent of the sites lacked mound features and were assigned a rank of 0. Sites characterized by a single mound were assigned a rank of 1. Sites having multiple mounds were given a rank of 2.

The presence of certain classes of material objects can be considered an indicator of the importance of sites or of the elevated sociopolitical status of their inhabitants. Salgado (1996a), for example, assigns a higher sociopolitical rank to sites in Granada that have carved stone statues and imported ceramics and obsidian. Although statues were not recovered in Rivas, imported ceramics and obsidian are present at numerous sites (see Table 6.1). Rivas sites were ranked based on the presence or absence of imported ceramic and obsidian: 0 was assigned those sites lacking imported goods and a rank of one was given to those with imported materials (see Table 10.2).

In addition to reflecting interaction beyond the local level, imported goods can have strong status-predicting value (Helms 1988, 1992, 1993). However, this is dependent on the type of exchange systems functioning within the region. Bounded network systems, for example, are well ordered to the local hierarchy (Smith 1976). Imported goods are limited to those sites that are either central or intermediary within the settlement hierarchy and can be correlated with the presence of elites. Bounded network economies typically support high-level chiefdoms and states (Smith 1976). If there is an extended network system functioning, exchange is conducted between several equivalent spatial units. The distribution of imported goods does not reflect preferential access and social stratification.

A total score was calculated for all sites by taking the average of area, volume, and imported goods ranks (see Table 10.2). The volume and imported goods ranks were weighted to achieve parity with the area rank. The final score determined site type. A site with a total score of 1.5 or less was assigned Type I. Type II sites have total scores from 1.6 to 2.6. Finally, Type III sites are those with a total score of at least 2.7. Type I comprises 83% of the sites, Type II comprises 14%, and Type III comprises 2%. Although the total-score ranges used to define each site rank were arbitrarily chosen, the results are distributed in an interpretable pattern that is reasonable balanced.

Settlement Pattern of the Orosí and Tempisque Periods

No evidence was gathered indicating settlement of the Rivas region before 1000 BC, the beginning of the Orosí Period. In addition, no Archaic or Paleo-Indian site has been identified within Pacific Nicaragua with the possible exception of Acahualinca, Managua. Only scarce evidence has been found in northwestern Costa Rica. During the early part of the last century, Hartman purchased a fluted point in northwestern Guanacaste, which was later acquired by the Carnegie Museum in Pittsburgh (Stone 1984:27). Although its origins are controversial, the point is comparable to a Clovis point recovered from the Bolivar site during survey as part of the Proyecto Prehistórico Arenal in Costa Rica (Hoopes and Chenault 1994:93; Sheets 1994:231) Lange (1971:209) also states that lithic artifacts collected from several sites south of La Cruz, Guanacaste may represent a temporal period from 5,000 to 7,000 BP, but that the "lack of firm geological data and absence of deposits in stratigraphic contexts rules out firmer assumptions." However, to date, no project has been specifically directed to locate Paleo-Indian or Archaic settlements in Nicaragua.

The earliest Rivas settlement data is problematical due to the lack of well-defined ceramic complexes in the regional sequence that date to the Orosí Period. As discussed in Chapter 8, the only ceramic diagnostic of the late Orosí, Bocana Incised, has been dated between 800 BC to 0 AD (Haberland 1992; Healy 1980; Hoopes 1987, 1992; Lange 1980).

Twenty-three sites, or 45% of all sites within the study area, had components dating to the Tempisque Period (Figure 10.2; Table 10.3). Sixty-five percent of the sites were located at least partially within the survey transects. The sites were characterized by extremely low densities of surface remains and range in size from 25 m^2 to 90 ha. Four sites (e.g., Paco Rojas, San Jorge, Los Pinos, and Santa Isabel) lacked continuous surface remains. The sites are more aptly described as site clusters of seven to 30 ha. Three of the sites (e.g., Santa Elena, Las Mesas, and El Vergel) are considered single component.

In spite of differences in site area, there is no clear indication of a settlement hierarchy (Figure 10.3). Imported artifacts were limited to the Mesoamerican ceramic type Usulután and related wares. The presence of the ceramics at 11 sites indicates that there was no centralized control over imported goods.

Overall, the regional settlement pattern of the Tempisque Period was dispersed, suggesting a lower population than subsequent periods. Incipient aggregation could be

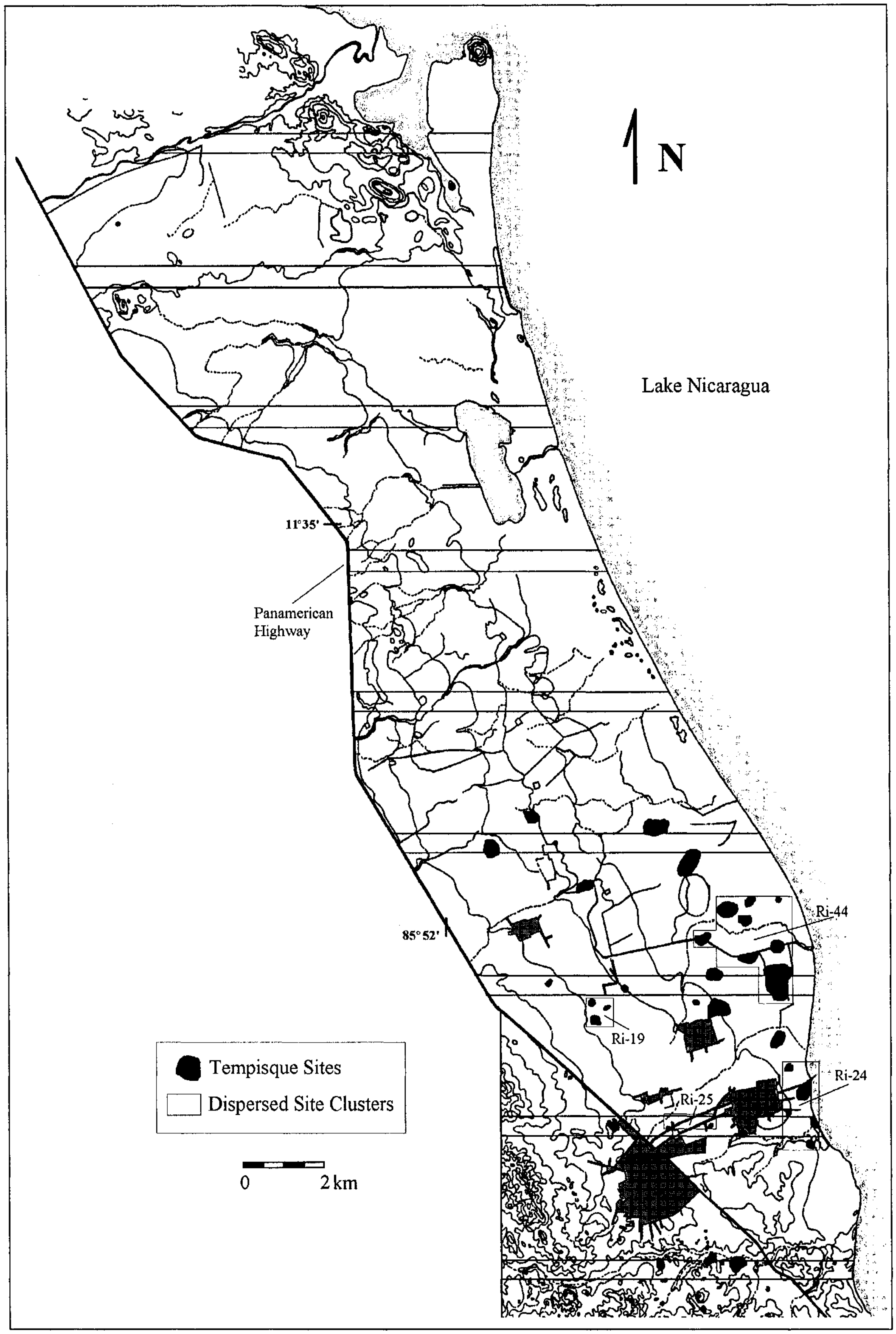


Figure 10.2. Tempisque Period sites in the Study Area.

Table 10.3. Tempisque Period Settlements and Site Rankings.

Site Ri-	Area (ha)	Imported Goods	Area Rank	Feature Rank	Imported Goods Rank	Total Score	Site Type
7, Las Mesas	>1	Ceramics	0	0	1	1.0	I
14, Santa Lucía	8	---	1	0	0	0.3	I
15, San Martín	14	Ceramics	1	0	1	1.3	I
16, San Félix	3	---	0	0	0	0.3	I
18, El Vergel	>1	---	0	0	0	0.0	I
19, Paco Rojas*	9	Ceramics	1	0	1	1.3	I
20, Sabana Grande	1	---	0	0	0	0.0	I
23, Santa Elena	4	Ceramics	0	0	1	1.0	I
24, San Jorge*	35	Ceramics	1	0	1	1.3	I
25, Finca de Caña*	2	---	0	0	0	0.0	I
26, Jose Mercedes	4	---	0	0	0	0.0	I
27, La Conchita	8	Ceramics	1	0	1	1.3	I
28, Miguel Mora	5	---	1	0	0	0.3	I
32, Sucuyá	15	Ceramics	1	0	1	1.3	I
33, El Pital	18	---	1	0	0	0.3	I
34, San Fernando	12	Ceramics	1	0	1	1.3	I
36, La Esperanza	15	Ceramics	1	0	1	1.3	I
37, Yamíl Ríos	1	Ceramics	0	0	1	1.0	I
38, El Paraiso	9	---	1	0	0	0.3	I
41, Alfredo Siazer	2	---	0	0	0	0.0	I
42, Chata	14	---	1	0	0	0.3	I
43, Chatilla	4	---	0	0	0	0.0	I
44, Santa Isabel*	90	Ceramics	1	0	1	1.3	I

*Sites 19, 24, 25 and 44 represent dispersed site clusters and not contiguous surface remains dating to the Orosí/Tempisque periods.

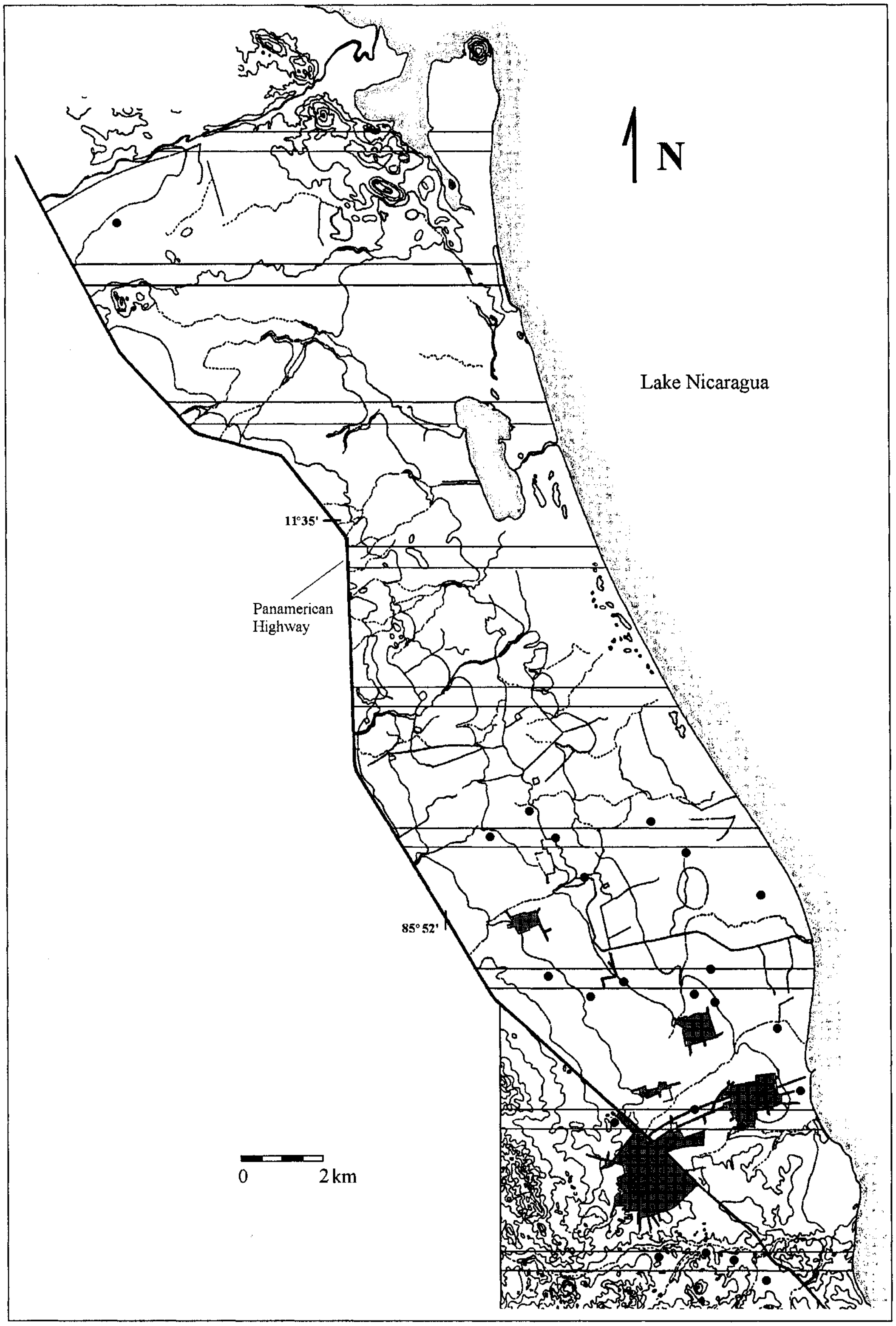


Figure 10.3. Tempisque Period settlements (no hierarchy evident).

hypothesized for the Paco Rojas, San Jorge, Finca de Caña, and Santa Isabel sites, all of whose later Bagaces Period surface remains are much larger.

Settlement Pattern of the Bagaces Period

Twenty-nine sites, or 60 %, of all sites located within the study area, have Bagaces components (Figure 10.4; Table 10.4). Fifteen (51%) of the sites were located at least partially within transects. The number of Bagaces sites represents a 34% increase in the total number of settlements. Settlements that were also occupied during the earlier Tempisque Period were two to five times larger. Nine sites (e.g., Las Piedras, Ingenio Xavier Guerra, San Joaquín, Salvador García, San Jeronimo, Sergio Martinez, La Ceiba, Santo Domingo, and San Francisco) were occupied for the first time. This suggests an increase in population.

Three sites (e.g., Paco Rojas, San Jorge, and Santa Isabel) were characterized by at least one earthen mound approximately 1.5 to 3 m in height and ranging from 10 to 20 m in diameter. Excavations conducted at the mound located in the central area of Paco Rojas revealed cultural deposits over two meters in depth. The recovery of bunt daub suggests that a structure once stood atop the mound. Repeated plowing in the area has destroyed any evidence as packed-earth walking surfaces or post molds that may have existed. A similar low mound was present at Santa Isabel. The mound was located in the part of the site corresponding to the Santa Isabel "B" Site reported by Healy (1980:58). The mound was approximately 20 m by 2 m in size. The mounds of San Jorge were visited by Willey and Norweb in 1959 and 1961 and have since been destroyed. Healy (1980:41) described the mounds, which differed from those of the other sites, as "located

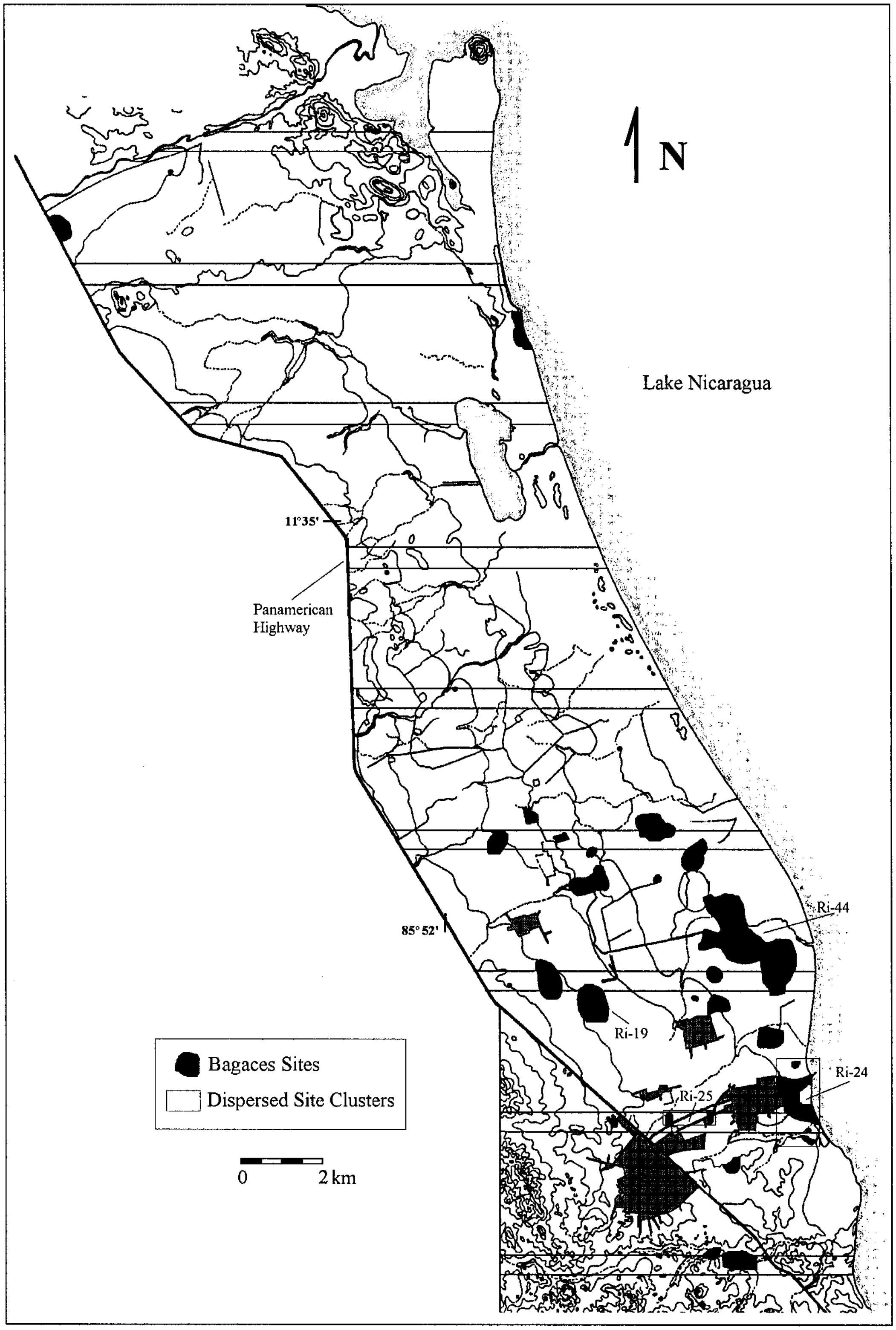


Figure 10.4. Bagaces Period sites in the Study Area.

Table 10.4. Bagaces Period Settlements and Site Rankings.

Site Ri-	Area (ha)	Imported Goods	Area Rank	Volume Rank	Imported Goods Rank	Total Score	Site Type
1, Las Piedras	22	---	1	0	0	0.3	I
6, Ingenio Xavier Guerra	29	---	2	0	0	0.6	I
8, San Joaquín	>1	---	0	0	0	0.0	I
10, Salvador García	>1	---	0	0	0	0.0	I
11, San Jeronimo	>1	---	0	0	0	0.0	I
14, Santa Lucía	2	---	0	0	0	0.0	I
15, San Martín	30	---	2	0	0	0.6	I
16, San Félix	7	---	1	0	0	0.3	I
19, Paco Rojas	45	Ceramics, Obsidian	2	1	1	2.1	II
20, Sabana Grande	40	---	2	0	0	0.6	I
21, Sergio Martinez	>1	---	0	0	0	0.0	I
24, San Jorge	70	Ceramics, Obsidian	2	2	1	2.6	II
25, Finca de Caña	14	---	1	0	0	0.3	I
27, La Conchita	24	---	1	0	0	0.3	I
28, Miguel Mora	5	---	1	0	0	0.3	I
31, La Ceiba	>1	---	0	0	0	0.0	I
32, Sucuyá	31	---	2	0	0	0.6	I
33, El Pital	36	---	2	0	0	0.6	I
34, San Fernando	35	---	2	0	0	0.6	I
35, Santo Domingo	2	---	0	0	0	0.0	I
36, La Esperanza	30	---	2	0	0	0.6	I
37, Yamíl Ríos	5	---	1	0	0	0.3	I
38, El Paraiso	9	---	1	0	0	0.3	I
40, San Jose	3	---	0	0	0	0.0	I
41, Alfredo Siazer	2	---	0	0	0	0.0	I
42, Chata	14	---	1	0	0	0.3	I
43, Chatilla	10	---	1	0	0	0.3	I
44, Santa Isabel	204	Ceramics, Obsidian	3	2	1	3.0	III
45, San Francisco	15	---	1	0	0	0.3	I

in rolling grazing lands which slope markedly toward the lake shore." He considers them to have been platforms for house residences, probably serving to protect the structures against flooding. Imported ceramics and obsidian were found only at these three sites.

Foreign ceramics during this period was limited to Delírio Red-on-White and Tenampúa Polychromes from Honduras. A total of 69 obsidian artifacts were recovered, 39 of which were from excavated contexts at Paco Rojas. Of the excavated artifacts, 37 were sourced to Guiñope, Honduras and two to Ixtepeque, Guatemala.

Based on the differences between the sites, a three-tiered hierarchy settlement can be defined (Figure 10.5). Santa Isabel was at the top of a hierarchy of three levels. The site was clearly larger and more densely occupied than any other site of the period. It covered an area approximately double that of the Paco Rojas and San Jorge sites combined. In spite of this, the existence of mounds and imported materials at these two sites differentiates them from the remaining sites of the period. They were also located approximately 4-5 km from Santa Isabel and each other, forming a triangle. It appears that Paco Rojas and San Jorge represent secondary sites in a three-tiered settlement hierarchy.

The settlement system during the Bagaces Period indicates the emergence of a society with at least an incipient process of social and political differentiation. Santa Isabel emerged as a regional center and most of the population would have been aggregated there. There was an increase in macro-regional interaction from the preceding period with areas located to the north of Rivas. The distribution of foreign artifacts suggests that networks of long-distance trade were controlled by inhabitants of

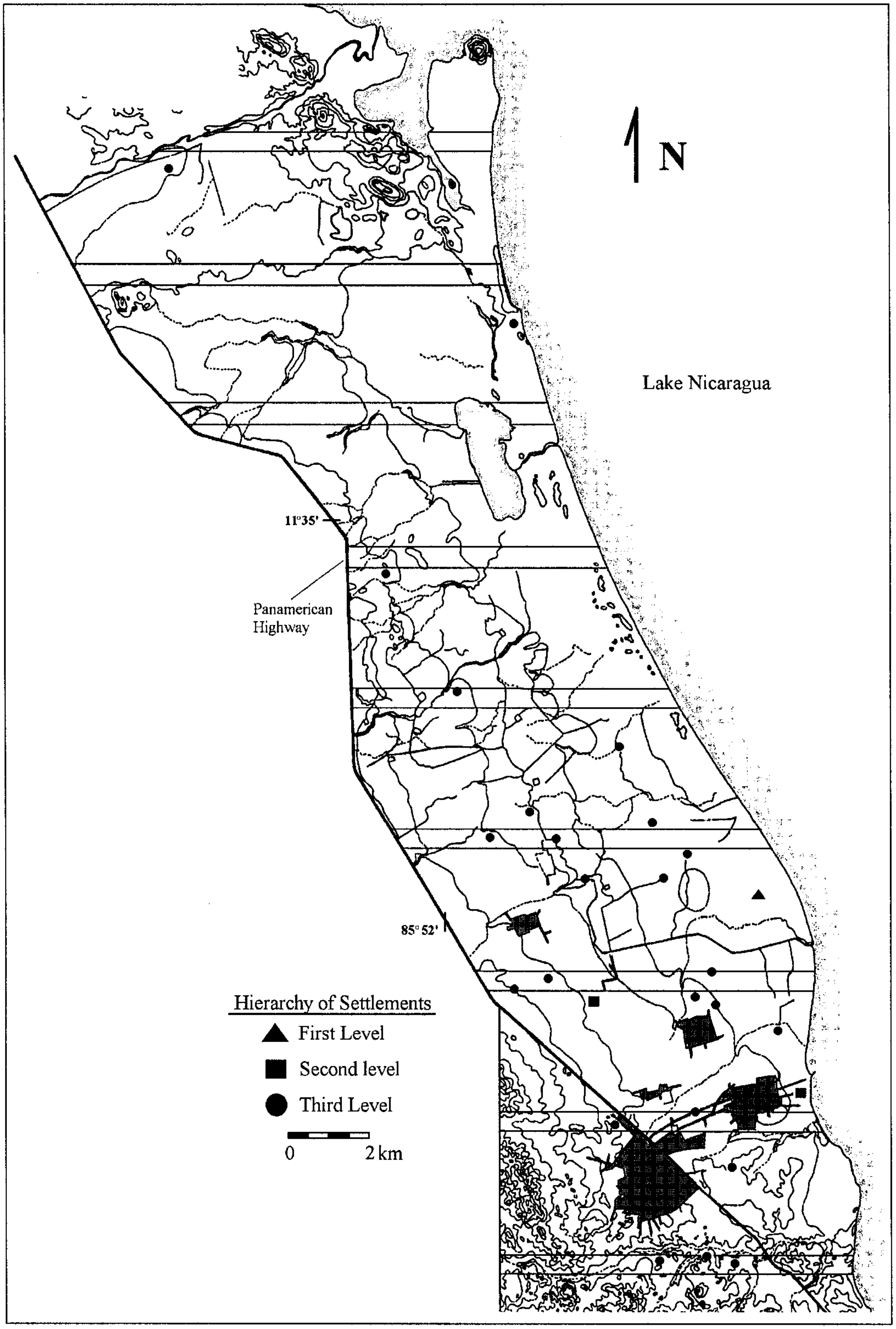


Figure 10.5. Bagaces Period settlement hierarchy.

the largest sites, if not solely by those of Santa Isabel. The foreign artifacts represent not only a mechanism of wealth accumulation, but serve as status builders, associating emergent elite with distant places.

Settlement Pattern of the Sapoá Period

The number of sites occupied during the Sapoá Period is 33, or 68%, of all sites within the region (Figure 10.6; Table 10.5); 51% of the sites were located within transects. Eight of the sites revealed evidence of initial occupation. Two sites (e.g., Sergio Martinez and El Paraiso), occupied during the Bagaces Period, were apparently abandoned. Twelve additional Bagaces sites revealed a 60-90% reduction in total settled area. All sites that were either abandoned or decrease in size are located inland from the lake. At the same time, there was an increase in extension and artifact density of three coastal sites (e.g., Las Piedras, San Jorge, and Santa Isabel). This pattern suggests a change in use of environmental resources, specifically those of the lake.

Although Santa Isabel remained a regional center during this period, the center of the site shifted approximately one km to the east, near the lakeshore. The site is strikingly similar to the contemporaneous regional center, Tepetate, located northwest of the city of Granada. At least 10 low mounds, 1.5 to 2 m in height and 10 to 15 m in diameter characterized the central areas of both sites. The mounds were apparently arranged around an open plaza. One difference between the two sites is the lack of flat rocks or lajas covering the mounds at Santa Isabel (see Salgado 1996a). The excavation of a mound at the site during summer 2000 confirmed that it was artificial with sequential cultural deposits to a depth of over two meters. Packed-earth walking surfaces associated

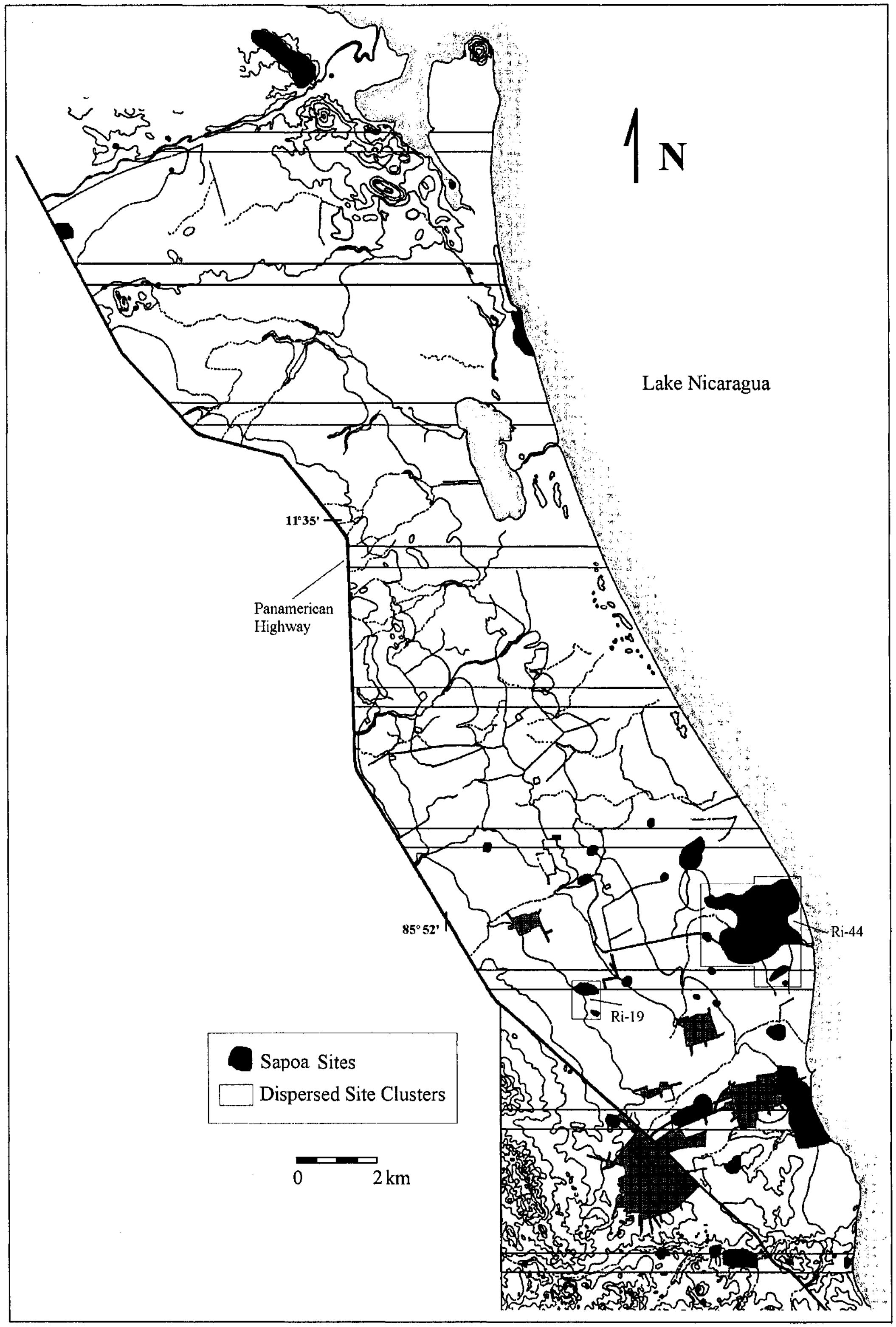


Figure 10.6. Sapoá Period sites in the Study Area.

Table 10.5. Sapoá Period Settlements and Site Rankings.

Site Ri-	Area (ha)	Imported Goods	Area Ran k	Volume Rank	Imported Goods Rank	Total Score	Site Type
1, Las Piedras	27	---	2	0	0	0.6	I
2, Santa Rosa	<1	---	0	0	0	0.0	I
5, Humberto Bazarano	<1	---	0	0	0	0.0	I
6, Ingenio Xavier Guerra	19	---	1	0	0	0.3	I
8, San Joaquin	<1	---	0	0	0	0.0	I
9, San Ramon	<1	---	0	0	0	0.0	I
12, El Corral	<1	---	0	0	0	0.0	I
13, El Castillo	<1	Obsidian	0	0	1	1.0	I
14, Santa Lucia	4	---	0	0	0	0.0	I
15, San Martin	24	Obsidian	I	0	1	1.0	I
16, San Felix	4	Obsidian	0	0	1	1.0	I
19, Paco Rojas	18	---	1	0	0	0.3	I
23, Santa Elena	4	---	0	0	0	0.0	I
24 San Jorge	151	Obsidian	3	0	1	2.0	II
25, Finca de Cana	48	---	2	0	0	0.6	I
26, Jose Mercedes	3	Obsidian	0	0	1	1.0	I
27, La Conchita	18	Obsidian	1	0	1	1.3	I
28, Miguel Mora	7	---	1	0	0	0.3	I
31, La Ceiba	<1	---	0	0	0	0.0	I
32, Sucuya	3	Obsidian	0	0	1	1.0	I
33, El Pital	36	---	2	0	0	0.6	I
34, San Fernando	5	Obsidian	1	0	1	1.3	I
35, Santo Domino	2	---	0	0	0	0.0	I
36, La Esperanza	7	Obsidian	1	0	1	1.3	I
37, Yamil Rios	3	---	0	0	0	0.0	I
40, San Jose	3	---	0	0	0	0.0	I
41, Alfredo Siazer	2	---	0	0	0	0.0	I
42, Chata	3	Obsidian	0	0	1	1.0	I
43, Chatilla	4	---	0	0	0	0.0	I
44, Santa Isabel	271	Obsidian	3	2	1	3.0	III
45, San Francisco	15	---	1	0	0	0.3	I
46, San Rafael	<1	---	0	0	0	0.0	I
47, El Mojon	<1	---	0	0	0	0.0	I
48, El Brujo	99	---	2	0	0	0.6	I

with possible adobe bricks and remnants of burnt daub (e.g., *bahareque*) provided evidence of living areas and architecture. Future research at this site and at Tepetate is necessary to understand their similarities, differences, and intra-site organizations clearly. San Jorge increased in size from 70 ha to 151 ha and the central area of the site shifted south. It remains classified as a Type II site. Paco Rojas decreased in size from 45 ha to 18 ha. The site is considered a Type I site[1].

Identifiable foreign artifacts were limited to obsidian. The obsidian artifacts were more widely distributed than during the Bagaces Period (see Tables 10.4 and 10.5). This suggests that more dynamic exchange and trade mechanisms were functioning. A total of 67 artifacts were assigned to this period. The majority of the artifacts (80%) were sourced to Guiñope, Honduras.

The settlement system during the Sapoá Period was structured in a three-tiered hierarchy (Figure 10.7). At the top of the hierarchy was Santa Isabel. It was clearly larger than any other settlement, covering an area of 2.71 km^2 and characterized by numerous mounds arranged around an open plaza-like area. San Jorge, which was approximately 1.51 km^2 in size and situated on the southern edge of the town San Jorge, was classified as a second-order site. Although manmade mounds, one of the features used to identify second-order sites in Granada during this period, were not found at the site, it was significantly larger with a higher density of surface remains than the remaining sites. Future excavations at the site would be necessary to confirm its position in the settlement hierarchy. The remaining sites comprise the third level of the hierarchy.

[1] The possibility exists that the Bagaces components at San Jorge extend westward towards the center of the modern town. However, artifact densities observed in road cuts and disturbances within residential yards along the western portion of the site area were low. The site's Sapoá and Ometepe components are most heavily concentrated on a finca located southeast of the modern residential district of San Jorge.

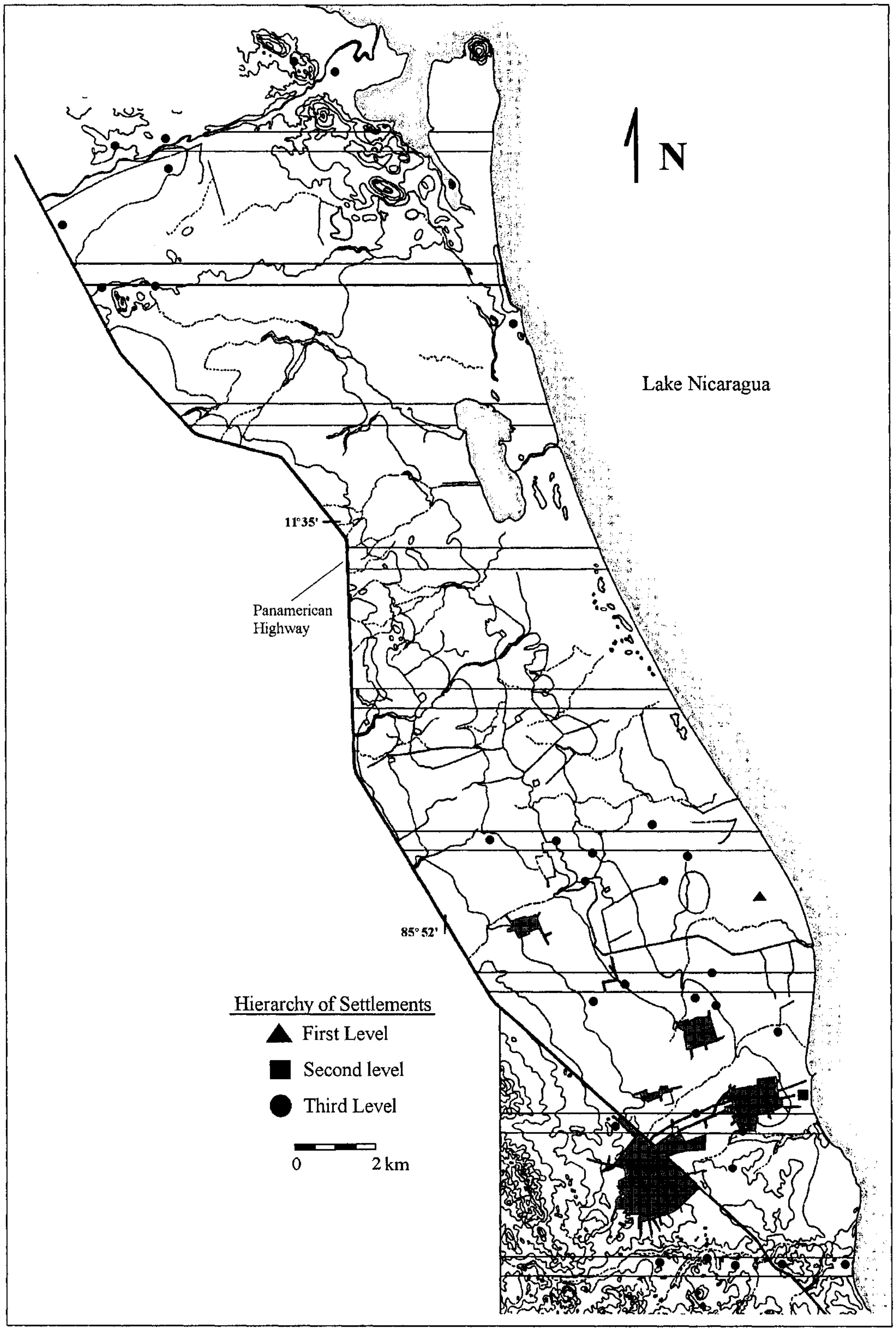


Figure 10.7. Sapoá Period settlement hierarchy.

A series of changes occurred both at the micro and macro levels of the settlement pattern when compared to the Bagaces Period. In addition, there was a 13% increase in the total number of sites, from 29 to 33 sites, and an increase in total settled area. These developments were accompanied by changes in lithic and pottery technology and in the iconography of the latter (see Chapter 8: The Ceramic Artifacts).

Settlement Pattern of the Ometepe Period

Identification of Ometepe Period settlements based on surface remains is difficult due to continuation of main Sapoá-period ceramic types in Ometepe artifact complexes. These ceramics defining the period (e.g., Vallejo, Madeira, Luna, and Castillo Engraved) are recovered in low frequencies in Rivas as well as other regions of Pacific Nicaragua. This fact was once assumed to indicate a decline in the number of sites, and thus population levels (e.g., Healy 1980; Salgado 1996a). The Rivas sites were classified as Ometepe only if the minor but chronologically significant types were collected. The possibility exists that some Ometepe Period sites were not classified as such. Only excavations conducted at Sapoá and Ometepe Period sites will provide a definitive answer as to their chronologies.

A total of 18 sites were assigned to the Ometepe Period (Figure 10.8; Table 10.6), 10 (55%) of which were located within transects. This represents a 45% decrease in the number of sites from the Sapoá Period. Additionally, the total area of eight sites decreased from the Sapoá to Ometepe Periods while only two sites (e.g., San Jorge and Jose Mercedes) show an increase. Two sites revealed evidence of initial occupation during this period (e.g., Jose Rojas and Sergio Martinez), both of which were classified as

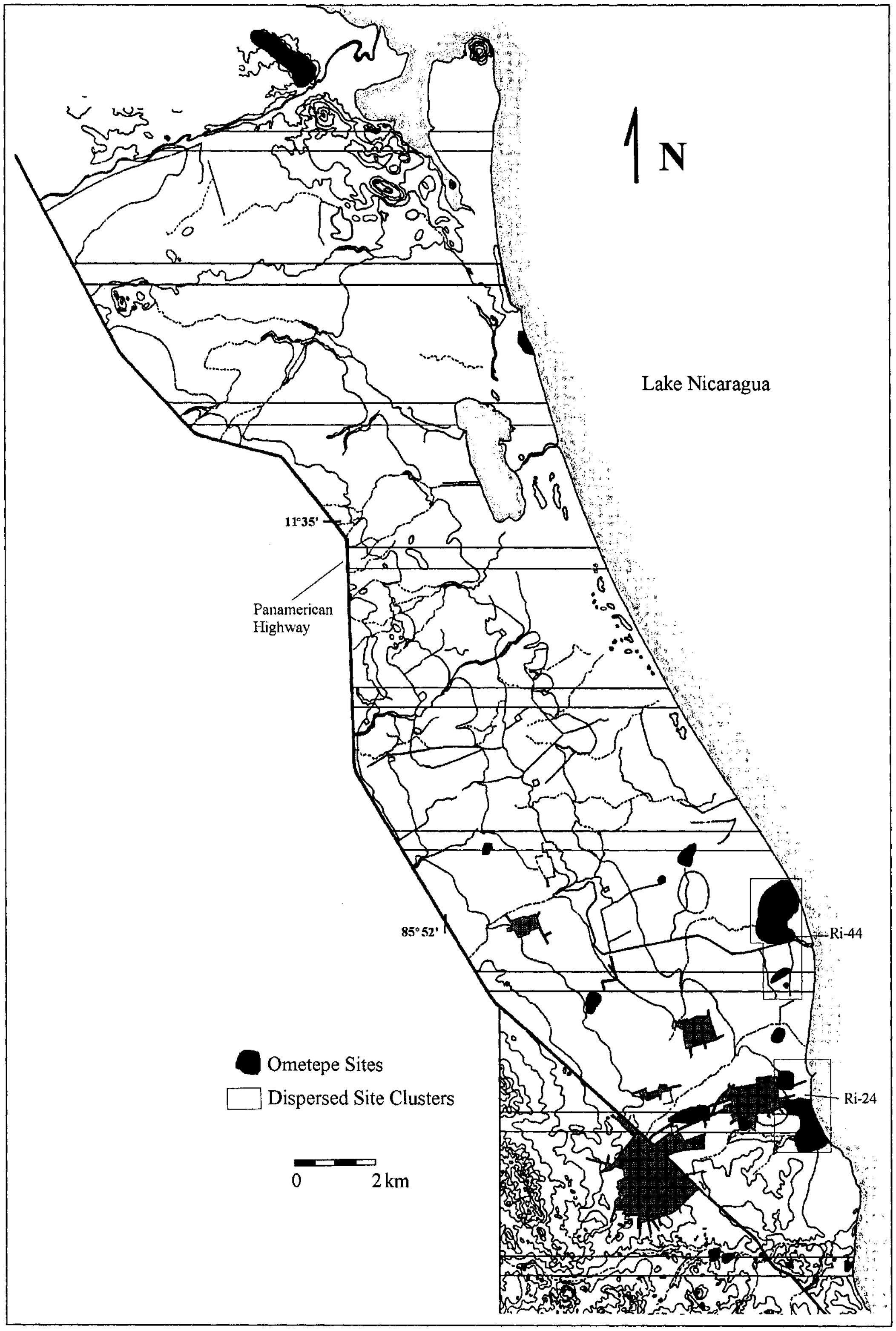


Figure 10.8. Ometepe Period sites in the Study Area.

Table 10.6. Ometepe Period Settlements and Site Rankings.

Site Ri-	Area (ha)	Imported Goods	Area Rank	Volume Rank	Imported Goods Rank	Total Score	Site Type
1, Las Piedras	14	---	1	0	0	0.3	I
12, El Corral	<1	---	0	0	0	0.0	I
13, El Castíllo	<1	Obsidian	0	0	1	1.0	I
15, San Martín	6	---	1	0	0	0.3	I
16, San Félix	4	Obsidian	0	0	1	1.0	I
17, Jose Rojas	<1	Obsidian	0	0	1	1.0	I
19, Paco Rojas	13	---	1	0	0	0.3	I
21, Sergio Martinez	<1	---	0	0	0	0.0	I
24, San Jorge	123	Obsidian	2	0	1	1.6	II
25, Finca de Caña	26	---	2	0	0	0.6	I
26, Jose Mercedes	8	---	1	0	0	0.3	I
27, La Conchita	11	---	1	0	0	0.3	I
33, El Pital	12	---	1	0	0	0.3	I
35, Santo Domingo	2	---	0	0	0	0.0	I
36, La Esperanza	5	---	1	0	0	0.3	I
44, Santa Isabel	130	Obsidian	2	2	1	3.0	III
46, San Rafael	<1	---	0	0	0	0.0	I
48, El Brujo	99	---	2	0	0	0.6	I

Type I sites.

In spite of the decline in the number of sites, the regional hierarchy maintained three levels (Figure 10.9). Santa Isabel appears to have remained the regional center based on the recovery of Ometepe materials from the mounds in the central area of the site. Although the exact location of Nicarao settlement, Quauhcapolca, is not known, Santa Isabel, for its prominence during the Ometepe Period, is a good candidate. San Jorge, as a secondary site, was still differentiated by its size and artifact density compared to the remaining sites. Tertiary sites consisted of nine dispersed villages and seven hamlets. Imported artifacts were limited to obsidian. As during the Sapoá Period, the distribution of foreign goods indicates dynamic exchange mechanisms were functioning. Thirty-five obsidian artifacts were assigned to the Ometepe Period. The obsidian was sourced to Guiñope and Ixtepeque.

Developments in the Rivas Settlement Pattern

Processes of nucleation occurred within communities of the Rivas region from approximately 300 BC to AD 800. There is no indication that the growth of sites, such as Paco Rojas or Santa Isabel, from the Tempisque to the Bagaces Period was triggered by population pressure, scarcity of resources, or any form of circumscription. In spite of this, hints of social differentiation exist. From one period to the next, there was a 34% increase in the number of sites. Site size also increased. Three sites (e.g., Paco Rojas, San Jorge, and Santa Isabel) were each characterized by one earthen mound. Imported goods were also limited to these sites. Santa Isabel was at the top of a hierarchy of three levels based on its size, covering an area almost double that of the Paco Rojas and San

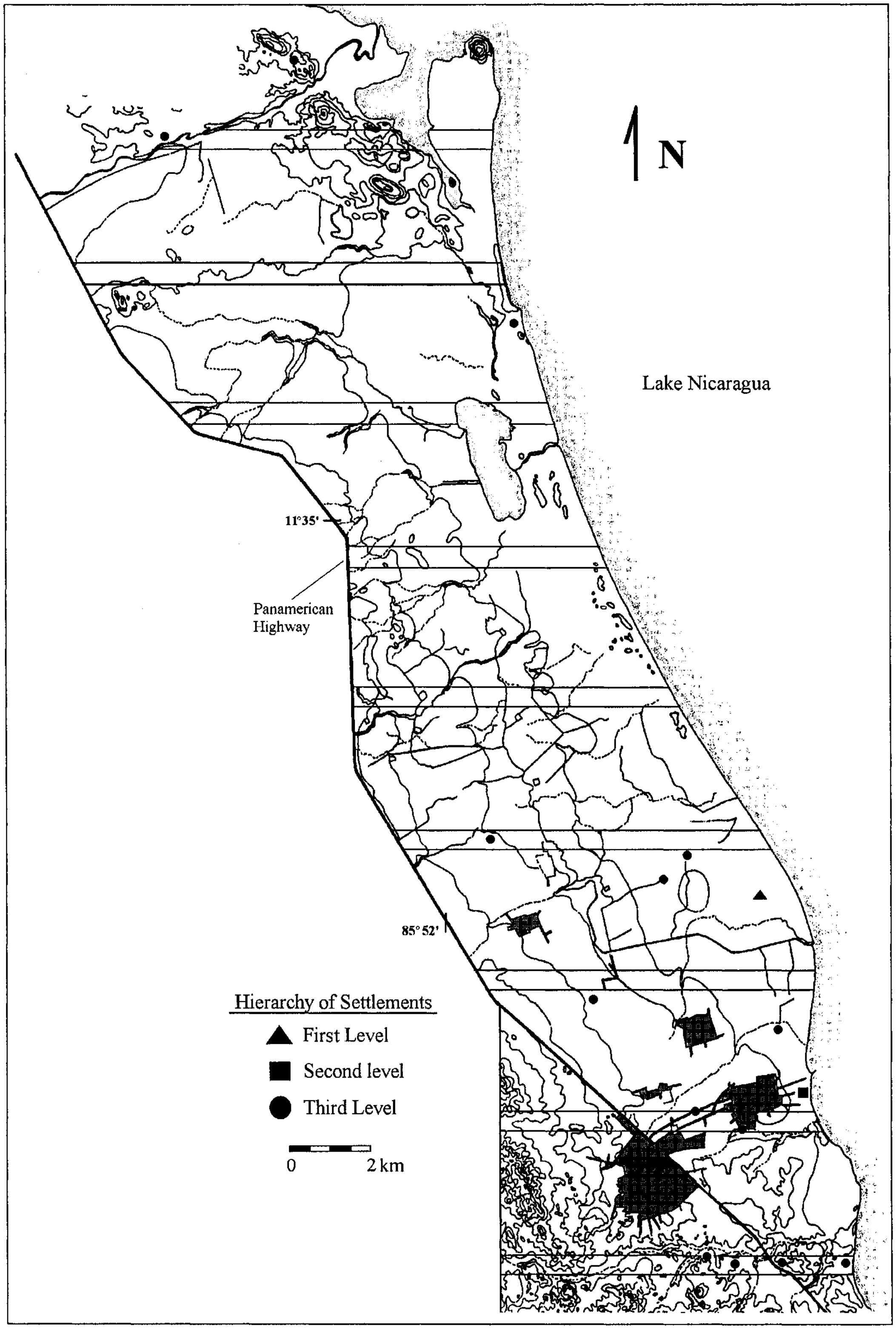


Figure 10.9. Ometepe Period settlement hierarchy.

Jorge sites combined. Paco Rojas and San Jorge were interpreted as secondary sites.

Following the Bagaces Period, significant changes in regional and community patterns are evident. Sites previously settled suffered a decline in the density of occupation or abandonment, and, in the case of Santa Isabel, a new larger nucleated center emerged having a different layout than that of previous periods. Multiple earthen mounds, which may be arranged around an open plaza-like space, characterized the center of the site. A three-tiered settlement hierarchy was present with Santa Isabel as the regional center. San Jorge was again a second order site.

The transition to the Ometepe Period was marked by a 45% decrease in the number of occupied sites. However, identification of Ometepe Period settlements is difficult due to the continuation of main Sapoá Period ceramic types. In spite of the possible decline in sites, the regional hierarchy maintained three levels. Santa Isabel remained the regional center based on the presence of Ometepe materials from the mounds in the central part of the site.

These changes in the settlement pattern were accompanied by significant changes in the artifact complexes (see Chapter 8: The Ceramic Artifacts and Chapter 9: Lithic, Faunal, and Other Artifacts). It is probable that they were related to the migration of Mesoamerican groups to the area. This evidence supporting the arrival of the groups is discussed in more detail in the following chapter.

CHAPTER 11
EVALUATING MODELS OF RIVAS SOCIOPOLITICAL DEVELOPMENT

This chapter explores evidence for the migration of Postclassic Mesoamerican groups to the Rivas region and the possible sociopolitical impact of their arrival from the ninth to the fifteenth centuries. The area is discussed within a larger sociopolitical and economic context in order to illuminate how interregional relationships changed during the post-migration period and the extent to which the social and economic networks of Rivas may have facilitated migration to the area. The sociopolitical development of Rivas is first compared with data available from other regions of Greater Nicoya.

Comparisons with Other Regions of Greater Nicoya

During the last several decades, there has been much research conducted within Greater Nicoya (see Figure 3.1). This includes work in Chontales (Gorin 1990; Espinoza and Rigat 1994), the Lake Managua Basin (Espinoza et al. 1994), Madriz/Estelí (Espinoza et al. 1996; Fletcher 1993; 1994), the Islands of Lake Nicaragua (Baker and Smith 1987; Bruhns 1992; Haberland 1992), Granada/Masaya (Salgado 1996a; Salgado et al. 1998), the Bay of Salinas/Río Sapoá Valley (Lange 1971, 1986, 1996), the Bay of Culebra (Lange and Abel-Vidor 1980; Solís 1998; Vazquez and Weaver 1980); the Tempisque River (Baudez 1967; Day 1982); the Guanacaste-San Carlos corridor (Creamer 1979; Ryder 1986; Norr 1986); the Gulf of Nicoya (Creamer 1983, 1986), the Nosara Valley (Guerrero 1986; Lange et al. 1974) and the Arenal Basin (Sheets and McKee 1994).

Unfortunately, the paucity of research in several areas greatly inhibits inferences concerning sociopolitical development. Reconstruction of the regional settlement pattern in the Lake Managua Basin area, for example, is obscured by the lack of chronological control. Archaeological survey in this area identified a total of 78 sites, several of which were distinguished by size and the presence of numerous manmade mounds (Espinoze et al. 1994). Due to the lack of diagnostic material, it was not possible to assign 49 sites to a temporal period.

Regional research conducted on the islands of Ometepe and Zapatera in Lake Nicaragua is also limited. Fifty-three sites were located on Ometepe Island, which has the longest occupation sequence yet known in Nicaragua (Haberland 1992). Although artifact densities were the highest during the San Roque Phase (AD 500-950), possibly reflecting high population levels, there is no clear indication of a settlement hierarchy during this period or at any point in the cultural sequence (Haberland 1992:83).

Projects conducted on Zapatera Island have not specifically addressed questions of social and political organization. However, sites differentiated by size and layout, such as Punta de Las Figuras and Sonzapote, are thought to reflect the existence of hierarchical societies (e.g. Bruhns 1992:340). Both sites had ceremonial centers defined by the presence of earth mounds with stone statues placed around their perimeter (Lange et al. 1992: 28). Bruhns (1992:342) argues that settlements of this type suggest

> ...that there was a very important site in an area, head and shoulders above the others in terms of access to labor and general wealth, or, equally, that these were specialized sites, whose effusion of artwork was supported by others for some, as yet, unknown reason.

Based on associated ceramics, the main occupation of these sites occurred during the Sapoá and Ometepe Periods (Baker and Smith 1987). Any sociopolitical differentiation would thus be associated with those periods. Considering the islands in a larger context, Salgado (1996a:156) speculates that Zapatera, if not both islands, was part of a larger system involving mainland sites. Future research at the islands could clarify their relationships with mainland areas as well as their cultural sequences.

Many of the systematic surveys conducted within northwest Costa Rica did not identify sites with clear-cut central place or hierarchical status (e.g., Lange and Norr 1986). In some cases, it seems that central place status would only be assigned if the sites were of the same scale as Teotihuacan, Monte Alban, or even Quelepa (e.g., Lange 1992:112). In the Bay of Culebra, for example, there are distinctions based on total site area and variations in material culture (e.g., quantity/quality of polychrome ceramics, the presence or absence of imported trade items) (Lange 1984:182). Researchers have not made the step to hypothesize how this is connected with regional social organization (e.g., Lange 1984:183). Lacking the architectural evidence to establish site hierarchies, analysis has shifted to that of intrasite organization, focusing on ceramics, lithics, human skeletal remains, and, when possible, structures. Although there is evidence suggesting that individuals were ranked at some sites (e.g., Vasquez 1986), the implication of this at the regional level is unknown, in turn making comparison with data from Rivas difficult.

Archaeological surveys conducted of the Río Sapoá Valley and adjacent portions of the Bay of Salinas also did not identify evidence of settlement hierarchies at any point in time (e.g., Lange 1971; 1986; 1996b). However, this area represents a distinct transitional zone between Nicaragua and northwest Costa Rica based on recovered ceramic types (Lange [1996:139] uses the term "crossroads"). During the Tempisque Period, sites were characterized by scarce quantities of ceramics including Bocana

Incised and Rosales Engraved (Lange 1986:Table 1.1, 1996:127). Zelaya Painted and Guinea Incised, diagnostic of the later part of the Tempisque Period within the nearby Bay of Culebra and the Santa Elena Peninsula, were not recovered. Tola Trichrome was present during the later part of the Period at the Las Marias site. Ceramics present during the Bagaces Period include Chavez White-on-Red, Galo Polychrome, León Punctate, and Carrillo Polychrome, a so-called southern sector type and not identified in Rivas during survey and excavation (Lange 1996:131).

During the Sapoá Period, Jicote Polychrome, a predominant type in the Tempisque Valley, was not present; Mora Polychrome was identified, representing the northernmost presence of this ceramic type, with the exception of the few samples found in Rivas. As part of the movement of white-slipped ceramics from the northern sector into the southern sector, the ratio of Papagayo to Mora at Las Marias was 3 to 1 but nearly the opposite at Chahuite Escondido, located on the adjacent Santa Elena Peninsula (see Lange 1996:133). This suggests that the Río Sapoá/Bay of Salinas area was peripheral to existing interaction routes.

During the Ometepe Period, the Río Sapoá/Bay of Salinas area marks the northern limits of substantial amounts of Bramadero Polychrome and Murillo Appliqué and the southern limits of Madeira Polychrome (Lange 1994). Banda also appears to have had its distribution focused in this area. Based on the number of Bramadero, Murillo, and Banda samples recovered from Rivas compared to the earlier Mora Polychrome, it would appear that more interaction was occurring between the northern and southern sectors than during the previous Sapoá Period.

Shifting further south from Rivas, archaeological sites identified within the Gulf of Nicoya area reflect gradual population growth over time and a shift from inland to more coastal areas (Creamer 1984, 1986). Although a definite hierarchical organization of sites was not identifiable on the basis of surface collections, at least two settlement types are indicated by the remains found at Carrizal, a ceremonial center distinguished by both size and material remains (Creamer 1986). The site, which dates to the Bagaces Period, is considered to have been an important trade center but its exact relationship to other Early Polychrome Period sites remains unexplored. During the Sapoá Period, the materials remains recovered from sites were similar to those identified at sites in other parts of Guanacaste and both habitation and cemeteries were recorded (Creamer 1986). Distinct local traditions develop after approximately AD 1200, with ceramics appearing to form a social boundary between the Gulf of Nicoya and adjacent areas (Creamer and Haas 1985:748). In addition, sites dating after AD 1200 show no evidence of architectural features or communal labor projects—only shell middens—and there is little indication of specialized production. Although a range of social statuses is represented by burial data (e.g., differences in associated burial goods), consistent classes of burials could not be definable based upon the available data (Creamer and Haas 1985).

Inferences regarding social organization based upon settlement data from the Arenal Basin area are limited: a recent enlargement of Lake Arenal inundated everything below 540 meters above sea level (Mueller 1994:543). This included the most extensive areas of flat land, which were presumably more attractive for both settlement and agriculture (Mueller 1994:543). The most substantial occupation of area occurred during the Arenal Phase (500 BC – AD 600) (Tempisque through Bagaces Periods) (Mueller

1994:62). During this time span, sites increased in both size and frequency. Evidence of large-scale land clearing (e.g., the apparent absence of forest indicators and substantial increase of weedy grasses within phytolith assemblages) may be related to population increase and regional expansion (Mueller 1994:62-63; Piperno 1994:292). Arenal Phase ceramic assemblages show a fair degree of similar to Greater Nicoyan assemblages to the west (see Hoopes 1987, 1994).

During the Silencio Phase (AD 600-1300), there appears to have been a population shift from the lakeshore, westward to the Piedra River Valley (Mueller 1994:64). Highland sites during this time included a cemetery and two sites that were apparently caches for *lajas* (flat stones) used in tomb construction. In the Piedra River valley, there was one large habitation site and two cemeteries with unique ground and incised stone markers or stone-faced masonry. Two other possible elite cemeteries were located in the middle reaches of the Arenal River Valley. The nature of grave goods, the presence of architecture at some cemeteries, new site types (e.g., the *laja* repositories), and the presence of a few large habitation sites could suggest increasing social differentiation (Mueller 1994:63), which would have been roughly coeval with developments in Rivas. There is little evidence that Silencio Phase sites were more nucleated than the largest sites of the Arenal Phase, although this could be due to the limitations of the settlement data (Mueller 1994:63). A high level of contact between this area and western Greater Nicoya is indicated by the use of Greater Nicoya ceramic production techniques (e.g., specifically polychrome decoration and fine line incision) and the presence of polychrome vessels from Greater Nicoya in burials (Hoopes 1994:192).

The final Tiluran Phase (AD1300-1500) appears to represent a time of instability within the Arenal Basin area (Mueller 1994:63). Although some sites increased in size, others decreased or were abandoned. No new sites were established. This phase is marked by a divergence from ceramic assemblages commonly found along the Pacific Coast and Tempisque Valley (Hoopes 1994). In particular, with the exception of Jicote Polychrome, none of the late painted types of Greater Nicoya are present; the phase is instead characterized by large, coarse ceramics similar to those from the Gulf of Nicoya (Hoopes 1994).

Developments within Chontales, Madrid/Estelí, and Granada/Masaya most closely parallel those of Rivas. Ninety-seven sites, spanning a time period from 500 BC through AD 1600, have been identified within the Chontales region (e.g., Gorin 1990; Espinoza and Rigat 1994). Site differentiation first occurred during the Cuisalá Phase (AD 400-800), which was coeval with the Bagaces Period. Both mounded and non-mounded sites were present. In the following Potrero Phase (AD 800-1200), this pattern appeared to increase in complexity. Sites were larger and the number of mounds increases at those sites that have these features. There is also evidence that statuary was present at some of the sites. The settlement pattern was the most complex during the Cuapa Phase (AD 1400-1600). The three largest sites (e.g., San Jacinto, La Candelaria, and El Amparo) were characterized by numerous mounds and more than one plaza. San Jacinto had 197 circular mounds spread over 6.5 ha. A plaza was located near the largest mound. La Candelaria was over three ha in size and characterized by 47 stone-faced circular mounds, the largest also located in front of a plaza. Mound placement at the last site, El Amparo, reveals a more structured pattern. In the southwest section of the site, there was a closed plaza bordered at each side by two parallel rows of mounds. The site was approximately 4 ha in size. Differences present between sites with and without mounds during the Cuisalá Phase reflect a regional hierarchy of at least two levels. This suggests incipient complexity that was roughly coeval with Bagaces Period developments in Rivas.

The settlement pattern of the Madriz/Estelí region can tentatively be reconstructed (Braswell et al. 2002). In particular, a three-tiered settlement hierarchy emerged between AD 300-600 (Braswell et al. 2002:9). Stone mounds of variable sizes and, at times, an open plaza-like space characterized the largest sites. Foreign artifacts were also found primarily at these sites. The site differentiation and limited distribution of imported goods indicates the incipient development of politically centralized polities concurrent with the polities of Rivas during this time period (Braswell et al. 2002:9).

From AD 600-950 (the late Bagaces Period), the complex sociopolitical organization was consolidated in Madriz/Estelí (Braswell et al. 2002:13). The settlement pattern reflected a site hierarchy consisting of four levels, with regional centers characterized by the presence of more than one plaza, numerous mounds, and a size of more than 10 ha (Braswell et al. 2002:13; Espinoza et al. 1994:40-41). A significant increase in imported materials indicates intensified contact with cultures to the north, particularly those of Honduras and El Salvador. While sociopolitical complexity emerged during the Bagaces Period in Rivas, current evidence indicates that a similar process of consolidation did not occur.

Only scarce amounts of white-slipped ceramics dating to the Sapoá and Ometepe Periods have been recovered from the Madriz/Estelí region (Fletcher 1993). This suggests at least a minor occupation during those periods, but makes settlement comparison with other regions difficult.

Within the Granada/Masaya area, inferences about sociopolitical organization were drawn from data recovered during surface inspections (Salgado 1996a; Salgado et al. 1998). During the Tempisque Period, the majority of the sites were located inland and characterized by low densities of surface remains. No mounds were evident. Similar to the Rivas sites, there was no clear indication of a settlement hierarchy. Imported artifacts were also limited to Usulután or Usulután-related ceramics (Salgado et al. 1998:11).

With the transition to the Bagaces Period, there was an increase in the number and size of sites (Salgado et al. 1998:11). There was no surface indication of mounds similar to those found at contemporaneous Rivas sites. A two-tiered settlement hierarchy was clearly distinguished with the Ayala Site as regional center based on its size and surface artifact density. Imported materials, recovered only at Ayala, were limited to obsidian and Ulúa, Delírio Red-on-White, and Tenampúa Polychromes (Salgado et al. 1998:12). These factors indicate the emergence of political complexity coeval with developments in Rivas.

During the latter half of the Bagaces Period, the complex form of sociopolitical organization was consolidated (Braswell et al. 2002:13). This is reflected by an increase in the number of imported ceramics recovered in diverse excavated contexts (Salgado 1996a). Imported ceramics included Las Vegas Polychrome, which was recovered from Bagaces/Sapoá transitional excavation levels (Salgado et al. 1999:16). No increase occurred in the number of imported ceramics at sites located in Rivas based on the available data. In spite of this, both the Rivas and Granada/Masaya regions were part of the same ceramic sphere.

During the Sapoá Period, sociopolitical organization was significantly restructured in the Granada/Masaya region (Salgado et al. 1998:12-13). For the first time there were permanent sites located on the coast of Lake Nicaragua, indicating the occupation of new environmental areas and—similar to developments in Rivas—a focus on different natural resources. The number of sites increased, while important sites from the preceding period (Bagaces) were either smaller in total area, or abandoned altogether (Niemel et al. 2001)

A three-tiered settlement hierarchy emerged with Tepetate as the paramount regional center. As has already been discussed in Chapter 10, the site was similar to the Rivas regional center, Santa Isabel. In addition, a high frequency of figurine molds at the site provides evidence for specialized ceramic production (Niemel et al. 1997:678).

Stone sculpture made its first regional appearance at two second-order sites, San Ignacio and El Rayo, providing a strong indication of not only the regional hierarchy, but also of specialization. The sculpture was similar to that found on the islands and coast of Lake Nicaragua: a columnar human-type figure with an animal sometimes depicted hanging over the shoulders or head. Several stone-faced mounds were also found at each site. No sites with stone sculpture were located during Rivas surveys, nor was sculpture noted at Tepetate. However, property owners had removed the sculptures found at the second-order sites from their original contexts, something that may have occurred elsewhere.

Foreign artifacts were limited to obsidian and were more widely distributed than in the previous period. As in Rivas, pottery from regions located outside Greater Nicoya was not recovered from Sapoá contexts. Nonetheless, similarities existed between several ceramic types and types produced in areas of Mesoamerica. Changes in the settlement pattern were also accompanied by change in lithic and ceramic technologies.

During the Ometepe Period, there was a decrease in the number of sites. Similar to Rivas, this resulted from low frequencies of diagnostic ceramics and continuation of various types from the prior period (see Salgado 1996a). In spite of the decline, the regional hierarchy maintained three levels with Tepetate as regional center (Niemel et al. 1997). Excavation at Sapoá and Ometepe sites is necessary to verify reconstruction of the settlement system during the Ometepe Period.

Data from other regions of Greater Nicoya suggest that the sociopolitical development of Rivas occurred within a greater regional context. During much of prehistory, similar processes were apparently happening in surrounding areas of Pacific Nicaragua and, to a lesser extent, northwest Costa Rica. Although it is possible that a peer-polity model might explain this scenario (see Renfrew 1986), the following sections explore whether migration processes could have triggered sociopolitical development.

Local Processes and Macro-regional Dynamics

The decision to migrate is based on negative stresses in the home region and positive attractions in the destination region. The relationship between the two is complex, dynamic, and ultimately unknowable in its entirety to the archaeologist. In Chapter 3, it was hypothesized that a familiarity with the destination area and the "inertia effect" of migratory flows (e.g., Anthony 1997:25) may explain why the Nicarao ended up in the same part of Central America as the Chorotega (Steinbrenner 2002). The Nicarao, presumably moving along the same trade routes as the earlier Chorotega, heard stories of previous migrant groups, resulting in the prophesy by a Nicarao elder in Honduras that they would settle on the shores of a freshwater sea in sight of an island with two volcanoes. This section explores how the societies of Rivas were linked to macro-regional networks of interaction from approximately 1000 BC to AD 1522.

Long-distance interactions between Lower Central America and Mesoamerica served a number of functions, most notably the spread of ceramic technologies, the initial spread of domestic cultigens, and the exchange of interactions involving valued goods such as jade and gold. Interactions probably occurred along primary east-west pacific coastal plain routes and a multitude of river and sea-based routes. The Maya were presumed to be the primary mediators in relationships between Lower Central America and Mesoamerica during much of prehistory (Sharer 1984).

As was noted in Chapter 10, the earliest data from Rivas are problematical due to the lack of well-defined ceramic complexes in the regional sequence dating to the Orosí Period. Pottery such as Bocana Incised and Schettel reveal similarities with ceramics ranging from coastal Soconusco to Ecuador (Salgado 1996a:284). Salgado (1996a:284) suggests that a "general level of interaction could explain the similarities of formative complexes in Nuclear America". In some regions, such as Managua, the interaction was more intense: obsidian sourced to Güinope, Honduras was imported as early as 2000 BC (Salgado 1996a:285).

Settlements in Rivas during the Tempisque Period are small in size and reveal a low density of cultural materials. There is no indication of politically centralized societies. The material assemblages are most similar to those of nearby Ometepe Island, Masaya, and Granada. Braswell et al. (2002) consider Granada only marginally part of Greater Nicoya during this period based on low frequencies of the pan-regional ceramic types Bocana Incised and Rosales Engraved. Since only minimal frequencies of these types were also recovered in Rivas, it is more likely that Greater Nicoya was not as unified during this time period as researchers previously thought (e.g., Lange 1984).

Usulután-related ceramics constitute a small percentage (<1%) of Tempisque ceramic assemblages. It is not certain whether the ceramics originated from El Salvador, Honduras, or northern Nicaragua. The Usulután-related pottery could have been acquired through general exchange processes between Rivas and societies north of Greater Nicoya as well as interaction with regions such as Granada, where a similar quantity is recorded. Salgado (1996a:291) interprets the significance of the imported pottery in the following manner:

> social groups in Granada were being exposed to interactions, even if weak, with people form other regions, and also to the dynamics of exchange and/or trade and its potential implications for building a base of power for such groups that could take advantage of such transactions.

Social complexity emerged in Rivas during the Bagaces Period, which was roughly coeval with the Mesoamerican Classic Period. The eruption of the Ilopongo Volcano in El Salvador circa AD 429 (Dull et al. 2001) was particularly significant in terms of macro-regional dynamics. This eruption caused the depopulation of large areas of western El Salvador and dislocated established trade networks (Demarest 1988). As a result, the regional center of Quelepa, which is located in eastern El Salvador, may have begun to build stronger ties with Lower Central America (Demarest 1988; Joyce 1993). Joyce (1993:92-93) views Quelepa as an intermediary between Comayagua, western El Salvador, and different areas of Greater Nicoya.

Sociopolitical complexity in the Madriz/Estelí region in northern Nicaragua, Masaya, Granada, and several areas of Honduras can be viewed as either directly or indirectly stimulated by the dynamics of a macro-regional system (Salgado 1996a:292; Salgado et al 1998). In particular, interaction between central and southern Honduras and Granada increased during the first three centuries of the Bagaces Period. By approximately AD 650, Ayala emerged as a regional center (Salgado 1996a:292-293).

In Rivas, a three-level settlement hierarchy was apparent, with Santa Isabel as its main center. In addition to elaboration of the settlement hierarchy, the distribution of imported materials was limited to the three largest sites. There is evidence that macro-regional interaction increased with areas north of Rivas, particularly Honduras. Foreign ceramics include Delirío Red-on-White, manufactured near Quelepa, and Tenampúa, manufactured in the Comayauga Valley. The majority of obsidian artifacts were sourced to Güinope, Honduras.

During the Postclassic Period, several exchange networks linked Mesoamerica and Lower Central America. After the decline of such southeastern centers as Copan, exchange networks extended along the Caribbean Coast from the Yucatan as far south as Panama and possibly northern Columbia (Graham 1993b). Another network was along the Pacific Coast, connecting Mexico with regions to the south (Sharer 1984).

Goods originating from Costa Rica or Panama found in Postclassic Mesoamerican sites include *tumbaga,* or gold-copper alloy artifacts in Chichen Itza and Copán (Graham

1993b:13), and Papagayo and Las Vegas Polychromes at Chichen Itza, the Central Petén, and Tula, Hidalgo (Salgado 1996a: 298-299). Mesoamerican goods in Pacific Nicaragua are limited to obsidian. Copper bells and plumbate vessels from coastal Chiapas have been recovered in Costa Rica (Reyman 1995). Although tumbaga artifacts originating in Costa Rica are found in areas of Mesoamerica during this time period (Graham 1993b), gold artifacts are rare in Pacific Nicaragua. In spite of this, gold imagery such as frogs with flanged feet or gold adornments was represented on ceramics such as Papagayo:Casares, and a reported 70,758 pesos of gold "booty" was collected from the Costa Rica border area to the northern part of the Isthmus of Rivas as a result of Gonzalez' entrada from 1522-1526 (Abel-Vidor 1980:390). In addition, the parallel development of Papagayo and Las Vegas Polychromes indicates continued interaction between central and southern Honduras.

Sociopolitical restructuring and change in all several aspects of material culture mark the Sapoá Period. This can be linked to the historically documented immigration of Mesoamerican groups to Pacific Nicaragua. Salgado (1996a:297), in particular, has explained their movement to the region in terms of world systems dynamics:

> in the first place Pacific Nicaragua was known to Mesoamerican groups through the trade networks that connected Central American groups in previous periods. Second, the immigration of these groups was at least partially wrought by the disintegration and restructuration of entire macro regional systems during the Late Classic and Early Postclassic.

The following section discusses the evidence of the migration of Mesoamerican groups to the Rivas Study Area.

The Migration of Mesoamerican Peoples

The testing of migration hypotheses requires particularly high quality archaeological data. Migration models are best applied in areas with a long history of high-quality research (Burmeister 2000:554, 560). The lack of an extensive program of excavations in Rivas inhibits a fine grain reconstruction of migration processes as well as a precise understanding of their chronology. Also problematical is paucity of research within adjacent regions; Nicaragua, in particular, is one of the least known archaeological regions in Central America. These limitations do not begin to address difficulties in recovering "non-material" aspects of culture (e.g., knowledge) or perishable items (e.g., textiles, feathers, animal furs, worked woods, tobacco, honey wax, etc.), which are not generally preserved in tropical environments. Compounding these problems is the fact that the exact region of origin of the migrants is debatable, as are the routes connecting Mexico and Greater Nicoya. While these difficulties make it impossible to develop more than tenuous hypotheses, consideration of the archaeological correlates of migration presented in Chapter 4 provide for new interpretations of the existing record and identify future research possibilities.

The data collected from 1999-2000 within Rivas indicate that significant changes occurred with the transition to the Sapoá Period. The sociopolitical organization was restructured with the emergence of a new center at Santa Isabel while significant changes occurred in all aspects of material culture. There were changes in the micro- and macro-settlement pattern: an increase in settlement size and number—and consequently the population; the replacement of main Bagaces settlements by new ones; and the notable occupation of the coast of Lake Nicaragua. Funerary practices, pottery, and lithic complexes also change.

Based on this data, it seems likely that Mesoamerican group arrived to the region by at least AD 900. Taken together, the changes that occurred should not be understood as directly reflecting the scale of migration, but as cultural changes triggered by their arrival. The scale of migration and a more definitive understanding of migrant-native interactions require more research.

It is very likely that the migrants were Chorotega, since the historical sources indicate that the later-arriving Nicarao encountered Chorotega already inhabiting the Isthmus of Rivas (see Chapman 1960). The differences between the two groups, as described in the ethnohistorical record, suggest that they possessed distinct material cultures that could be easily differentiated archaeologically. Clues are provided that would be quite useful to an archaeologist excavating a household, marketplace, or ceremonial center. In spite of this, archaeological assemblages from Rivas and Granada, associated at contact with the Nicarao and Chorotega respectively, are not strikingly different. Although this is partly due to the limited research conducted in both regions, it may also reflect differences in the nature of the migrations of each group. The latter will be discussed below.

Ceramic complexes during this time are characterized by several varieties of the type Papagayo Polychrome. Papagayo:Culebra, the earliest variety dating to approximately AD 700/800-950 (the late Bagaces Period), has been recovered only in Rivas and areas of northwest Costa Rica. The remaining varieties of Papagayo, dating to the Sapoá Period, are eventually found throughout Greater Nicoya (Bonilla et al. 1990).

This corresponds to all the areas assumed to be under Chorotegan influence. Although the Culebra variety demonstrates some Mesoamerican influence, it is not until approximately AD 1000 that there is a proliferation of Papagayo varieties featuring an expanded repertoire of Mexican-related style and iconography. As discussed in Chapter 8, ceramic paste is also better oxidized and coarser, while common vessel forms include egg- and pear-shaped vessels, zoomorphic or conical tripod feet, annular or ring bases, support jars, and composite silhouette bowls. Contemporaneous with this Papagayo florescence are changes in settlement patterns, and the widespread appearance of a new monochrome utilitarian ware, Sacasa Striated, which was also used for burial urns. Similar developments have been recorded in Granada and Masaya (Salgado 1996a; Salgado et al. 1998).

This archaeological evidence suggests that Papagayo:Culebra was associated with the initial arrival of the migrants. It may also explain why the variety was recovered from largely Bagaces Period sites in Rivas. The subsequent developments correspond to the post-migration "consolidation stage" that is marked by "the development and crystallization of formal and informal social institution and associations" (Schwartz 1969:178). The archaeological correlates of this stage include evidence of population growth resulting from additional migration, technological changes, and increasingly complex social organization (Schwartz 1969:190-191).

The sudden and significant changes apparent in the material culture shortly after the appearance of the Papagayo:Culebra suggest a chain migration structure. As noted in Chapter 4, the archaeological settlement pattern produced should resemble islands defined by large extensions of bypassed area, which is supported by evidence of earlier penetration by merchants, craft specialists, and other information-relaying scouting groups sent to identify what would later become destinations for migrations (Anthony 1990). That Papagayo:Culebra is associated with or reflects this process is suggested by its affinities with ceramics of El Salvador (e.g., the Nicoya/Nicoya-like polychromes). Several contemporaneous sites in El Salvador including Quelepa, Cihuatán, Santa Maria, and Cerro Ulata are characterized by large temple platforms, I-shaped ballcourts, elite residential compounds, and artifacts associated with western Mexico or Gulf Coast areas such as wheeled figurines, life-size ceramic effigies, varibable-pitch flutes, and ritual ballgame objects (Braswell et al. 1994:176; Fowler 2001).

The ethnohistoric records indicate that the Chorotega and the Nicarao left Mexico as victims of oppression (Fowler 1989). Coerced migration, in which "displaced persons, refugees, slaves, and social pariahs migrate not because they choose to, but because they are forced from their home ranges or regions", usually takes the form of numerous episodes of chain migration rather than "mass tribal movements" (Anthony 1997:27). Salgado (1996a:304) hypothesizes that the Chorotega and other groups followed a trade route along the Pacific side of Mexico and Central America. The groups "could have taken advantage of the existing routes of trade to avoid territories that represented possibilities of conflict until they reached their final destination in Pacific Nicaragua" (Salgado 1996a:304). Evidence for this trade route is suggested by the emergence of white-slipped pottery traditions ranging from west Mexico and central Veracruz to the Gulf of Nicoya (Salgado 1996a: 246-247).

The transition between the Sapoá and Ometepe Periods, approximately AD 1200 to 1350, is marked by another change in white-slipped polychromes: the appearance of

Vallejo Polychrome, which demonstrates the most evident Mexican influence of any ceramics in this area (Day 1994). As described in Chapter 8, Vallejo ceramics are decorated with painted and incised versions of central Mexican entities such as the fire serpent, the wind god, sun symbols, the earth monster, and various other elements identified with the Mixteca-Puebla style. The ceramics are linked with a number of other related types, including Madeira and Luna Polychromes. Vallejo, in particular, is thought to signal the arrival of the Nicarao (e.g., Day 1994; Healy 1980), regardless of the fact that it is found both within and outside the territories traditionally controlled by them.

Vallejo Polychrome and related ceramics have always been recovered in low frequencies at archaeological sites in Rivas as well as other regions of Greater Nicoya. This factor was once assumed to indicate a decline in the number of sites and population levels in the Rivas area (Healy 1980). Similarly, the general absence of Vallejo-related ceramics at nine small archaeological sites in Granada, all of which would have occupied the lowest level of the site hierarchy during the Ometepe Period, led to the conclusion that these sites were abandoned. Niemel et al. (1997) suggest a different explanation for the scarcity of these types: increased regionalism in Pacific Nicaragua during the Ometepe Period, characterized by local preferences for different late-appearing types. They state that Luna and Madeira Polychromes are typically found in the highest frequencies on Ometepe Island in Lake Nicaragua, and in higher frequencies in Rivas than in Granada. Conversely, Vallejo Polychromes are found in lower frequencies in Granada than in either Rivas or on Ometepe Island.

Unlike the transition to the Sapoá Period, the emergence of Vallejo and related ceramics do not correlate with other changes in material culture. Assuming the ceramics reflect the arrival of Nicarao groups, their appearance, frequency, and distribution provide clues about the nature of the Nicarao migration. While their surface decoration indicates undeniable "Mexican influence", the limited frequency yet widespread distribution of the ceramics in Greater Nicoya do not suggest the presence of a substantial new ethnic presence. Stronger evidence for the intrusion of an ethnic group would be the appearance and limited distribution of a new kind of utilitarian ceramic ware in Rivas between AD 1200 and 1350, analogous to the appearance of Sacasa Striated and the arrival of the Chorotega. For example, large numbers of ceramic *comales* (tortilla griddles) could be expected since ethnohistoric sources state that the Nicarao ate tortillas. In central Mexican household contexts comales account for approximately 20% of the ceramic assemblage (Geoffrey McCafferty, personal communication 2001). In spite of this, comales are rare in Rivas contexts[1]. During both the 1999 and 2000 excavations at Santa Isabel, for example, not one comal sherd was recovered. The problem may reflect the current paucity of the database, but if no comales are found at a site where Vallejo sherds are recovered, the Nicarao identity of the site is questionable. Alternately, the migrants may have ceased this custom, especially if Nicarao men married local women.

Rather than consisting of an entirely new ethnic group, composed of both elites and commoners, the Nicarao may have been a relatively small, intrusive group of elites, who came to dominate a primarily Chorotegan population. Tortillas, commented on by the Spanish chroniclers, might have been a delicacy consumed only by these Nicarao elites, who likely would have been the group with whom the Spanish interacted. Likewise, tortillas may have prepared only within households occupied by Nicarao women. The appearance of the ceramics outside of Nicarao territory may reflect

[1] Kelly (1988) also notes that they are not common at Cihuatán.

interaction between Nicarao and Chorotega groups as they negotiated social and political relationships. This would explain the absence of the ceramics at the "abandoned" Ometepe Period sites in Granada—notably sites that were not high enough in the regional hierarchy to participate in exchange webs with the Nicarao.

Lange et al. (1992) argue that even when Mesoamerican groups moved into Nicaragua they were not incorporated into a Mesoamerican sphere. They state migrants such as the Chorotega "were greatly removed from their ancestry to the north…(and) it is unlikely that they perceived any cultural affinity with Mesoamerica" (Lange et al 1992:271). Although migrant groups would have started their own process of reconstitution and redefinition of their sociopolitical structure once they had settled in Nicaragua, the similarities that remained in iconography, language, and the presence of religious practices (e.g., the 260-day monthly ritual calendar, the Volador ceremony, etc.) and institutions such as the market, all had historical links to Mesoamerica. When the groups interacted with those already inhabiting the area, the outcome of this process was cultural innovation and change.

CHAPTER 12
CONCLUSIONS

The aim of this dissertation is to explore the social changes resulting from the arrival of two Mesoamerican migrant groups (e.g., the Chorotega and the Nicarao) to Rivas, Pacific Nicaragua during the ninth to the fifteenth centuries. The evidence for migration in this region has never been examined systematically from an archaeological perspective. In addition, previous research in this area (e.g., Healy 1980) was exploratory in nature and did not specifically address questions of social organization.

From 1998 to 2000, a program of settlement archaeology consisting of survey and excavation was conducted within Rivas. A total of 48 archaeological sites were identified. Their surface remains indicate continuous occupation of the region from at least 500 BC through the time of Spanish contact. The settlement pattern indicates increasing social complexity from the earliest known period, Tempisque (500 BC - AD 300), through the Bagaces Period (AD 300-800). During the latter period, the number and size of sites increase. Artificial mounds and the presence of imported goods characterize the three largest sites: Santa Isabel, San Jorge, and Paco Rojas. Santa Isabel, the largest of these sites, is approximately double the size of the other two. Overall, this settlement patterning indicates a three-level settlement hierarchy.

The transition to the Sapoá Period (AD 800-1350) is marked by significant developments. Although a three-level settlement hierarchy is maintained, sociopolitical organization was restructured with the emergence of a new center at Santa Isabel. There were changes in micro- and macro-settlement patterns: an increase in settlement size and number and consequently the population; the replacement of main Bagaces settlements by new ones; and the notable occupation of the coast of Lake Nicaragua. Funerary practices, pottery, and lithic complexes also change. In particular, the white-slipped ceramic tradition emerges, which features Mexican-related style and iconography.

I propose the arrival of a Mesoamerican group to the region by at least AD 950 based on the types of changes that occurred during the Sapoá Period. It is very likely that the migrants were Chorotega, since the ethnohistorical sources indicate that the later-arriving Nicarao encountered Chorotega already inhabiting the Isthmus of Rivas (see Chapman 1960).

Developments within the Rivas region during the Sapoá Period correspond to a post-migration "consolidation stage" that is marked by "the development and crystallization of formal and informal social institution and associations" (Schwartz 1969:178). The archaeological correlates of this stage include evidence of population growth resulting from additional migration, technological changes, and increasingly complex social organization (Schwartz 1969:190-191). The sudden changes apparent in the material culture also suggest a chain migration structure. This type of migration is supported by evidence of earlier penetration by merchants, craft specialists, and other information-relaying scouting groups sent to identify what would later become destinations for migrations (Anthony 1990).

The transition between the Sapoá and Ometepe Periods, approximately AD 1200 to 1350, is difficult to discern largely due to the continuation of the principal Sapoá ceramic types. A decrease in the number of sites is inferred but the regional hierarchy maintains three levels. Santa Isabel remains the primary site. San Jorge, as a secondary site, is still differentiated by its size and artifact density compared to the remaining sites.

Additional change occurs in the white-slipped ceramics of the region during the Ometepe Period. In particular, the ceramics demonstrate an increase in Mexican influence and are decorated with painted and incised versions of central Mexican entities such as the fire serpent, the wind god, sun symbols, the earth monster, and various other elements identified with the Mixteca-Puebla style. These ceramics are thought to signal the arrival of the Nicarao (Day 1994; Healy 1980).

However, unlike the transition to the Sapoá Period, the changes evident in the ceramic assemblage do not correlate with other changes in material culture. If the ceramics do reflect the arrival of Nicarao groups, their appearance, frequency, and distribution provide clues about the nature of the Nicarao migration. While their surface decoration indicates undeniable "Mexican influence", the limited frequency yet widespread distribution of the ceramics in Greater Nicoya do not suggest the presence of a substantial new ethnic presence. Rather than consisting of an entirely new ethnic group, composed of both elites and commoners, the Nicarao may have been a relatively small, intrusive group of elites, who dominated a primarily Chorotegan population.

Researchers have argued that the migrant groups such as the Nicarao and Chorotega did not maintain cultural affinity with Mesoamerica (e.g., Lange et al 1992:271). Although it is true that these groups would have started their own process of reconstitution and redefinition of their sociopolitical structure once they had settled in Nicaragua, the similarities that remained in iconography, language, religious practices, and institutions, all had historical links to Mesoamerica. Migration, simply, was an important factor in the development of Pre-Columbian Greater Nicoya.

APPENDIX A
SITE DESCRIPTIONS

A total of 48 Precolumbian sites were located during survey of the study area (see Figure 6.3). Table A.1 shows the diagnostic ceramic types found at each site. Classification of surface artifact densities was based on the following scale: low, 1-5 artifacts per m^2; medium, 6-50 artifacts per m^2; and high, >50 artifacts per m^2. Site coordinates are referenced to the appropriate topographic maps issued by the Instituto Nicaragüense de Estudios Territoriales (INETER).

Ri-1, Las Piedras. This site is located at the southern end of the present day village of Las Piedras, on the coast of Lake Nicaragua (N11°37', W085°51'33" - INETER 3050-IV, Belen). The site is estimated to be 27 ha in size. A series of natural hills mark the area, which is divided into a series of small land plots. Wetlands are present to the west and south. The soils in this area are not very fertile and are either highly eroded or contain great quantities of volcanic rock (Agronomist Mario Galo, personal communication 1999). Surface vegetation consists of scrub and sparse low grass. In spite of this, artifacts are visible only in areas that have either been disturbed (e.g., plowed, near waterholes or construction) or naturally eroded. During survey, artifacts removed from context by erosion processes were found at the base of hills. They were surprisingly well preserved when compared to the weathered artifacts recovered at sites such as El Brújo (N-Ri-48). According to local residents, looting has been a problem in the past. The remains of looter's holes were visible at the top of the largest hill, approximately 1.3 km south of the village center.

Table A.1. Ceramic Types Recovered From Archaeological Sites During Survey.

Ceramic Types	Archaeological Sites																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Bocana																			X	X				X
Rosales																			X					X
Schettel														X	X	X		X	X					X
Garcia																			X					
Charco															X				X					X
Huila																								
Tola	X														X				X					X
Tenampúa*																			X					X
Chavez															X				X		X			X
Leon	X					X		X		X					X	X			X	X				X
Potosi															X				X					
Momta																			X					X
Espinoza							X												X				X	X
Galo	X													X					X					
Belén*																								
Puchor															X									X
Rosalita																			X					X
Delirio*																			X					X
Usulután*															X				X				X	X
Ulua*																								
Mora*																			X					X
Papagayo	X					X		X	X			X		X	X				X				X	X
Sacasa	X	X			X									X	X	X			X				X	X
Pataky	X																							X
Vallejo	X														X				X					X
Mombacho	X																							X
Combo																								
Castillo	X											X				X								X
Madeira	X																				X			X
Luna																								X
Bramadero*																								X
Murillo*																								X
Banda	X																							
Bagaces**	X									X	X				X				X				X	X
Ometepe**	X																		X				X	X

Table A.1. (cont'd)

Ceramic Types	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
Bocana	X	X	X					X	X	X							X	X	X	X				
Rosales	X	X	X					X	X	X		X								X				
Schettel	X		X	X				X		X		X		X					X	X				
Garcia								X												X				
Charco	X	X	X	X				X	X	X	X		X	X				X		X	X			
Huila												X								X				
Tola								X	X	X			X	X		X				X				
Tenampúa*																								
Chavez	X		X	X				X		X		X	X	X				X		X				
Leon	X		X					X		X	X					X	X	X	X	X				
Potosi										X										X				
Momta								X		X										X				
Espinoza	X		X							X		X				X			X	X				
Galo			X					X		X										X				
Belén*	X																							
Nicaragua																					X			
Rosalita										X										X				
Delirio*																				X				
Usulután*			X					X		X		X	X							X				
Ulúa																				X				
Mora*																				X				
Papagayo	X	X	X	X		X		X	X	X	X	X	X			X	X	X	X	X		X		X
Sacasa	X	X	X	X			X	X	X	X	X	X	X					X	X	X	X	X	X	X
Pataky		X																		X				
Vallejo	X	X	X						X		X									X				
Mombacho																				X				
Combo																								
Castillo	X	X	X								X									X				
Madeira																				X				X
Luna		X																		X				
Bramadero*																								
Murillo*		X	X																	X				
Banda																				X				
Bagaces**	X		X				X	X	X	X		X				X		X	X	X	X			
Ometepe**		X	X						X		X	X								X		X		X

Archaeological Sites: columns 25–48.

*Tenampúa, Delirio, Ulúa, and Usulután are imported northern ceramics. Mora, Belén , Bramadero and Murillo are ceramics associated with the southern sector of Greater Nicoya (northwestern Costa Rica)(Vasquez et al. 1986). **Ceramics with diagnostic modes characteristic of the Bagaces and Ometepe periods.

A high density of surface remains mark the small hills pertaining to Hilberto Zambrana (200 m south of the largest hill). During survey, chert flakes and shatter, metate fragments, several round worked sherds, and one celt fragment were found in this area. Ceramic materials include Bagaces Period rimsherds, and Papagayo, Madeira and Sacasa sherds. Felix Zambrana is the owner of the property to the north (southernmost hill depicted on the INETER 3050-IV, Belen map). Surface artifact density is sporadically medium to high on his property. Several large cobbles, some of which stand upright, are located on the northwestern side of the hill. It is unclear whether the cobbles are natural or placed there. If the latter is true, they could represent the foundation of a structure.

Ceramic types collected from the site include Tola; Leon; Galo:Belo variety; Papagayo Fonseca, Cervantes, Culebra, Casares, Manta, Mandador, and Papagayo varieties; Sacasa; Pataky; Mombacho; Vallejo Vallejo variety; Mombacho; Castillo Engraved; Banda; and Madeira Las Marias variety. Several worked ceramic sherds, basalt mano and metate fragments, an andesite celt fragment and chert flakes and shatter were also found.

Ri-2, Santa Rosa. This site is located approximately 50 m north of the Río Las Lajas and 1.5 km east of the Panamerican Highway (N11°38'9", W085°56'38" - INETER 3050-IV, Belen). Silvio Rodriguez Aragón owns the property, which is called Finca Santa Teresa. The site is approximately 50 m^2 in size and characterized by low surface artifact densities. The area has probably been plowed in the past since artifacts are visible despite tall, thick grass. Artifacts recovered during survey include several angular chert fragments (shatter), red-slipped and monochrome sherds, and one Sacasa Striated sherd.

Ri-3, Juan Martinez. This site is approximately 50 m² and located 100 m north of the Río Las Lajas and 2.5 km east of the Panamerican Highway (N11°38'27", W085°56'38" - INETER 3050-IV, Belen). Surface artifact density is low. Materials collected include red-slipped and monochrome sherds and two angular (shatter) chert fragments. Juan Martinez owns the property. Surface vegetation consists of sparse grass and low scrub.

Ri-4, Las Lajas. The site is located on the south bank of the Río Las Lajas approximately 3 km east of the Panamerican Highway on the property of Silvio Rodriguez Aragón (owner of the finca Santa Teresa)(N11°38'20", W085°55'43" - INETER 3050-IV, Belen). The site covers approximately 50 m². Surface artifact density is low. Collected artifacts include red-slipped and monochrome ceramics, one basalt pestle, chert flakes and chert shatter. Surface vegetation consists of sparse, low grass.

Ri-5, Humberto Bazarano. This site is located approximately 400 m east of the Pan-American Highway on the north bank of the Río Las Lajas (N11°38'12", w085°57'20" - INETER 3050-IV, Belen). The site covers 50 m². Surface artifact density is low. Surface vegetation consists of low scrub and sparse grass. Artifacts recovered at the site include Sacasa Striated, monochrome and red-slipped ceramics. It is unclear whether Humberto Bazarano, whose residence is nearby, owns the property.

Ri-6, Ingenio Xavier Guerra. The site is located approximately 300 m south of the Río Ochomogo and just east of the Panamerican Highway in a field of sugarcane belonging to the Ingenio Xavier Guerra of Nandaime (N11°39'4", W085°58" – INETER

3050-IV, Belen). Low to medium densities of archaeological materials are scattered over an area of about 29 ha. The field on the other side of the highway (which had just been plowed) was also surface inspected for archaeological materials. None were encountered and it was fairly certain that the site does not extend to the west. In general, ceramics collected during surface survey were eroded and the soil strata not very deep. Ceramics include Leon Punctate and Papagayo Polychrome.

Ri-7, Las Mesas. The site is located approximately one km south of the Río Ochomogo and one km east of the Panamerican Highway, in a field of sugarcane belonging to the Ingenio Xavier Guerra of Nandaime (N11°39'10", W085°57'11" – INETER 3050-IV, Belen). The site has an area of 25 m^2 and is characterized by low surface artifact densities. At the time of survey, the field had just been plowed. Diagnostic ceramics are limited to Espinoza Red-Banded.

Ri-8, San Joaquin. This site is located approximately one km northeast of the Las Mesas Site (Ri-7) and 800 m south of the Río Ochomogo in a field of sugarcane belonging to the Ingenio Xavier Guerra of Nandaime (N11°39'46", W085°56'26" – INETER 3050-IV, Belen). Total site area is about 25 m^2. At the time of survey, the field had recently been plowed. Ceramic material includes the types Leon Punctate and Papagayo Polychrome, indeterminate variety. Surface artifact density is low.

Ri-9, San Ramón. This site is located approximately 150 m northeast of the Finca San Ramón buildings and 50 m east of the Río Ochomogo (N11°41'7", W085°54'18" – INETER 3051-III, Isla Zapatera). Poorly preserved ceramic material (e.g., indeterminate Papagayo Polychrome) dating to the Sapoá Period was found in a road cut. A basalt pestle and chert artifacts were also recovered. The adjacent fields, which are used for pasture, yielded no artifacts. Determination of site extension would require subsurface testing. The site is assigned a low surface artifact density.

Ri-10, Salvador García. The site is situated on the top of a hill, one km east of the Panamerican Highway and one km south of the seasonal drainage El Tortuguero (N11°34'18", W085°53'26" – INETER 3050-IV, Belen). The area is known simply as "Salvador Garcia"—a reference to the dispersed residences found there. The site is 25 m² in size and characterized by low surface artifact densities. The Ingenio Benjamin Zeladón rents the field where the site is located for sugarcane. Diagnostic ceramic material includes the type Leon Punctate and Bagaces period rimsherds.

Ri-11, San Jeronimo. The site is located 2.5 km east of the Panamerican Highway and approximately 150 east of the Río Gíl Gonzalez (N11°32'41", W085°52'31" – INTETER 3050-IV, Belen). The area is used for sugarcane and managed by the Ingenio Benjamin Zeladón. The site is 40 m² in size. Surface artifact density is low. Diagnostic ceramic material consists of Bagaces period rimsherds.

Ri-12, El Corral. This site is situated approximately four km south of San Jorge and 2 km east of the Panamerican Highway on the coast of Lake Nicaragua (N11°24'57", W085°46'62" – INETER 3050-III, Rivas). The soils in this area, as well as to the south, are similar to the eroded, shallow soils of the northern part of the project area. Primary land use is pastoral (e.g., cattle-raising). The property where the site is located is known as Finca El Castillo, which is owned by Manuel Sentinel of Rivas.

A low to medium density of surface material, which dates to the Sapoá and Ometepe periods, is scattered over several small hills (the hills did not appear to be sand dunes, while, in general, the topography in this area is gently to moderately rolling).

Surface vegetation consists of short grass and low scrub. The site has an estimated area of 60 m^2. Diagnostic ceramic material includes Papagayo Polychrome and Castillo Engraved. Chert flakes and shatter were also recovered.

Ri-13, El Castillo. This site is located approximately 500 m east of the Pan-American Highway and 500 m south of the Río En Medio on the property of Finca El Castillo (N11°24'58", W085°47'41" – INETER 3050-III, Rivas). Lithic and ceramic materials, which include several monochrome cylindrical beads, were found in a short road cut on top of a small hill. The total area of archaeological remains is 42 m^2. This is an estimate since it is uncertain whether artifacts originated from the road cut and were then spread over the area by natural processes (e.g. rain, etc). Recovered ceramic material could not be assigned to a chronological period, although it was pre-Columbian. Sixteen obsidian prismatic blade fragments collected from the site date to the Sapoá and/or Ometepe periods (Geoffrey Braswell 1999, personal communication). Other lithic artifacts recovered include metate fragments, chert flakes and shatter, one chert core, and one chert prismatic blade fragment. Surface coverage in the surrounding area, which is primarily used as pasture, consists of short grass and scrub.

Ri-14, Santa Lucía. The site is situated on both sides of the Río En Medio and three km west of the Panamerican Highway on the properties of Salvador Sanchez, Ramón Rivas, and Armando Rivas (N11°25'05", W085°49'25" – INETER 3050-III, Rivas). A low to medium density of surface remains is found throughout the area. The site has an area of 8 ha. The topography is hilly. The fields where the site is located are used for banana, watermelon, green pepper, and gourd. Diagnostic ceramic material includes Schettel Incised, Momta, Sacasa Striated, and Papagayo Polychrome. One chert flake and several pieces of chert shatter were also recovered.

Ri-15, San Martín. This site is located on the south side of the Río En Medio, approximately one km west of the Panamerican Highway on the property of Atenor Monte Alta, Francisco Gallegos (owner of Finca San Martín), and Gerardo Paez (owner of Finca El Vergel) (N11°24'58", W085°48'32" – INETER 3050-III, Rivas). The site has an estimated area of 30 ha. The density of surface remains range from low to high across the site. Although this may reflect the relative intensity of occupations between different areas, surface visibility is somewhat limited by thick grass and scrub.

There are two areas of high surface artifact densities at the site. The first is a 20 m hill about 800 m north of the Finca San Martín buildings. The remains of a small military outlook are located on top of the hill. There is a smaller hill immediately east. A dirt road cuts between the hills. Artifact density is high in the runoff channels formed in the road by rain. Cultural materials extend north until the bank of the river. Recovered artifacts include metate and mano fragments, obsidian, chert (including a prismatic blade fragment), and diagnostic ceramics dating from the Tempisque through Ometepe periods, such as Schettel Incised, Charco Puerto variety, Chavez, Tola, Potosi Appliqué, Papagayo Culebra variety, and imported Usulután. Two worked sherds were also collected. The obsidian found at the site is from Guiñope and consists of flakes, shatter, and prismatic blade fragments.

The second area of high density is in a field located to the east of the large hill near the congruence of the Río En Medio and a north-south drainage on the property of Atenor Monte Alta. Surface remains include ceramics (e.g. Rosales, Charco, Rosalita, Chavez, Leon Punctate, Espinoza Red-Banded, Puchor, Papagayo Culebra variety, Sacasa and Vallejo), mano fragments, and chert flakes, shatter, and cores.

Ri-16, San Félix. This site is situated approximately 300 m west of Ri-15 at the congruence of the Río En Medio and the Aposonga Drainage. Olga Morices is the owner of the property (Finca San Félix)(N11°25'01", W085°49'25" – INETER 3050-III, Rivas). Low to medium densities of archaeological remains are scattered over an area of seven ha. The land is used for plantain cultivation. Recovered ceramic types include Schettel Incised, Leon Punctate, Sacasa Striated, and Castillo Engraved. Lithic artifacts include six obsidian prismatic blade fragments and four manos

Ri-17, José Rojas. This site is located approximately 70 m north of the Río En Medio and 40 m west of the Panamerican Highway on the property of José Rojas (N11°25'04", W085°48'05" – INETER 3050-III, Rivas). Prior to survey of the area, Sn. Rojas was removing fill from an 8-m by 10-m area in his front yard to make bricks and found three obsidian prismatic blade cores. He donated the cores to the Rivas Museum. Low artifact densities, including one possible andesite hammerstone and one chert flake, mark the disturbed area. Cultural remains are not visible in the surrounding sections of the property, which is covered by low grass. Total site area is approximated at 50 m^2. In February 1999, one shovel test and one 2 m x 1 m test unit were excavated at the site.

Ri-18, El Vergel. This site is one km west of the Panamerican Highway and 500 m south of the Río En Medio on the property of Gerardo Paez (owner of Finca El Vergel)(N11°24'43", W085°48'08" – INETER 3050-III, Rivas). The field where the site is located is used for sorghum. The site has an estimated area of 40 m^2. Recovered ceramics include Shettel Incised, monochrome and red-slipped wares. Chert was also recovered at the site. Surface artifact density is low.

Ri-19, Paco Rojas. This site is located about 1.5 km east of the Panamerican Highway and 1.5 km south of the Ingenio Benjamin Zeladón (N11°28'22", W085°50'22" – INETER 3050-III, Rivas). The fields in this area are mostly used for sugarcane, banana and sorghum. Others are fallow or pasture. The density of surface remains ranges from low to high. The total area of contiguous surface remains is 45 ha. Archaeological remains date from the Tempisque through Sapoá periods.

The densest concentration of cultural remains is located on the property of Paco Rojas. This area is also characterized by a large mound, 1.5-2.0 m high and approximately 20 m in diameter. Medium to high densities of surface remains are located on top of the mound and surrounding areas (approximately 30 ha). The remainder of the site area consists of low surface artifact densities.

The field with the mound shows evidence of being plowed and there is an overgrown irrigation ditch cut in a northeast-southwest direction. Some looting has occurred. Sn. Rojas also admitted that he allows people to excavate in his banana fields approximately 300 m to the east. The majority of artifacts collected from the central area of the site date to the Bagaces Period, however late Tempisque material is also present. The presence of Papagayo:Culebra, the earliest of the Papagayo varieties, suggests that the site was occupied during the Bagaces-Sapoá transition.

The property to the west is known as Finca El Pino. The owner of the finca, Francisco Gallegos of Rivas, encountered a Postosí Appliqué incensario while excavating a waterhole near the finca buildings in 1998. The artifact is in the owner's private residence in Rivas.

Diagnostic ceramic material collected at the site includes Bocana Incised, Rosales Engraved, Schettel Incised, Charco Black-on-Red, Tola Trichrome, Tenampúa, Rosalita, Chavez, Leon Punctate, Potosí Appliqué, Momta, Espinoza Red-Banded, Popoyuapa Zoned Ridged, Delírio, Usulután, Papagayo Culebra variety, Sacasa Striated, and Vallejo Polychrome. Lithic artifacts include metate fragments, mano and pestle fragments, chert artifacts, two obsidian flakes, and one obsidian prismatic blade fragment. Five worked sherds, one miniature ceramic mano, and one ear spool fragment were also collected. In June 1999, three test units were excavated in the central area of the site.

Ri-20, Sabana Grande. This site is situated approximately 800 m northeast of site Ri-19 (N11°28'52", W085°51'7" - INETER 3050-III, Rivas). Archaeological materials in low to medium surface densities extend over an area of 40 ha. The area is divided into fields of plantain and fallow patches of low grass and scrub. Diagnostic ceramic material recovered at the site includes Bocana Incised and Leon Punctate.

Ri-21, Sergio Martinez. The site is located approximately 750 m to the west of Ri-20 and 500 m east of the Pan-American Highway on the property of Sergio Martinez (N11°28'41", W085°51'38" – INETER 3050-III, Rivas). It has an estimated area of 40 m^2. Diagnostic ceramic material collected at the site includes Chavez White-on-Red and Madeira Polychrome. Surface vegetation consists of scattered banana trees, low scrub and tall grass. Surface artifact density is low.

Ri-22, El Ojo de Agua. This site is 500 m northeast of Ri-21 (N11°28'46", W085°51'51" – INETER 3050-III, Rivas). Only red-slipped monochrome wares were recovered. Total site area is approximately 40 m^2. Surface artifact density is low.

Ri-23, Santa Elena. The site is located 300 m to the east of Ri-19 (N11°28'43", W085°50' – INETER 3050-III, Rivas). At the time of survey, the area had recently been plowed and surface visibility was very good. Total site area is approximately 4 ha. Diagnostic ceramic material recovered at the site includes Espinoza Red-Banded, Usulután, Sacasa Striated, and Papagayo Culebra variety. One worked sherd (rounded) and several chert flakes were also collected. Surface artifact density is low.

Ri-24, San Jorge. This site extends from the finca La Conchita in the north, to the southern boundary of the finca La Unión (N11°27'10", W085°47'37" – INETER 3050-III, Rivas). The site is approximately 800m from east to west. The possibility exists that a portion of the site continues west under the center of the town of San Jorge. However, artifact densities in along the western portion of the site were low. The possibility that cultural remains were not adequately evaluated is reduced by the fact that there were numerous road cuts and disturbances (e.g., waterholes, half-dug patios, etc) within residential yards that could have signaled higher artifact densities. At the time of fieldwork between the two fincas were divided into 38 sectors for systematic reconnaissance. Surface artifact density ranges from low to high.

The total area of Ri-24 is 195 ha. Recovered ceramic types include Rosales, Schettel, Bocana Incised, Charco, Rosalita, Tola Trichrome, Leon Punctate, Espinoza Red-Banded, Nicaragua Orange-Engraved, Galo Polychrome, Usulután, Mora Polychrome, Papagayo Polychrome, Sacasa Striated, Pataky Polychrome, Vallejo

Polychrome, Castillo Engraved, Luna Polychrome, Murillo Appliqué, Momta, Chavez White-over-Red, Delirio, Madeira Polychrome, and Bramadero Polychrome. Notable artifacts include rounded worked sherds and miniature ceramic manos and metates. Obsidian and chert artifacts were also present. Numerous notched sherds were recovered from an area south of the La Unión farm buildings. The sherds, which are typically associated with fishing (e.g., as netsinkers or fishing spools), may indicate a specialized activity area.

Ri-24 includes the site J-Ri-3, which was visited by Willey and Norweb in 1959 and 1961 (Healy 1980: 41). The two archaeologists did not determine the size of the site, but they did excavate five test units in the vicinity of the fishing pier. The majority of the recovered material dated to the Tempisque and Bagaces periods. Healy (1980:41) provides a description of the excavation area, which has since been leveled by construction activity:

> The site is characterized by a series of artificial mounds ranging in height from 1.5 to 2.5 m, located in rolling grazing lands that slope markedly toward the lakeshore. These tumuli did not appear to be arranged in an orderly fashion. Based upon Oviedo's observations, and ethnohistoric and ethnographic observations made from other parts of Middle America, we are inclined to view the mounds as common house residences. Being located relatively close to the lakeshore, flooding may have been an important consideration in building the raised platforms for perishable structures like pole and thatch houses.

Ri-25, Finca de Caña. The site is one to two kilometers east of Rivas on the road leading to San Jorge (N11°10'53", W085°49'10" – INETER 3050-III, Rivas). The majority of the site is found on the north side of the road, however it does extend southward. It has an estimated area of two ha. Surface vegetation of the site varies from grass, scrub, and trees to planted crops including banana, green pepper and watermelon.

Artifacts collected at the site include one worked sherd, and Bocana Incised, Rosales, Schettel, Charco, Chavez, Leon Punctate, Belen Incised, Papagayo indeterminate variety, Sacasa Striated, Pataky, Vallejo, monochrome and red-slipped wares. No lithic artifacts were recovered. Surface artifact density ranges from low to medium.

Lange et al. (1992:36-37) visited Ri-25 in 1983. Their description of the site is as follows:

> *General Location*: 2 km east of Rivas on the south side of the road to Puerto San Jorge
> *Site Size*: Unknown; scattered lithics and ceramics
> *Site Condition*: disturbed by agriculture
> *Time Periods Represented*: Early Polychrome (A.D. 500-800) and Late Polychrome (A.D. 1350-1530)
> *Lithic Summary (Total sample size):* only one lithic artifact, a percussion flake of obsidian was found.
> *Ceramic Summary (Total sample size: 64):* ceramics found at Finca de Caña included Pataky Polychrome, Leon Punctate, and Charco Black-on-Red Puerto variety.

Ri-26, Jose Mercedes. The site is located south of San Jorge and approximately 1.5 km west of the lake coast (N11°26'45", W085°48'19" – INETER 3050-III, Rivas). It has an estimated area of 11 ha and is characterized by low surface artifact densities. Collected artifacts include Bocana Incised, Rosales Engraved, Charco, Papagayo indeterminate variety, Sacasa Striated, Pataky Polychrome, Vallejo Polychrome, Castillo, Madeira Polychrome, Luna Polychrome, Murillo Appliqué, late period white-slipped sherds, and monochrome and red-slipped wares. Obsidian was also found.

Ri-27, La Conchita. This site is located approximately one kilometer north of San Jorge on both sides of the dirt road leading to the Ingenio Benjamín Zeladón. Part of the site falls within the property of Arcelia de Gúzman, owner of the finca La Conchita. Surface vegetation consists of sugarcane and banana trees. Ceramics found at the site include Bocana, Rosales, Schettel, Charco:Puerto, Chavez, Leon Punctate, Espinoza Red-Banded, Galo Polychrome, Usulután, Papagayo indeterminate variety, Papagayo Manta variety, Sacasa Striated, Vallejo, Castillo, Murillo, late period white-slipped sherds, and monochrome and red-slipped wares. Other artifacts include obsidian, chert flakes, worked sherds ("notched" sherds), and one chert biface fragment.

Ri-28, Miguel Mora. This site is approximately 300 m west of the Panamerican Highway in the residential barrio known as Los Pinos (N11°26'49", W085°50'13" – INETER 3050-III, Rivas). Miguel Mora owns the property. The site is characterized by low to medium density surface remains extending over an area of seven ha. Recovered lithic artifacts include chert, mano and metate fragments. Diagnostic ceramics include Schettel Incised, Charco, Chavez, Papagayo indeterminate variety, and Sacasa Striated. Surface vegetation consists of banana trees, short grass and scrub.

Ri-29, Sodelba Lopez. The site is located 1.5 km west of Ri-28 (N11°26'56", W085°51'56" – INETER 3050-III, Rivas) on the property of Sodelba Lopez. Low surface densities of archaeological remains are scattered over an area of 50 m^2. No diagnostic material was recovered.

Ri-30, El Capulín. This site is one km west of Lake Nicaragua and 11 km north of Rivas on the finca Sucuyá (N11°31'54", W085°49'38" – INETER 3050-IV, Belen). Ann Holman owns the property. The site is approximately 50 m^2 in size. No diagnostic material was collected. Surface vegetation consists of low grass and scrub.

Ri-31, La Ceiba. The site is located one km west of Ri-30 on the finca Sucuyá (N11°31'53", W085°50'8" – INETER 3050-IV, Belen). Diagnostic artifacts include

Bagaces-style rimsherds, and Sacasa Striated sherds. Surface vegetation consists of low grass and scrub. Total site area is approximately 50 m².

Ri-32, Sucuyá. This site is approximately 2.5 km west of Lake Nicaragua and three km north of the Ingenio Zeladón canal, near the Sucuyá farm buildings (N11°30'49", W085°49'40" – INTER 3050-IV, Belen). It is characterized by low to high densities of archaeological remains spread over a total of 32 ha. The land is used for sugarcane. Local residents state that they frequently find ceramic and lithic artifacts after plowing. They donated several such artifacts to the project, which include two Chavez supports, two solid zoomorphic supports, one hollow support with red slip, one Madeira Polychrome support, one Bagaces period hollow support, and one monochrome ceramic handle fragment with a human effigy face.

Artifacts collected at the site include Bocana Incised, Rosales, Schettel, Charco, Tola, Chavez, Leon Punctate, Espinoza Red-Banded, Popoyuapa, Galo, Usulután, Papagayo indeterminate variety and Sacasa Striated. Obsidian, chert artifacts, and metate fragments were also collected. Ten beveled, flat slate axe fragments were found. The axes are similar to the description Healy (1980:283) provides.

Ri-33, El Pital. This site is situated approximately 2.25 km west of Lake Nicaragua and 1.25 km north of the Ingenio Zeladón canal on the property of Ana Holman (finca El Pital)(N11°30'6", W085°49'7" – INETER 3050-IV, Belen). It is characterized by low to medium densities of surface remains concentrated on top of a small natural rise. The land is used for sugarcane. The site is 36 ha in size. Ceramic material recovered includes Bocana Incised, Rosales, Charco, Tola Trichrome, Papagayo indeterminate variety, Sacasa Striated and Vallejo Polychrome. Fragments of metate, chert and one notched re-worked sherd (probably used as a net spacer) were also collected.

Ri-34, San Fernando. This site is located one km northeast of Potosí on the property of the Ingenio Benjamín Zeladón (N11°30'8", W085°50'30" – INETER 3050-IV, Belen). An existing Ingenio storage building is northeast of the site. The site is characterized by low to high densities of surface remains concentrated mainly on top of a mound about 40 m in diameter. At the time of survey, the area had recently been plowed. The site is 35 ha in size. Collected ceramic material includes Bocana, Rosales, Schettel, Charco, Tola, Rosalita, Chavez, Leon Punctate, Potosí, Momta, Espinoza Red-Banded, Popoyuapa, Galo, Usulután, Papagayo indeterminate variety and Sacasa Striated. Obsidian, chert, mano and metate fragments and beveled flat-slate axes were also recovered.

In 1959, Willey and Norweb visited a site called Ingenio Dolores (Healy 1980:41). They did not excavate at the site, but only conducted a brief surface collection. The site dated primarily to the Bagaces Period and was located approximately five km north of Rivas. A low mound, roughly 45 m in diameter and 1.5 m in height, characterized the site. Recent agricultural activity had destroyed part of the mound and an irrigation ditch had been cut through part of the rise. Site Ri-34, for its location, accessibility, and characteristics, may be the Ingenio Dolores site. Unfortunately no further information is available. During survey of the site, no evidence of an irrigation ditch was apparent. The topography was gently rolling.

Ri-35, Santo Domino. This site is located about 1.25 km east of Ri-34, 1.5 km north of the Ingenio Zeladón canal, and 500 m west of N-Ri-33 (N11°30'10", W085°49'37" – INETER 3050-IV, Belen). It is has an area of 2 ha. Low densities of Charco, Leon Punctate, Papagayo indeterminate variety, Sacasa Striated, Vallejo and Castillo Engraved ceramics were collected. Chert was also present at the site.

Ri-36, La Esperanza. This site is situated primarily on the properties of the brothers Domingo and Pablo Arriola between the Panamerican Highway and Apompúa (N11°30'32", W085°51'47" – INETER 3050-IV, Belen). The name of their finca is La Esperanza. The land is a mixture of banana trees, sugarcane, and fields of low brush and scrub. The site is 30 ha in size. Recovered ceramic material includes Rosales, Schettel, Charco, Chavez, Espinoza Red-Banded, Huila, Usulután, Papagayo indeterminate variety and Sacasa Striated. Chert and obsidian were also present.

Pablo Arriola recovered three carved metates with matching manos while excavating a water hole just prior to the survey. The metates date to the Tempisque Period and were found approximately 1.5 to 2 meters below surface level.

Ri-37, Yamil Ríos. This site is located on the property of the cooperative Yamil Ríos near Apompúa (N11°30'40", W085°50'58" – INETER 3050-IV, Belen). It is five ha in size. Recovered ceramic material includes Charco, Chavez, Espinoza Red-Banded, Nicaragua Orange-Engraved, Garcia Ridged, Papagayo indeterminate variety, and Sacasa Striated. No lithic artifacts were encountered.

Ri-38, El Paraiso. This site is about one km north of Apompúa (N11°31', W085°51'22" – INETER 3050-IV, Belen). It is seven ha in size. The land is used for sugarcane. Collected ceramic material includes Bocana, Rosales, Schettel, Rosalita, Tola, Chavez, and Espinoza Red-Banded.

Ri-39, La Noria. This site is five km west of Lake Nicaragua and five km north of Rivas near the Ingenio Zeladón canal (N11°29'15", W085°49'46" – INETER 3050-IV, Belen). The total site area is approximately 40 m². Surface vegetation consists of low grass and scrub. No diagnostic material was recovered.

Ri-40, San Jóse. This site is 800 m east of Apompúa and 500 m north of Ri-34 (San Fernando)(N11°30'26", W085°50'35" – INETER 3050-IV, Belen). Total site size is 3 ha. Diagnostic material collected at the site includes Tola Trichrome, Leon Punctate, and Papagayo Polychrome indeterminate variety. No lithic artifacts were recovered.

Ri-41, Alfredo Siezer. This site is located 300 m north of Buenos Aires on the property of Alfredo Siezer (N11°28'28", W085°49' – INETER 3050-III, Rivas). The surface remains were localized around a small natural rise. The site is two ha in size. Collected ceramic material includes Leon Punctate, Bocana, and Papagayo Polychrome indeterminate variety. At the time of survey, the area had recently been plowed.

Ri-42, Chata. This site is located 400 m northeast of Buenos Aires on the properties of Marvin Narvae and Michael Healy, owner of the finca Chatilla (N11°28'23", W085°48'42" – INETER 3050-III, Rivas). The site is 14 ha in size. The land is used for sugarcane and banana. Diagnostic ceramics include Bocana, Charco Puerto variety, Chavez, Leon Punctate, Papagayo indeterminate variety and Sacasa Striated. Obsidian and chert were also found.

Ri-43, Chatilla. This site is one km north of Buenos Aires east of the farm buildings of the finca Chatilla (owned by Michael Healy)(N11°28'46", W085°48'47" – INETER 3050-III, Rivas). Surface artifact density ranges from low to medium. Surface vegetation consists of sugarcane. Portions of the site area had recently been plowed at the time of survey. The site is 10 ha in size. Diagnostic ceramic material includes Bocana, Rosales, Leon Punctate, Espinoza Red-Banded, Papagayo indeterminate variety, and Sacasa Striated. Several rounded re-worked sherds were also encountered. No lithic artifacts were present.

Ri-44, Santa Isabel. This site is four km north of San Jorge and extends west from the lakeshore (N11°29'30", W085°48'20" – INETER 3050-III, Rivas). Ri-44 constitutes the largest area (320 ha) of contiguous surface remains found within the research region and includes both Santa Isabel "A" and Santa Isabel "B" investigated by Willey and Norweb in 1959 and 1961. The "A" and "B" designations reflect two nucleated centers with high densities of surface remains at different points in time. The section of Ri-44 that corresponds to Santa Isabel "B" dates to the Bagaces period and covers approximately 70 ha in the northwestern section of the site. Santa Isabel "A" is located to the east, covering an area of approximately 90 ha. The remainder of the site extends largely to the south and is a mixture of medium and low-density surface remains. Artifacts collected included obsidian, chert, mano and metate fragments, ear spool fragments, and worked ceramic sherds.

The Santa Isabel "A" section of Ri-44 remains intact except for occasional looting. When the site area was first visited in 1999, two different households attempted to sell prehistoric artifacts. Looters holes were also evident on the property of Candelario Bojorge, located southwest of the Willey and Norweb Santa Isabel "A" site center. In 1959 and 1961, Willey and Norweb site excavated three stratigraphic test units at this location. Their Pit 2 was excavated on top of Mound 4. At the time of survey, this mound was the most distinct in terms of height (6 m). A large tree stands at the summit of the mound. In July 1999, two excavation units were placed approximately 50 m west of their Mound 1. Excavations were continued in summer 2000 in collaboration with Geoffrey McCafferty of the University of Calgary. Sixty-five shovel test pits were excavated at 10 m intervals in a fallow field of about 50 m by 120 m that included Willey and Norweb's Mound 2. Five 1m x 1m test units were also excavated.

Ri-45, San Francisco. The site is located approximately 1.5 km east of Rivas and 1.5 km south of San Jorge on the property of Noel Jerez (Finca San Francisco)(N11°26'15", W085°48'30" – INETER 3050-III, Rivas). Total site area is 15 ha. Surface vegetation consists of low grass, scrub and banana trees. Artifacts collected at the site include one worked sherd, Charco Puerto variety, Nicaragua Orange-Engraved, Sacasa Striated, and red-slipped and monochrome wares.

Ri-46, San Rafael. This site is north of the Río Ochomogo in the Department of Granada, approximately four km west of the Panamerican Highway (N11°40'14", W085°56'29' – INETER 3051-III, Isla Zapatera). The site is $50m^2$ in size. Surface vegetation consists of short scrub, trees and grass. Collected artifacts include chert, indeterminate Papagayo, Sacasa Striated, indeterminate late-period white-slipped ceramics, red-slipped and monochrome wares.

Ri-47, El Mojón. The site is also located on the northern side of the Río Ochomogo in the Department of Granada near the drainage El Mojón (N11°40'8", W085°57'17" – INETER 3051-III, Isla Zapatera). Surface visibility at the time of survey was poor and vegetation consisted of short grass, scrub and trees. The site is $40m^2$ in size. Artifacts collected include chert, Sacasa Striated and monochrome and red-slipped wares.

Ri-48, El Brújo. This site is north of the Río Ochomogo on the finca San Ramón (N11°41'24", W085°54'54" – INETER 3051-III, Isla Zapatera). It has an elevation of 91 to 98 meters above sea level. Total site area is 99 ha, which is spread over the summit of the two hills known as "Lomas del Brujo". Low to medium densities of archaeological remains were observed primarily in eroded contexts in the higher elevations of the site. Artifacts include chert, Papagayo indeterminate variety, Sacasa Striated, Madeira Polychrome, late period white-slipped sherds, red-slipped and monochrome wares. During surface inspection, a large rock (36 cm x 25 cm x 14 cm) used as a mortar was collected from the periphery of the site suggesting that processing activities occurred away from the central area. Seven test excavations were conducted at Ri-48 in June 1999 with the objective of understanding site component and layout.

Appendix B: Ceramic Data
1999 Excavation
Jose Rojas Site (RI-17)

	RI-17 Excavation Unit 1										Shovel Test
Level/Total	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Total**	
Papagayo Polychrome				1						**1**	
Sacasa Striated		1								**1**	
Late Period White-Slipped											1
Indet. Monochrome	139	318	441	236	188	220	106	48	22	**1718**	26
Indet. Red-Slipped	4					2	1			**7**	
Indet. Late Period						1				**1**	
Unknown		1	5	2			1	1		**10**	
TOTAL	**143**	**320**	**446**	**239**	**188**	**223**	**108**	**49**	**22**	**1738**	**27**

Appendix B: Ceramic Data
1999 Excavation
Paco Rojas Site (RI-19):
Excavation Unit 1

RI-19 Excavation Unit 1

Level/Total	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**12**	**13**	**14**	**15**	**16**	**TOTAL**
Bocana				1							1					**2**
Rosales						1										**1**
Apompua				1		1		1	1							**4**
Charco	3		2	6	12	2			2	1			1			**29**
Puerto V.	2	1	2	5	8	1	3	5	1		4	2				**34**
Espinoza			2			9	4	7	2	8	5	2			1	**40**
Potosi				1	1			2		1						**5**
Usulutan		1					2			1						**4**
Chavez	5	5	1	1	7	13	4	11	7	8	9	7	3	1	2	**84**
Astorga V.					1			4				1				**6**
Rosalita			1		1			2								**4**
Tola	5	9	6	4	21	13	6	9	4		1		1	1		**80**
Leon	5	3	1	6	7	7	2	4		1	2		1			**39**
Galo	1	1				2									1	**5**
Belo V.						1			1							**2**
Bagaces Style	2	5	3	4	1	3		3					1			**22**
Momta	1	2		4	9	2		1								**19**
Tenampua						1										**1**
Delirio	1	1	1	1												**4**
Mora																
Papagayo	1	3	1	37	2											**44**
Culebra V.				1												**1**
Manta V.				1												**1**
Vallejo			1	1												**2**
Mombacho				1												**1**
Indet. Late Period				1												**1**
Indet. White-Slipped	1			8		1										**10**
Nicaragua			1													**1**
Indet. Crème-Slipped				4				1								**5**
Indet. Monochrome	156	329	232	541	232	252	126	144	68	71	153	88	35	19	7	**2453**
Indet. Red-Slipped	199	314	258	571	445	339	168	156	177	120	105	77	55	28	28	**3040**
Figurine														1		**1**
Unknown	5	8	8	18	9	5	4	5	4	2				1	1	**70**
TOTAL	**387**	**682**	**520**	**1218**	**756**	**653**	**319**	**355**	**267**	**213**	**280**	**177**	**97**	**51**	**40**	**6015**

Appendix B: Ceramic Data
1999 Excavation
Paco Rojas Site (Ri-19): Excavation Unit 2

RI-19 Excavation Unit 2

Level/Total	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**TOTAL**
Rosales								1		1												**2**
Apompua		3					1		1	1		3		5	3			1				**18**
Guinea										1												**1**
Popoyuapa											2											**2**
Charco	2	15	8	8	4		1			3			2		2			1				**46**
Puerto V.	9	18	14	12	11	1	8	7	2	7	7	1	1	2	4	1			1	1		**107**
Puchor						1	1															**2**
Espinoza	21	66	23	52	50	21	22	22	28	91	100	34	15	33	10	8	6	6	2		4	**614**
Potosi					1			2	1	4			1									**9**
Usulutan				1	2			1	2	1				1								**8**
Local "Usulutan"										1	1											**2**
Chavez	14	34	27	92	105	177	150	67	47	154	163	60	48	44	9	10	4	18	4	2	8	**1237**
Astorga V.		7	7	6	10	4	10	7	4	13	11		4		1							**84**
Velasco	3	39			1	3	1															**47**
Rosalita				1	3					1												**5**
Tola/Chavez					3			1			1											**5**
Tola	17	82	40	62	18	30	17	10	3	13	6	2	1		10							**311**
Leon	10	53	36	26	13	31	17	22	5	26	27	6	14	6	6	7	1			1		**307**
Galo		17	8	10	1	13	1			7		1				1						**59**
Belo V.	4			1				1			2		1									**9**
Lagarto V.				4				2	1			2	1		1							**11**
Jaguar V.	1																					**1**
Bagaces Style	6	24	14	13	13	9	11	10	4	13	15	9	5	2	6							**154**
Momta	13	20	7	3		2				1	1				2							**49**
Tenampua		1																				**1**
Delirio	1																					**1**
Papagayo			1	1	1	2									1							**6**
Belen			4																			**4**
Vallejo						1																**1**
Indet. Late Period						1																**1**
Indt. Crème-Slipped		3		1		2		1														**7**
Indet. White-Slipped				1																		**1**
Nicaragua		2	1	1	1								1									**6**
Indet. Monochrome	602	2336	469	916	700	840	637	604	514	932	1035	358	301	292	214	154	64	30	33	21	31	**11083**
Indet. Red-Slipped	1369	2375	681	911	744	711	461	496	297	737	806	314	286	302	226	103	72	40	64	43	61	**11099**
Figurine	1		1	1	1		1		1		1				2							**9**
Unknown	7	34	12	27	3	18	21	14	8	30	22	8	4	6	9		4				2	**229**
TOTAL	**2080**	**5129**	**1353**	**2150**	**1685**	**1867**	**1360**	**1268**	**918**	**2037**	**2200**	**798**	**685**	**693**	**506**	**284**	**151**	**96**	**104**	**68**	**106**	**25538**

Appendix B: Ceramic Data
1999 Excavation
Paco Rojas Site (Ri-19): Excavation Unit 3

Ri-19 Excavation Unit 3

Level/Total	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**TOTAL**
Rosales Engraved	1				1				1	1			1		1		**6**
Apompua Modelled			1								1		1				**3**
Popoyuapa Zoned Ridged															2		**2**
Garcia Ridged	1																**1**
Charco		2	2							2			6			2	**14**
Charco V.					1		1				2	1		1			**6**
Puchor	1		1							1	1	2	1			1	**8**
Potosi Applique	164	32	21	20	6	6	3	1									**253**
Espinoza Red-Banded	5		3	2	1	1	1		3	2	3				1		**22**
Usulutan	1																**1**
Chavez	10	5	3	4							1					1	**24**
Velasco Red-Banded		1															**1**
Leon Punctate	1	2	2					1									**6**
Galo Polychrome		2															**2**
Bagaces Style	2	1	1														**4**
Nicaragua Orange-Engraved			1														**1**
Indet. Monochrome	683	451	317	121	50	43	30	52	55	37	40	37	35	21	8	23	**2003**
Indet. Red-Slipped	318	280	185	94	38	36	51	47	51	51	39	49	37	30	17	15	**1338**
Figurine	1																**1**
Unknown	3	2	1	1	2	1	2	2	3	2	6	5	1	2		4	37
TOTAL	**1191**	**778**	**538**	**242**	**99**	**87**	**88**	**103**	**113**	**96**	**93**	**94**	**82**	**54**	**29**	**46**	**3733**

Appendix B: Ceramic Data
1999 Excavation
Santa Isabel Site (Ri-44): Excavation Unit 1

Ri-44 Excavation Unit 1(all sherds)

Level/Total	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**TOTAL**
Galo Polychrome: Belo Variety		1											**1**
Granada Polychrome				1									**1**
Papagayo Polychrome	31	24	68	55	66	99	61	29	6	5	1		**445**
Alfredo V.					2		1						**3**
Fonseca V.				1	1	3	5	2					**12**
Cervantes V.					2								**2**
Casares V.			1	1	4	4	3	1.					**14**
Manta V.					11	8	16	2					**37**
Mandador V.					2	5	10	6					**23**
Sacasa Striated	19	4	109	92	205	141	111	37	9	9			**736**
Pataky Polychrome						1	1	1					**3**
Papagayo Paste/Vallejo Form								1					**1**
Vallejo Polychrome		3	16	2	11	9	4		1				**46**
Mombacho					2	1							**3**
Combo Colander								1	1				**2**
Castillo Engraved			1										**1**
Madeira Polychrome		1											**1**
Las Marias V.				1									**1**
Bramadero Polychrome	1		1										**2**
Murillo Applique			1			2							**3**
Banda				1									**1**
Late Period White-Slipped			6	6	3	5	4						**24**
Indet. Late Period				2									**2**
Nicaragua Orange-Engraved	1												**1**
Indet. Crème-Slipped				4									**4**
Indet. White-Slipped		2	5	5			18	5		1			**36**
Indet. Monochrome	88	51	321	241	327	325	189	65	19	18	3	5	**1652**
Indet. Red-Slipped	123	54	116	70	146	340	309	99	35	5	5	3	**1305**
Unkown	1	3		1					2				**7**
TOTAL	**264**	**143**	**645**	**483**	**782**	**943**	**732**	**249**	**73**	**38**	**9**	**8**	**4369**

Appendix B: Ceramic Data
1999 Excavation
Santa Isabel Site (Ri-44): Excavation Unit 1

Ri-44 Excavation Unit 1 (rimsherds)

Level/Total	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**TOTAL**
Galo Polychrome: Belo Variety													
Granada Polychrome				1									1
Papagayo Polychrome	1	1	16	8	1	12		6					53
Alfredo V.					2								2
Fonseca V.				1	1	1	1	1					5
Cervantes V.					1								1
Casares V.					1	3		1					5
Manta V.					1	1	1	1					4
Mandador V.					1	1	1	1					4
Sacasa Striated				1	1								2
Pataky Polychrome							1						1
Papagayo Paste/Vallejo Form													
Vallejo Polychrome			3	1	1	1	1						7
Mombacho					1								1
Combo Colander													
Castillo Engraved			1										1
Madeira Polychrome				1									1
Las Marias V.													
Bramadero Polychrome													
Murillo Applique													
Banda				1									1
Late Period White-Slipped													
Indet. Late Period			2	4	1	2							7
Nicaragua Orange-Engraved	1												1
Indet. Crème-Slipped				1									1
Indet. White-Slipped				1									1
Indet. Monochrome	2		3	2	3		3	2	1	1		1	18
Indet. Red-Slipped	9		9	9	31	28	22	11	5		2		126
Unkown		3											3
TOTAL	**13**	**4**	**34**	**31**	**46**	**49**	**30**	**23**	**6**	**1**	**2**	**1**	**246**

Appendix B: Ceramic Data
1999 Excavation
Santa Isabel Site (Ri-44): Excavation Unit 2

Ri-44 Excavation Unit 2 (all sherds)

Level/Total	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**TOTAL**
Ometepe Red-Slipped			1									**1**
Granada Polychrome								1				**1**
Papagayo Polychrome	5	19	37	17	55	32	21	1	1			**188**
Fonseca V.			1		2							**3**
Cervantes V.					2							**2**
Casares V.		1			3							**4**
Manta V.		1		2	5				1			**9**
Mandador V.					2			1				**3**
Sacasa Striated	37	61	120	128	144	76	56	48	40	1		**711**
Pataky Polychrome		1							4			**5**
Papagyo Paste/Vallejo Form						1						**1**
Lago Black Modelled					1							**1**
Vallejo Polychrome	7		15	7	2		2		2			**35**
Vallejo V.				1								**1**
Mombacho			3		2				1			**6**
Combo Colander		1										**1**
Castillo Engraved	1			2		3						**6**
Madeira Polychrome	1	1	7	5		1						**15**
Luna Polychrome			3	2								**5**
Murillo Applique	3	2	3	1								**9**
Banda	3	1	3		1				1			**9**
Late Period White-Slipped	29	23	33	10	18	3		2	2	1		**121**
Late Period Orange-Slipped				1								**1**
Indet. White-Slipped		9	14	6				4	7			**40**
Indet. Monochrome	157	169	326	274	328	185	71	37	45	7	2	**1601**
Indet. Red-Slipped	68	81	198	92	125	55	36	18	24	4		**701**
Figurine				1								**1**
Unknown			1									**1**
TOTAL	**311**	**370**	**765**	**549**	**690**	**356**	**186**	**112**	**128**	**13**	**2**	**3482**

Appendix B: Ceramic Data
1999 Excavation
Santa Isabel Site (Ri-44): Excavation Unit 2

RI-44 Excavation Unit 2 (rimsherds)

Level/Total	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**TOTAL**
Ometepe Red-Slipped			1								1
Granada Polychrome								1			1
Papagayo Polychrome	1	1	2	1	8	4	4		1		22
Fonseca V.			1								1
Cervantes V.											
Casares V.					1						1
Manta V.		1			1				1		3
Mandador V.								1			1
Sacasa Striated			1	3				1			5
Pataky Polychrome									1		1
Papagyo Paste/Vallejo Form											
Lago Black Modelled											
Vallejo Polychrome	1		1	4	1				1		8
Vallejo V.				1							1
Mombacho			1								1
Combo Colander											
Castillo Engraved	1					1					2
Madeira Polychrome		1	6	4							11
Luna Polychrome			2								2
Murillo Applique	1	1	1	1							4
Banda	2	1	1		1				1		6
Late Period White-Slipped	1	1	2	1	7	1					13
Late Period Orange-Slipped				1							1
Indet. White-Slipped			1						7		8
Indet. Monochrome	3		8		4						15
Indet. Red-Slipped	8	2	17	12	15	13	5		7	1	80
Figurine											
Unknown											
TOTAL	**18**	**8**	**45**	**28**	**38**	**19**	**9**	**3**	**19**	**1**	**188**

Appendix B: Ceramic Data
1999 Excavation
El Brujo Site (Ri-48)

Excavation Unit	1					2			3	4	5-A			5-C	5-D	5-F	6				7		
Level/Total	**1**	**2**	**3**	**4**	**Total**	**1**	**2**	**Total**	**1**	**1**	**1**	**2**	**Total**	**1**	**1**	**1**	**1**	**2**	**3**	**Total**	**1**	**2**	**Total**
Papagayo Polychrome	1	2			**3**				2	18	2	1	**3**	1	2		15	65	1	**81**			
Sacasa Striated	3	11	1	3	**18**	6	1	**7**	3	133	2	2	**4**			4	39	153	2	**194**	3	2	**5**
Vallejo Polychrome																		2		**2**			
Vallejo Variety																							
Mombacho										2	1	6	**7**					8		**8**			
Castillo Engraved	1				**1**																		
Madeira Polychrome																		5		**5**			
Late Period White-Slipped		1			**1**	2		**2**	1	16							8	19	1	**28**			
Indet. White-Slipped	1				**1**					9								35		**35**			
Indet. Monochrome	7	7	2	1	**17**	2		**2**	11	136	6	8	**14**	4	9	9	96	304	25	**425**	24	8	**32**
Indet. Red-Slipped	2	4			**6**				3	27	1			2	1		5	23		**28**			
Unknown										3				1				4		**4**			
TOTAL	**15**	**25**	**3**	**4**	**47**	**10**	**1**	**11**	**20**	**344**	**12**	**17**	**28**	**8**	**12**	**13**	**163**	**618**	**29**	**810**	**27**	**10**	**37**

Appendix B: Ceramic Data
2000 Excavation
Santa Isabel Site (Ri-44): Excavation Unit N10E30

	Ri-44 Excavation Unit N10E30								
Level/Total	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**TOTAL**
Usulutan-Related Orange-Slipped									
Incised Red-Slipped (Tempisque)									
Leon									
Papagayo Polychrome	1	3	1					1	**6**
Alfredo V.			3		1				**4**
Casares V.							1		**1**
Cervantes V.		1					1		**2**
Culebra V.									
Fonseca V.	2		1	1					**4**
Mandador V.		4	4						**8**
Manta V.									
Papagayo V.									
Cervantes/Fonseca									
Sacasa Striated									
Pataky Polychrome									
Vallejo Polychrome			1						**1**
Vallejo V.	1		1						**2**
Papagayo Paste/Vallejo From Mombacho									
Combo Colander									
Castillo Engraved					1				**1**
Madera Polychrome			1						**1**
Granada Polychrome	1		1		1				**3**
Luna Polychrome									
Ometepe Red-Slipped									
Bramadero									
Murillo									
Unk White-slipped									
Banda									
Wide-band (Late Period)									
Late Period White-Slipped									
Ind. Crème-slipped		1							**1**
Ind White-Slipped									
Monochrome	2		5		2	1	1		**11**
Red-slipped	19	19	26	10	6	6	7	4	**97**
Miscellaneous	3		5	1	8		3		**20**
TOTAL	**29**	**28**	**49**	**12**	**19**	**7**	**13**	**5**	**162**

Appendix B: Ceramic Data
2000 Excavation
Santa Isabel Site (Ri-44): Excavation Unit N11E30

	Ri-44 Excavation Unit N11E30									
Level/Total	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**TOTAL**
Usulutan-Related Orange-Slipped										
Incised Red-Slipped (Tempisque)										
Leon										
Papagayo Polychrome				1		2	1			**4**
Alfredo V.		2	1							**3**
Casares V.			1			1				**2**
Cervantes V.										
Culebra V.										
Fonseca V.										
Mandador V.					1					**1**
Manta V.						2				**2**
Papagayo V.										
Cervantes/Fonseca										
Sacasa Striated										
Pataky Polychrome										
Vallejo Polychrome		1								**1**
Vallejo V.		1								**1**
Papagayo Paste/Vallejo From										
Mombacho										
Combo Colander										
Castillo Engraved										
Madera Polychrome										
Granada Polychrome										
Luna Polychrome										
Ometepe Red-Slipped										
Bramadero										
Murillo										
Unk White-slipped										
Banda										
Wide-band (Late Period)										
Late Period White-Slipped										
Ind. Crème-slipped						2				**2**
Ind White-Slipped				1						**1**
Monochrome		1		1		1	1	2		**6**
Red-slipped		2	12	7	3	16	4	9	1	**54**
Miscellaneous		3	4	3					1	**11**
TOTAL	**0**	**12**	**18**	**13**	**4**	**24**	**6**	**11**	**2**	**90**

Appendix B: Ceramic Data
2000 Excavation
Santa Isabel Site (Ri-44): Excavation Unit N16E16

Ri-44 Excavation Unit N16E16

Level/Total	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**wall**	**TOTAL**
Usulutan-Related Orange-Slipped											
Incised Red-Slipped (Tempisque)											
Leon											
Papagayo Polychrome	2		5	4	1	2		2	2		**18**
Alfredo V.		1		1	3	1		1			**7**
Casares V.			1			1	1				**3**
Cervantes V.				1				2	1		**4**
Culebra V.											
Fonseca V.			1			1		1			**3**
Mandador V.		1	1	1		1	1	1	2		**8**
Manta V.								1	1		**2**
Papagayo V.											
Cervantes/Fonseca											
Sacasa Striated											
Pataky Polychrome		1						1			**2**
Vallejo Polychrome		1									**1**
Vallejo V.											
Papagayo Paste/Vallejo From											
Mombacho											
Combo Colander											
Castillo Engraved											
Madera Polychrome	1										**1**
Granada Polychrome		6	2		1			1			**10**
Luna Polychrome											
Ometepe Red-Slipped											
Bramadero											
Murillo											
Unk White-slipped											
Banda											
Wide-band (Late Period)											
Late Period White-Slipped							1				**1**
Ind. Crème-slipped				2							**2**
Ind White-Slipped			1				1				**2**
Monochrome	2	1	4	2			4	2			**15**
Red-slipped	1	2	9	9	5	6	9	3	6		**50**
Miscellaneous		2		1		5					**8**
TOTAL	**6**	**15**	**24**	**21**	**10**	**17**	**17**	**15**	**12**	**0**	**137**

Appendix B: Ceramic Data
2000 Excavation
Santa Isabel Site (Ri-44): Excavation Unit N20E30

RI-44 Excavation Unit N20E30

Level/Total	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	wall	TOTAL
Usulutan-Related Orange-Slipped																							
Incised Red-Slipped (Tempisque)				1																			1
Leon																							
Papagayo Polychrome	1		2		4	2	5	2	2		6	2	1	2			4	1	5	1	2		42
Alfredo V.	1		1		1			3	2	2	2		1			1		1				1	16
Casares V.							2		2	2	1				2		1						10
Cervantes V.	1							1			1	1			1				1				6
Culebra V.																							
Fonseca V.		1			2	1	2	1	1	1	1	1			3	1			1	1			17
Mandador V.	1				2		4	1	1	2	2	1	2	3	1	1	3	1	6	2	2		35
Manta V.							3					1		1		1		1	1				8
Papagayo V.																							
Cervantes/Fonseca																							
Sacasa Striated																							
Pataky Polychrome							1		1	1	1			1				1					6
Vallejo Polychrome			1	1					1	3			1										7
Vallejo V.	1		2	1	1	1	4		3	2	1		1			1							18
Papagayo Paste/Vallejo From				1		1	1																3
Mombacho										2	2	1	1										6
Combo Colander																							
Castillo Engraved						2	1	2	2		1												8
Madera Polychrome			1	1	2	3	1	2	1	1													12
Granada Polychrome									1		2				1								4
Luna Polychrome																							
Ometepe Red-Slipped									1													1	2
Bramadero																							
Murillo			1																				1
Unk White-slipped																							
Banda					1																		1
Wide-band (Late Period)			2		1																		3
Late Period White-Slipped															1				1				2
Ind. Crème-slipped																							
Ind White-Slipped						1			1	2	1							1					6
Monochrome				1	1	2	7	1	2		1		1	1		2	2	1	1	1			24
Red-slipped	10	1	17	13	16	8	33	26	19	28	15	7	24	10	9	20	15	4	4	1	1	10	291
Miscellaneous			5	2	2	1	8	4	7	12	1	2	3			1							48
TOTAL	**15**	**2**	**32**	**21**	**33**	**22**	**72**	**43**	**47**	**58**	**38**	**16**	**35**	**18**	**18**	**28**	**25**	**11**	**20**	**6**	**5**	**12**	**577**

Appendix B: Ceramic Data
2000 Excavation
Santa Isabel Site (Ri-44): Excavation Unit N20E31

	Ri-44 Excavation Unit N20E31										
Level/Total	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**TOTAL**
Usulutan-Related Orange-Slipped											
Incised Red-Slipped (Tempisque)											
Leon											
Papagayo Polychrome						2		3	1		**6**
Alfredo V.			1						1		**2**
Casares V.											
Cervantes V.											
Culebra V.											
Fonseca V.	1								1		**2**
Mandador V.	2		1		1		1				**5**
Manta V.											
Papagayo V.											
Cervantes/Fonseca											
Sacasa Striated											
Pataky Polychrome			1			1					**2**
Vallejo Polychrome											
Vallejo V.						1			1		**2**
Papagayo Paste/Vallejo From											
Mombacho			1								**1**
Combo Colander											
Castillo Engraved					1			1	1		**3**
Madera Polychrome					2			2			**4**
Granada Polychrome					1						**1**
Luna Polychrome											
Ometepe Red-Slipped											
Bramadero						1					**1**
Murillo											
Unk White-slipped							1				**1**
Banda											
Wide-band (Late Period)					1		1				**2**
Late Period White-Slipped											
Ind. Crème-slipped									1		**1**
Ind White-Slipped			1								**1**
Monochrome	1				1	1	1	1		1	**6**
Red-slipped	3		4		9	5	9	8	21		**59**
Miscellaneous	3		1		3	6					**13**
TOTAL	**10**	**0**	**10**	**0**	**19**	**17**	**13**	**15**	**27**	**1**	**112**

Appendix B: Ceramic Data
2000 Excavation
Santa Isabel Site (Ri-44): Excavation Unit N30E10

Ri- Excavation Unit N30E10

Level/Total	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**wall**	**TOTAL**
Usulutan-Related Orange-Slipped																
Incised Red-Slipped (Tempisque)																
Leon						1										**1**
Papagayo Polychrome			1		1	5	4		2	2	1	2				**18**
Alfredo V.						2						1			1	**4**
Casares V.		1	1				1									**3**
Cervantes V.																
Culebra V.																
Fonseca V.	1					1		1								**3**
Mandador V.	1					2	1	1	1			1				**7**
Manta V.			1													**1**
Papagayo V.																
Cervantes/Fonseca																
Sacasa Striated																
Pataky Polychrome							1	3		1		2				**7**
Vallejo Polychrome	1		1					2								**4**
Vallejo V.	1				2	2		2	1	1						**9**
Papagayo Paste/Vallejo From																
Mombacho					1	1				1						**3**
Combo Colander																
Castillo Engraved																
Madera Polychrome	2		1	3	2	4	3	6	1		1					**23**
Granada Polychrome																
Luna Polychrome	1				2											**3**
Ometepe Red-Slipped																
Bramadero		1				2	1									**4**
Murillo							1									**1**
Unk White-slipped						1	1	1								**3**
Banda				1	1	1	1									**4**
Wide-band (Late Period)			1		4											**5**
Late Period White-Slipped			1	1	1	1										**4**
Ind. Crème-slipped				1						1						**2**
Ind White-Slipped					1			1								**2**
Monochrome	4		5	3	3	4	2	1		2	1			1		**26**
Red-slipped	14		3	8	6	23	7	10	5	16	7	5		4	7	**115**
Miscellaneous	3	3	11	5	7		1	4		2		3			1	**40**
TOTAL	**28**	**5**	**26**	**22**	**31**	**50**	**24**	**32**	**10**	**26**	**10**	**14**	**0**	**5**	**9**	**292**

Appendix B: Ceramic Data
2000 Excavation
Santa Isabel Site (Ri-44): Excavation Unit N30E40

Ri-44 Excavation Unit N30E40

Level/Total	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**wall**	**TOTAL**
Usulutan-Related Orange-Slipped								1			**1**
Incised Red-Slipped (Tempisque)											
Leon											
Papagayo Polychrome	1	3	6	6	6	1		1		2	**26**
Alfredo V.	1										**1**
Casares V.											
Cervantes V.											
Culebra V.											
Fonseca V.			1	1	1	1					**4**
Mandador V.			2	8	4		1			3	**18**
Manta V.			1	2	1					2	**6**
Papagayo V.											
Cervantes/Fonseca											
Sacasa Striated											
Pataky Polychrome			1								**1**
Vallejo Polychrome	1						1				**2**
Vallejo V.	1		1				1				**3**
Papagayo Paste/Vallejo From											
Mombacho											
Combo Colander											
Castillo Engraved											
Madera Polychrome											
Granada Polychrome											
Luna Polychrome											
Ometepe Red-Slipped											
Bramadero											
Murillo											
Unk White-slipped											
Banda											
Wide-band (Late Period)											
Late Period White-Slipped											
Ind. Crème-slipped							1				**1**
Ind White-Slipped		1	1							2	**4**
Monochrome	1		5	1	1						**8**
Red-slipped	3	2	11	9	6	1	4			9	**45**
Miscellaneous		3	3	7	3					4	**20**
TOTAL	**8**	**9**	**32**	**34**	**22**	**3**	**8**	**2**	**0**	**22**	**140**

Appendix B: Ceramic Data
2000 Excavation
Santa Isabel Site (Ri-44): Excavation Unit N30E41

	RI-44 EU N30E41					
Level/Total	**1**	**2**	**3**	**4**	**5**	**TOTAL**
Usulutan-Related Orange-Slipped						
Incised Red-Slipped (Tempisque)						
Leon						
Papagayo Polychrome	1	1	1	1	2	**6**
Alfredo V.						
Casares V.						
Cervantes V.						
Culebra V.						
Fonseca V.		1				**1**
Mandador V.		1	3		1	**5**
Manta V.				1		**1**
Papagayo V.						
Cervantes/Fonseca						
Sacasa Striated						
Pataky Polychrome						
Vallejo Polychrome		1				**1**
Vallejo V.						
Papagayo Paste/Vallejo From						
Mombacho						
Combo Colander						
Castillo Engraved						
Madera Polychrome						
Granada Polychrome				1		**1**
Luna Polychrome						
Ometepe Red-Slipped						
Bramadero						
Murillo						
Unk White-slipped						
Banda						
Wide-band (Late Period)						
Late Period White-Slipped						
Ind. Crème-slipped						
Ind White-Slipped						
Monochrome				1		**1**
Red-slipped		2		1	5	**8**
Miscellaneous	1	3	2			**6**
TOTAL	**2**	**9**	**6**	**5**	**8**	**30**

Appendix B: Ceramic Data
2000 Excavation
Santa Isabel Site (Ri-44): Shovel Tests

	ROW N0													ROW N10												
Shovel Test Number	**E0**	**E10**	**E20**	**E30**	**E40**	**E50**	**E60**	**E70**	**E80**	**E90**	**E100**	**E110**	**E120**	**E0**	**E10**	**E20**	**E30**	**E40**	**E50**	**E60**	**E70**	**E80**	**E90**	**E100**	**E110**	**E120**
Rosales																										
Rivas Red																										
Leon													1													
Papagayo Polychrome	3	1	1		5	1	1	1	1						1	3	5		3	5		2	1	1		
Alfredo V.	2			1	1		1		1										1	4						
Casares V.				1				2										1	2	1						
Cervantes V.			1														1									
Fonseca V.	5				2											2	1		11	1		1				
Mandandor V.	5		1	1												2	4	1	1							
Manta V.				1													1	1								
Sacasa Striated									7																	
Pataky Polychrome																										
Vallejo Polychrome											1								2							
Vallejo V.					1			1	1					1		1	1			1						
Papagayo Paste/Vallejo Form																										
Castillo Engraved	2				1	1		1							3		1					1				
Madeira Polychrome	1		1		2			2	1						3	3	1		1	3		1				
Granada Polychrome																2			2							
Luna Polchrome	1																									
Bramadero																										
Murillo																										
Unknown White-Slipped																										
Wide-Band (Late-Period)								1								1										
Indet. Late Period White-Slipped					2			1		1			1													
Indet. Crème-Slipped						1																				
Indet. White-Slipped						1									1				1							
Indet. Monochrome	2	1	2	1	5			4							2	6	3	1	4	1		1				
Indet. Red-Slipped	5	1	7	2	16	12	2	20	3	2	3	2	1	2	6	22	11	8	17	15	1	15		1	1	1
Miscellaneous			2	6	8	10	13	8	5				1	2	6	10	8	2	7		1					1
Total	**26**	**3**	**15**	**13**	**43**	**26**	**17**	**41**	**19**	**3**	**4**	**2**	**4**	**5**	**22**	**52**	**37**	**14**	**52**	**31**	**2**	**21**	**1**	**2**	**1**	**2**

Appendix B: Ceramic Data
2000 Excavation
Santa Isabel Site (Ri-44): Shovel Tests

ROW N20													ROW N30													ROW N40													
E0	E10	E20	E30	E40	E50	E60	E70	E80	E90	E100	E110	E120	E0	E10	E20	E30	E40	E50	E60	E70	E80	E90	E100	E110	E120	E0	E10	E20	E30	E40	E50	E60	E70	E80	E90	E100	E110	E120	TOTALS
															1																								1
																																				1			1
																																							1
	1	3		5		2								2	1	1		3		1								1	1		1	1					1		59
		3	2		1																																		17
					1										1	1																1							11
													1					4										1											8
					1									1					1							1			1			1							29
		2		1	2	2	1							1		2		1	1										1		1								30
					1												1																						5
																																							7
																											1												1
				1										1																1									6
	1	2			2									1		1		1												1	1								17
						1																																	1
		1		2													1										1												15
	1		1	5										3	6	2											1	2			1								41
			1																																				5
																																							1
	1																																						1
															1																								1
														1	3	2																							6
	1	1		2											1												1	2											10
	3		2	1										1	2																								14
																																							1
		2	2													1																				1			9
	2	4	1	2	3	3		1						6	1	3				1						1					1			1				1	64
	6	14	7	23	7	3	2	4		1			1	16	27	8	2	9	3	1	2		1		1	2	4	3	10	1	3	3		1	1	1			343
1	7	5	3		5									4	1		1	2	3	2								3	6										133
1	**23**	**37**	**19**	**42**	**23**	**11**	**3**	**3**	**5**	**0**	**1**	**0**	**2**	**37**	**45**	**21**	**5**	**20**	**8**	**5**	**2**	**0**	**1**	**0**	**1**	**4**	**8**	**12**	**19**	**3**	**8**	**6**	**0**	**2**	**1**	**3**	**1**	**1**	**841**

Appendix C: Lithic Data
1999 Excavation
Jose Rojas Site (Ri-17): Excavation Unit 1

	EU 1		
Level/Total	1.1	1.6	Total
OBSIDIAN			
Prismatic Blade	2	1	3
Percussion Blade			
Prismatic Blade Point			
Flake			
Exhuasted Polyhedral Core			
Chunk			
Nodule			
Subtotal	2	1	3
CHERT			
Prismatic blade			
Drill			
Biface			
Utilized Flake			
Util. Flake w/Cortex			
Unutilized flake			
Unut. flake w/cortex			
Core			
Shatter			
Shatter w/cortex			
Subtotal			0
BASALT			
Metate			
Metate re-used as mortar			
Metate engraved			
Mano			
Pestle			
Pestle/Mortar			
Mano/Mortar			
Biface			
Worked misc			
Subtotal			0
ANDESITE			
Biface pre-form?			
Axe pre-form?			
Axe			
Celt			
Misc. Worked			
Subtotal			0
SLATE			
Flat-bevelled axe preform			
Flat-bevelled axe			
Subtotal			0
OTHER LITHIC			
Worked Pumice			
Subtotal			0
TOTAL	2	1	3

Appendix C: Lithic Data
1999 Excavation
Paco Rojas Site (Ri-19): Excavation Unit 1

	Excavation Unit 1													
Level/Total	1	2	4	5	6	7	8	9	10	12	13	14	16	Total
OBSIDIAN														
Prismatic Blade									1					1
Percussion Blade														
Prismatic Blade Point														
Flake	2		3	1			1							7
Exhuasted Polyhedral Core														
Chunk			1		1								1	3
Nodule	1													1
Subtotal	3		4	1	1		1		1				1	12
CHERT														
Prismatic blade														
Drill		1			2									3
Biface														
Utilized Flake				1										1
Util. Flake w/Cortex														
Unutilized flake		1		4		1		1						7
Unut. flake w/cortex														
Core		1								1	2			4
Shatter		16	13	1	10	9	4	3		2	4	3		65
Shatter w/cortex														
Subtotal		19	13	6	12	10	4	4		3	6	3		80
BASALT														
Metate			1											1
Metate re-used as mortar														
Metate engraved														
Mano														
Pestle														
Pestle/Mortar														
Mano/Mortar														
Biface														
Worked misc				1										1
Subtotal			1	1										2
ANDESITE														
Biface pre-form?														
Axe pre-form?														
Axe														
Celt														
Misc. Worked														
Subtotal														0
SLATE														
Flat-bevelled axe preform									1					1
Flat-bevelled axe				2	1					1				4
Subtotal				2	1				1	1				5
OTHER LITHIC														
Worked Pumice														
Subtotal														0
TOTAL	3	19	18	10	14	10	5	4	2	4	6	3	2	94

Appendix C: Lithic Data
1999 Excavation
Paco Rojas Site (Ri-19): Excavation Unit 2

	Excavation Unit 2																		
Level/Total	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20	Total
OBSIDIAN																			
Prismatic Blade																			
Percussion Blade																			
Prismatic Blade Point																			
Flake		3	1			1					3	1	2	3			1		15
Exhuasted Polyhedral Core																			
Chunk			1			1										1		1	4
Nodule																			
Subtotal		3	2			2					3	1	2	3		1	1	1	19
CHERT																			
Prismatic blade																			
Drill																			
Biface																			
Utilized Flake																			
Util. Flake w/Cortex																			
Unutilized flake	7	4	5	2	1	5		2	3	1		2							32
Unut. flake w/cortex																			
Core			1		2	1				1					1				6
Shatter	9	20	13	14	9	14	1	2	1	7	8	19	4	5	3				129
Shatter w/cortex		4																	4
Subtotal	16	28	19	16	12	20	1	4	4	9	8	21	4	5	4				171
BASALT																			
Metate	2	1			1														4
Metate re-used as mortar																			
Metate engraved																			
Mano										2									2
Pestle				1															1
Pestle/Mortar																			
Mano/Mortar																			
Biface																			
Worked misc		1													1				2
Subtotal	2	2		1	1					2					1				9
ANDESITE																			
Biface pre-form?																			
Axe pre-form?																			
Axe																			
Celt																			
Misc. Worked																			
Subtotal																			0
SLATE																			
Flat-bevelled axe preform											1								1
Flat-bevelled axe	3	8	5	2	3		3	1	3	1	1		1						31
Subtotal	3	8	5	2	3		3	1	3	1	2		1						32
OTHER LITHIC																			
Worked Pumice		1																	1
Subtotal	3	9	5	2	3		3	1	3	1	2		1						33
TOTAL	21	42	26	19	16	22	4	5	7	12	13	22	7	8	5	1	1	2	233

Appendix C: Lithic Data
1999 Excavation
Paco Rojas Site (Ri-19): Excavation Unit 3

	Excavation Unit 3								
Level/Total	1	3	4	5	7	8	10	14	Total
OBSIDIAN									
Prismatic Blade									
Percussion Blade									
Prismatic Blade Point		1							1
Flake	2		1			1	1		5
Exhuasted Polyhedral Core									
Chunk					2				2
Nodule									
Subtotal	2	1	1		2	1	1		8
CHERT									
Prismatic blade									
Drill									
Biface									
Utilized Flake									
Util. Flake w/Cortex									
Unutilized flake				1				1	2
Unut. flake w/cortex									
Core									
Shatter	8	2	2						12
Shatter w/cortex									
Subtotal	8	2	2	1				1	14
BASALT									
Metate									
Metate re-used as mortar									
Metate engraved									
Mano									
Pestle									
Pestle/Mortar									
Mano/Mortar									
Biface									
Worked misc									
Subtotal									0
ANDESITE									
Biface pre-form?									
Axe pre-form?									
Axe									
Celt									
Misc. Worked									
Subtotal									0
SLATE									
Flat-bevelled axe preform									
Flat-bevelled axe									
Subtotal									0
OTHER LITHIC									
Worked Pumice									
Subtotal									0
TOTAL	10	3	3	1	2	1	1	1	22

Appendix C: Lithic Data
1999 Excavation
Santa Isabel Site (Ri-44): Excavation Unit 1

	Excavation Unit 1										
Level/Total	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	1.10	Total
OBSIDIAN											
Prismatic Blade											
Percussion Blade											
Prismatic Blade Point											
Flake											
Exhuasted Polyhedral Core											
Chunk				1							1
Nodule											
Subtotal				1							1
CHERT											
Prismatic blade											
Drill		1				1	1				3
Biface											
Utilized Flake	1		4	2		1					8
Util. Flake w/Cortex											
Unutilized flake	4		3	7	8	17	7	8		1	55
Unut. flake w/cortex											
Core							1				
Shatter	44	24	16	62	70		67	27	25	6	341
Shatter w/cortex							1				1
Subtotal	49	25	23	71	78	19	77	35	25	7	409
BASALT											
Metate											
Metate re-used as mortar											
Metate engraved											
Mano											
Pestle											
Pestle/Mortar											
Mano/Mortar											
Biface											
Worked misc											
Subtotal											0
ANDESITE											
Biface pre-form?											
Axe pre-form?					1						1
Axe											
Celt											
Misc. Worked											
Subtotal					1						1
SLATE											
Flat-bevelled axe preform											
Flat-bevelled axe											
Subtotal											0
OTHER LITHIC											
Worked Pumice											
Subtotal											0
TOTAL	98	50	46	144	158	38	154	70	50	14	410

Appendix C: Lithic Data
1999 Excavation
Santa Isabel Site (Ri-44): Excavation Unit 2

	Excavation Unit 2										
Level/Total	1	2	3	4	5	6	7	8	9	11	Total
OBSIDIAN											
Prismatic Blade	1							1			2
Percussion Blade											
Prismatic Blade Point											
Flake											
Exhuasted Polyhedral Core											
Chunk											
Nodule											
Subtotal	1							1			2
CHERT											
Prismatic blade											
Drill		1						1			2
Biface											
Utilized Flake			1	1							2
Util. Flake w/Cortex											
Unutilized flake	1	2	2				1	1			7
Unut. flake w/cortex											
Core											
Shatter	8	16	10	7	12		4	4	2	1	64
Shatter w/cortex											
Subtotal	9	19	13	8	12		5	6	2	1	75
BASALT											
Metate						2					2
Metate re-used as mortar											
Metate engraved											
Mano											
Pestle											
Pestle/Mortar											
Mano/Mortar											
Biface											
Worked misc											
Subtotal						2					2
ANDESITE											
Biface pre-form?											
Axe pre-form?											
Axe											
Celt											
Misc. Worked											
Subtotal											0
SLATE											
Flat-bevelled axe preform											
Flat-bevelled axe											
Subtotal											0
OTHER LITHIC											
Worked Pumice											
Subtotal											0
TOTAL	10	19	13	8	12	2	5	7	2	1	79

Appendix C: Lithic Data
1999 Excavation
El Brujo Site (Ri-48)

	Ri-48				
Excavation Unit.Level	1.1	1.1	6.1	6.2	Total
OBSIDIAN					
Prismatic Blade					
Percussion Blade					
Prismatic Blade Point					
Flake					
Exhuasted Polyhedral Core					
Chunk					
Nodule					
Subtotal					0
CHERT					
Prismatic blade					
Drill					
Biface					
Utilized Flake			1		1
Util. Flake w/Cortex					
Unutilized flake					
Unut. flake w/cortex					
Core	1				1
Shatter		1	3	1	5
Shatter w/cortex			1		1
Subtotal	1	1	5	1	8
BASALT					
Metate					
Metate re-used as mortar					
Metate engraved					
Mano					
Pestle					
Pestle/Mortar					
Mano/Mortar					
Biface					
Worked misc					
Subtotal					0
ANDESITE					
Biface pre-form?					
Axe pre-form?					
Axe					
Celt					
Misc. Worked					
Subtotal					0
SLATE					
Flat-bevelled axe preform					
Flat-bevelled axe					
Subtotal					0
OTHER LITHIC					
Worked Pumice					
Subtotal					0
TOTAL	1	1	5	1	16

Appendix C: Lithic Data
2000 Excavation
Santa Isabel Site (Ri-44): Excavation unit N10E30

	Ri-44 EU N10E30								Total
LEVEL	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
OBSIDIAN									
Prismatic blade									0
Tool									0
Shatter									0
WHITE CHERT (SILEX-CUARZO)									
Drill									0
Util. flake w/cortex									0
Unutilized flake					7				7
Unut. flake w/cortex							1		1
Shatter		7	14				2	1	24
RED CHERT									
Utilized flake									0
Shatter			3						3
OTHER CHERT (SILEX/CUARZO)									
Utilized flake									1
Util. flake w/cortex			1						1
Unutilized flake					1			1	2
Shatter		2	10						12
BASALT*									
ANDESITE									
Shatter									1
CHALCEDONY									
Utilized Flake			1						1
Utilized Flake w/cortex									0
Flakes w/out cortex									0
Unut. flake									0
Unut. flake w/cortex									0
Core		1							1
Projectile point									0
Tool(?) or Drill (?)			1						1
Shatter	4	8	22	2	19		1	3	59
OTHER LITHIC									
Jasper projectile point									0
TOTAL	4	18	52	2	27	0	4	5	114

***All Basalt Artifacts from the RI-44 2000 Excavatons are listed in Appendix F**

Appendix C: Lithic Data
2000 Excavation
Santa Isabel Site (Ri-44): Excavation Unit N11E30

RI-44 EU N11E30

LEVEL	1	2	3	4	5	6	7	8	9	Total
OBSIDIAN										
Prismatic blade										0
Tool			1							1
Shatter										0
WHITE CHERT (SILEX-CUARZO)										
Drill										0
Util. flake w/cortex										0
Unutilized flake										0
Unut. flake w/cortex										0
Shatter		2	9		2	4		7	1	25
RED CHERT										
Utilized flake										0
Shatter									2	2
OTHER CHERT (SILEX/CUARZO)										
Utilized flake										0
Util. flake w/cortex										0
Unutilized flake										0
Shatter		2	1				1	2		6
BASALT										
ANDESITE										
Shatter										0
CHALCEDONY										
Utilized Flake										0
Utilized Flake w/cortex										0
Unut. flake										0
Unut. flake w/cortex							1			1
Core										0
Projectile point										0
Tool(?) or Drill (?)										0
Shatter		5	2		1	1	13	13	1	36
OTHER LITHIC										
Jasper projectile point										0
TOTAL	0	9	13	0	3	5	15	22	4	71

Appendix C: Lithic Data
2000 Excavation
Santa Isabel Site (Ri-44):
Excavation Unit N16E16

	RI-44 EU N16E16										
LEVEL	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**wall**	**Total**
OBSIDIAN											
Prismatic blade											0
Tool											0
Shatter											0
WHITE CHERT (SILEX-CUARZO)											
Drill								1			1
Util. flake w/cortex						1					1
Unutilized flake	1	1			1	3					6
Unut. flake w/cortex											0
Shatter					3	5		2			10
RED CHERT											
Utilized flake											0
Shatter											0
OTHER CHERT (SILEX/CUARZO)											
Utilized flake											0
Util. flake w/cortex											0
Unutilized flake					1	2					3
Shatter											0
BASALT											
ANDESITE											
Shatter											0
CHALCEDONY											
Utilized Flake					1						1
Utilized Flake w/cortex											0
Flake w/out cortex											0
Unut. flake		3									3
Unut. flake w/cortex											0
Core							1				1
Projectile point								1			1
Tool(?) or Drill (?)											0
Shatter					1	11	8		3		23
OTHER LITHIC											
Jasper projectile point											0
TOTAL	1	4	0	0	7	22	9	4	3	0	50

Appendix C: Lithic Data
2000 Excavation
Santa Isabel Site (Ri-44): Excavation Unit N20E30

	RI-44 EU N20E30																						
LEVEL	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**wall**	**Total**
OBSIDIAN																							
Prismatic blade							1								1								2
Tool																							0
Shatter					1																		1
WHITE CHERT (SILEX-CUARZO)																							
Drill																							0
Util. flake w/cortex																							0
Unutilized flake												5					2						7
Unut. flake w/cortex																							0
Shatter							2		4	5	2					1							14
RED CHERT																							
Utilized flake					2																		2
Shatter																							0
OTHER CHERT (SILEX/CUARZO)																							
Utilized flake																							0
Util. flake w/cortex																							0
Unutilized flake		1		2			1				1	3		1									9
Shatter					1		3		1	2	1										1		9
BASALT																							
ANDESITE																							
Shatter																							0
CHALCEDONY																							
Utilized Flake												1											1
Utilized Flake w/cortex																							0
Flakes w/out cortex			2	2	8	1			5		5	1	2	5	2	2	3			5	8		51
Unut. flake																							0
Unut. flake w/cortex			3	1		1		1			1												7
Core			1		2		1			3	1						1						9
Projectile point																							0
Tool(?) or Drill (?)			1												1								2
Shatter		1	6	4	24		9		6	29	12	2	4	1	1		8	5					112
OTHER LITHIC																							
Jasper projectile point												1											1
TOTAL	0	2	13	9	38	2	17	1	16	39	23	13	6	7	5	3	14	5	0	5	9	0	227

Appendix C: Lithic Data
2000 Excavation
Santa Isabel Site (Ri-44): Excavation Unit N20E31

	Ri-44 EU N20E31										
LEVEL	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Total**
OBSIDIAN											
Prismatic blade											0
Tool											0
Shatter											0
WHITE CHERT (SILEX-CUARZO)											
Drill											0
Util. flake w/cortex											0
Unutilized flake											0
Unut. flake w/cortex											0
Shatter		2	2								4
RED CHERT											
Utilized flake											0
Shatter											0
OTHER CHERT (SILEX/CUARZO)											
Utilized flake											0
Util. flake w/cortex											0
Unutilized flake			2						1		3
Shatter					1		1	1			3
BASALT											
ANDESITE											
Shatter											0
CHALCEDONY											
Utilized Flake											0
Utilized Flake w/cortex											0
Flakes w/out cortex	1				1	2	3	3			10
Unut. flake											0
Unut. flake w/cortex						1	1				2
Core						1					1
Projectile point											0
Tool(?) or Drill (?)											0
Shatter	2		4		4	8	9	6	6		39
OTHER LITHIC											
Jasper projectile point											0
TOTAL	3	2	8	0	6	12	14	10	7	0	62

Appendix C: Lithic Data
2000 Excavation
Santa Isabel Site (Ri-44): Excavation Unit N30E10

Ri-44 EU N30E10

LEVEL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	wall	Total
OBSIDIAN																
Prismatic blade																0
Tool																0
Shatter														1		1
WHITE CHERT (SILEX-CUARZO)																
Drill																0
Util. flake w/cortex																0
Unutilized flake	3		2	6												11
Unut. flake w/cortex																0
Shatter	1														2	3
RED CHERT																
Utilized flake																0
Shatter		1														1
OTHER CHERT (SILEX/CUARZO)																
Utilized flake																0
Util. flake w/cortex																0
Unutilized flake			2	1							1					4
Shatter				4								1				5
BASALT																
ANDESITE																
Shatter																0
CHALCEDONY																
Utilized Flake					1											1
Utilized Flake w/cortex																0
Flakes w/out cortex					10	3	9								1	23
Unut. flake																0
Unut. flake w/cortex																0
Core					1											1
Projectile point															1	1
Tool(?) or Drill (?)																0
Shatter	3	1	13	15	13	11	20	2	4	5	5	3		6	1	102
OTHER LITHIC																
Jasper projectile point																0
TOTAL	7	2	17	26	25	14	29	2	4	5	6	4	0	7	5	153

Appendix C: Lithic Data
2000 Excavation
Santa Isabel Site (Ri-44): Excavation Unit N30E40

Ri-44 N30E40

LEVEL	1	2	3	4	5	6	7	8	9	wall	Total
OBSIDIAN											
Prismatic blade											0
Tool											0
Shatter											0
WHITE CHERT (SILEX-CUARZO)											
Drill											0
Util. flake w/cortex											0
Unutilized flake											0
Unut. flake w/cortex											0
Shatter											0
RED CHERT											0
Utilized flake											0
Shatter											0
OTHER CHERT (SILEX/CUARZO)											
Utilized flake											0
Util. flake w/cortex											0
Unutilized flake				1							1
Shatter											0
BASALT											
ANDESITE											
Shatter											0
CHALCEDONY											
Utilized Flake											0
Utilized Flake w/cortex				2							2
Flakes w/out cortex	2			4	7	1					14
Unut. flake											0
Unut. flake w/cortex							1				1
Core			2						3		5
Projectile point											0
Tool(?) or Drill (?)							2				2
Shatter	1	1	6	10	20		3	2	6		49
OTHER LITHIC											
Jasper projectile point											0
TOTAL	3	1	8	17	27	1	6	2	9	0	74

Appendix C: Lithic Data
2000 Excavation
Santa Isabel Site (Ri-44): Excavation Unit N30E41

	RI-44 EU N30E41					
LEVEL	**1**	**2**	**3**	**4**	**5**	**Total**
OBSIDIAN						
Prismatic blade						0
Tool						0
Shatter						0
WHITE CHERT (SILEX-CUARZO)						
Drill						0
Util. flake w/cortex						0
Unutilized flake						0
Unut. flake w/cortex					4	4
Shatter				2		2
RED CHERT						0
Utilized flake						0
Shatter				2		2
OTHER CHERT (SILEX/CUARZO)						
Utilized flake						0
Util. flake w/cortex						0
Unutilized flake				1	2	3
Shatter						0
BASALT						
ANDESITE						
Shatter						0
CHALCEDONY						
Utilized Flake						0
Utilized Flake w/cortex			3	2		5
Unut. flake						0
Unut. flake w/cortex			1	2		3
Core					1	1
Projectile point						0
Tool(?) or Drill (?)			1			1
Shatter	1	5	10	7		23
OTHER LITHIC						
Jasper projectile point						0
TOTAL	1	5	15	16	7	44

Appendix C: Lithic Data
2000 Excavation
Santa Isabel Site (Ri-44): Shovel Tests

	ROW N0												
Shovel Test Number	**E0**	**E10**	**E20**	**E30**	**E40**	**E50**	**E60**	**E70**	**E80**	**E90**	**E100**	**E110**	**E120**
LEVEL													
OBSIDIAN													
Tool							1						
Unutilized flake				2									
Shatter		1											
WHITE CHERT (SILEX-CUARZO)													
Unutilized flake	8												
Unut. flake w/cortex	1	9	5	9		1	2						
Shatter	5	19	13	25	5		12						
RED CHERT													
Unutilized flake													
Unut. flake w/cortex		1											
Shatter	2	4	2			5							
Shatter w/cortex													
OTHER CHERT (SILEX/CUARZO)													
Utilized flake	1												
Unutilized flake													
Unut. flake w/cortex				1									
Shatter							2						
BASALT													
ANDESITE													
Utilized flake													
Unutilized flake													
Shatter				1									
CHALCEDONY													
Utilized Flake							1						
Utilized Flake w/cortex							2						
Unut. flake													
Unut. flake w/cortex		3					2						
Core													
Projectile point													
Tool(?) or Drill (?)		6	1	1		1							
Shatter	2	22	2	1		8	5	1		1			
OTHER LITHIC													
Jasper projectile point													
Nodule of quartz (silex/cuarzo)				1									
Undentified													
TOTAL	**19**	**65**	**23**	**41**	**5**	**15**	**27**	**1**	**0**	**1**	**0**	**0**	**0**

Appendix C: Lithic Data
2000 Excavation
Santa Isabel Site (Ri-44): Shovel Tests

	ROW N10												
Shovel Test Number	**E0**	**E10**	**E20**	**E30**	**E40**	**E50**	**E60**	**E70**	**E80**	**E90**	**E100**	**E110**	**E120**
LEVEL													
OBSIDIAN													
Tool			1										
Unutilized flake													
Shatter													
WHITE CHERT (SILEX-CUARZO)													
Unutilized flake			9										
Unut. flake w/cortex	1												
Shatter					1								
RED CHERT													
Unutilized flake													
Unut. flake w/cortex													
Shatter									1				
Shatter w/cortex													
OTHER CHERT (SILEX/CUARZO)													
Utilized flake													
Unutilized flake	1												
Unut. flake w/cortex	1												
Shatter			2			1							
BASALT													
ANDESITE													
Utilized flake	1												
Unutilized flake													
Shatter													
CHALCEDONY													
Utilized Flake			2										
Utilized Flake w/cortex													
Unut. flake													
Unut. flake w/cortex		1	2	2									
Core	2		4		1								
Projectile point			5										
Tool(?) or Drill (?)	2		2			1							
Shatter	17	7	32	6	6	18							
OTHER LITHIC													
Jasper projectile point													
Nodule of quartz (silex/cuarzo)													
Undentified			5										
TOTAL	**25**	**8**	**64**	**8**	**8**	**20**	**0**	**0**	**1**	**0**	**0**	**0**	**0**

Appendix C: Lithic Data
2000 Excavation
Santa Isabel Site (Ri-44): Shovel Tests

	ROW N20												
Shovel Test Number	**E0**	**E10**	**E20**	**E30**	**E40**	**E50**	**E60**	**E70**	**E80**	**E90**	**E100**	**E110**	**E120**
LEVEL													
OBSIDIAN													
Tool													
Unutilized flake													
Shatter													
WHITE CHERT (SILEX-CUARZO)													
Unutilized flake													
Unut. flake w/cortex													
Shatter	5	6	1	5	5		1						
RED CHERT													
Unutilized flake													
Unut. flake w/cortex													
Shatter													
Shatter w/cortex	7												
OTHER CHERT (SILEX/CUARZO)													
Utilized flake													
Unutilized flake													
Unut. flake w/cortex													
Shatter	6		1	1	1	1		1					
BASALT													
ANDESITE													
Utilized flake													
Unutilized flake				1									
Shatter													
CHALCEDONY													
Utilized Flake													
Utilized Flake w/cortex													
Unut. flake				5									
Unut. flake w/cortex	1				3								
Core			1	1									
Projectile point													
Tool(?) or Drill (?)													
Shatter	14	2	2	5	14	1					1		
OTHER LITHIC													
Jasper projectile point													
Nodule of quartz (silex/cuarzo)													
Undentified	1												
TOTAL	**34**	**8**	**5**	**18**	**23**	**2**	**1**	**1**	**0**	**0**	**1**	**0**	**0**

Appendix C: Lithic Data
2000 Excavation
Santa Isabel Site (Ri-44): Shovel Tests

	ROW N30												
Shovel Test Number	**E0**	**E10**	**E20**	**E30**	**E40**	**E50**	**E60**	**E70**	**E80**	**E90**	**E100**	**E110**	**E120**
LEVEL													
OBSIDIAN													
Tool													
Unutilized flake					1								
Shatter													
WHITE CHERT (SILEX-CUARZO)													
Unutilized flake													
Unut. flake w/cortex													
Shatter	3	1	5	2				1					
RED CHERT													
Unutilized flake			1										
Unut. flake w/cortex													
Shatter	2	2	1	1									
Shatter w/cortex													
OTHER CHERT (SILEX/CUARZO)													
Utilized flake													
Unutilized flake													
Unut. flake w/cortex													
Shatter													
BASALT													
ANDESITE													
Utilized flake													
Unutilized flake													
Shatter													
CHALCEDONY													
Utilized Flake													
Utilized Flake w/cortex					3								
Unut. flake													
Unut. flake w/cortex	2				1								
Core													
Projectile point													
Tool(?) or Drill (?)													
Shatter	12	4	2	2	3	5							
OTHER LITHIC													
Jasper projectile point													
Nodule of quartz (silex/cuarzo)													
Undentified													
TOTAL	**19**	**7**	**9**	**5**	**8**	**5**	**0**	**1**	**0**	**0**	**0**	**0**	**0**

Appendix C: Lithic Data
2000 Excavation
Santa Isabel Site (Ri-44): Shovel Tests

							ROW N40							
Shovel Test Number	**E0**	**E10**	**E20**	**E30**	**E40**	**E50**	**E60**	**E70**	**E80**	**E90**	**E100**	**E110**	**E120**	**Totals**
LEVEL														
OBSIDIAN														
Tool														2
Unutilized flake														3
Shatter														1
WHITE CHERT (SILEX-CUARZO)														
Unutilized flake														17
Unut. flake w/cortex														28
Shatter			2	1	1	4								123
RED CHERT														
Unutilized flake														1
Unut. flake w/cortex														1
Shatter														20
Shatter w/cortex														7
OTHER CHERT (SILEX/CUARZO)														
Utilized flake														1
Unutilized flake														1
Unut. flake w/cortex														2
Shatter	1													17
BASALT														
ANDESITE														
Utilized flake														1
Unutilized flake														1
Shatter														1
CHALCEDONY														
Utilized Flake														3
Utilized Flake w/cortex														5
Unut. flake														5
Unut. flake w/cortex														17
Core		1												10
Projectile point														5
Tool(?) or Drill (?)														14
Shatter		2	4		5									206
OTHER LITHIC														
Jasper projectile point														0
Nodule of quartz (silex/cuarzo)														1
Undentified														6
TOTAL	**1**	**3**	**6**	**1**	**6**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**499**

Appendix D
Sites Ri-19 and Ri-44: Distribution of Faunal Remains

UNIT					**Ri-19 EU 1**							**T**
LEVEL	1	2	3	4	5	8	9	10	12	13	16	
Mammal Identiflable	15					1			1		1	18
Mammal unidentiflable	4				2		4	2			26	38
Bird Identifiable												
Bird Unidentifiable												
Reptile Identifiable								1	2	1		4
Reptile Unidentifiable	3	1			3							7
Amphibian Identifiable												
Amphibian Unidentifiable												
Fish (Total)	1					1						2
Gastropod Identfiable												
Gastropod Unidentfiable												
Pelecypod Identifiable												
Pelecypod Unidentifiable										2		2
Other												
Unclassifiable	17	2	1	2	5	3		1	3	3	70	107
Total	41	3	1	2	10	5	4	4	6	6	97	179

Appendix D

Sites Ri-19 and Ri-44: Distribution of Faunal Remains

UNIT										Ri-19 EU 2												T
LEVEL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	231
Mammal Identiflable	7	8	8	42	56	67		61	22	17	12	8	9	6	1		1		1	1	1	328
Mammal unidentiflable	9	25	19	90	48	22		1	9	5	6		1									235
Bird Identifiable			2		6	1			5	5	3	6	4									32
Bird Unidentifiable				1								2					1					4
Reptile Identifiable		9	5	15	16	23	7	16	9	7	6	11	9	3	3			2	1		4	146
Reptile Unidentifiable		2	14	23	7	9		4		2	2		1									64
Amphibian Identifiable																						
Amphibian Unidentifiable																						
Fish (Total)		1		121	240	698		467	958		364	239	245	147	31	10	3	3	14	9	14	3564
Gastropod Identfiable																						
Gastropod Unidentfiable						7		1														8
Pelecypod Identifiable																						
Pelecypod Unidentifiable				2						2	7	5	4	22			1					43
Other																						
Unclassifiable		13	14	119	122	50	1	26		24	28	29	16	26	6			1				475
Total	16	58	62	413	495	877	8	576		62	428	300	289	204	41	10		6	16	10	19	3890

Appendix D

Sites Ri-19 and Ri-44: Distribution of Faunal Remains

UNIT	**Ri-19 EU 3**												T
LEVEL	1	2	3	4	6	7	8	9	10	11	12	14	87
Mammal Identiflable	2	2	1	1			1			2	3	4	16
Mammal unidentiflable	6		1							11		6	24
Bird Identifiable												1	1
Bird Unidentifiable							1						1
Reptile Identifiable	2						2	1		3	8	1	17
Reptile Unidentifiable	1								2			3	6
Amphibian Identifiable													
Amphibian Unidentifiable													
Fish (Total)													
Gastropod Identfiable													
Gastropod Unidentfiable													
Pelecypod Identifiable													
Pelecypod Unidentifiable													
Other													
Unclassifiable	20	4	9		4	5	28		1	78	107	20	276
Total	31	6	11	1	4	5	32	1	3	94	118	35	341

Appendix D
Sites Ri-19 and Ri-44: Distribution of Faunal Remains

UNIT					**RI-44 EU N16E16**					**T**
LEVEL	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	
Mammal Identiflable	2	6		1	12	20	7	2	11	61
Mammal unidentiflable		2		3	5	9	4	1		24
Bird Identifiable				1	1	3	3 ?			8
Bird Unidentifiable		1	1	3		1	6	3	4	19
Reptile Identifiable		9	48	42	14	15	20	19	24	191
Reptile Unidentifiable	1		14	1	3	6	15	5	2	47
Amphibian Identifiable										
Amphibian Unidentifiable										
Fish (Total)		14		32	51	201	130		97?	428
Gastropod Identfiable						232		115		347
Gastropod Unidentfiable	3	154	3	106	129?		229	2	370	867
Pelecypod Identifiable										
Pelecypod Unidentifiable	1									1
Other										
Unclassifiable	1			3	3	4	1		2	14
Total	9	188	69	196	94	497	422	155	422	2052

Appendix D
Sites Ri-19 and Ri-44: Distribution of Faunal Remains

UNIT						**Ri-44 EU N20 E30**								**T**
LEVEL	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	
Mammal Identiflable				3	10	12	8		1	2			4	40
Mammal unidentiflable				9	89?	16	13	6	2	3	2		2	53
Bird Identifiable						2					1			3
Bird Unidentifiable								1						1
Reptile Identifiable			2	14	14	22	8	8	2	4		1	3	78
Reptile Unidentifiable			2	20	11	22	7	8	2					72
Amphibian Identifiable														
Amphibian Unidentifiable														
Fish (Total)	1			4	27	33	34	37	29	26	14	1	6	212
Gastropod Identfiable	2													2
Gastropod Unidentfiable						??								
Pelecypod Identifiable														
Pelecypod Unidentifiable														
Other														
Unclassifiable	2	4	2	50	91	100	73	50	1	5	5		21	404
Total	5	4	6	100	153	207	143	110	37	40	22	2	36	865

Appendix D
Sites Ri-19 and Ri-44: Distribution of Faunal Remains

UNIT			**Ri-44 EU N20 E31**						**T**
LEVEL	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**9**	
Mammal Identiflable	1	3	3	2	6	5	5	6	31
Mammal unidentiflable	1		3	2	5	3	3	1	18
Bird Identifiable									
Bird Unidentifiable									
Reptile Identifiable	3	4	2	7	12	11	1	2	42
Reptile Unidentifiable	2	2	8	5	12	5			34
Amphibian Identifiable						3	9	20	32
Amphibian Unidentifiable									
Fish (Total)			2						2
Gastropod Identfiable									
Gastropod Unidentfiable									
Pelecypod Identifiable									
Pelecypod Unidentifiable									
Other									
Unclassifiable	4	21	13	31					69
Total	11	30	31	47	35	27	18	29	228

Appendix D

Sites Ri-19 and Ri-44: Distribution of Faunal Remains

UNIT						Ri-44 EU N30 E10								T
LEVEL	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	
Mammal Identiflable		31	5	6	7	22	20	27	14	23	3	5	3	166
Mammal unidentiflable		18	7	7	8	27	27	15	10	21	3	4	2	149
Bird Identifiable				1			2	2		1		2		8
Bird Unidentifiable			2				6	3	6			4		21
Reptile Identifiable	4	42	12	11	16	23	23	32	11	14	10	8	8	214
Reptile Unidentifiable		34	14	15	28	15	21	46	15	10	7	5	2	212
Amphibian Identifiable		32												
Amphibian Unidentifiable														
Fish (Total)		2	5		22	94	171	80?	21	37	11	4	11	378
Gastropod Identfiable			1				42		1					44
Gastropod Unidentfiable														
Pelecypod Identifiable														
Pelecypod Unidentifiable														
Other														
Unclassifiable	3	69	14	25	35	37	66	34	4?	21	4	5	8	321
Total	7	456	60	65	116	218	378	159	78	127	38	37	34	1773

Appendix D
Sites Ri-19 and Ri-44: Distribution of Faunal Remains

UNIT	RI-44 EU N30E40								T
LEVEL	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
Mammal Identiflable			2	6	57	2	1	1	69
Mammal unidentiflable			1	24	15	4		2	46
Bird Identifiable					12				12
Bird Unidentifiable					9				9
Reptile Identifiable			7	13	11	8	4	3	46
Reptile Unidentifiable	1		3	3	2		2	2	13
Amphibian Identifiable									
Amphibian Unidentifiable									
Fish (Total)				43	578	6	10	10	647
Gastropod Identfiable					12		2		14
Gastropod Unidentfiable									
Pelecypod Identifiable									
Pelecypod Unidentifiable									
Other					34				34
Unclassifiable			1	12	61	1			75
Total	1		14	101	791	21	19	18	965

Appendix D
RI-44: Distribution of Faunal Remains, Shovel Tests

Ri-44 Shovel Test	N0E0	N0E10	N0E20	N0E30	N0E40	N0E50	N0E60	N0E70	N0E80	N0E90	N10E0	N10E10	N10E20	N10E30	N10E40	N10E50	N20E0	N20E10	N20E20	N20E30	N20340	N20E50	N30E0
Mammal Identiflable		6	3	7	2	12	24	2		4	1	6	23	5	8	4	11	16	1	19	2	2	6
Mammal unidentiflable	1	4	2	8	2	8	31			13	1	12	5	2		8	8		1	15	5	4	15
Bird Identifiable					1									1		3	8	7	1	5			4
Bird Unidentifiable		2										1											
Reptile Identifiable		6	7	24	6	41	19	8	1		4	15	12	2	3	12	27	3	17	34	13	3	71
Reptile Unidentifiable		5	3	15	2	10	13				4	11	4			8	26		3	9	9		42
Amphibian Identifiable																							
Amphibian Unidentifiable								1															
Fish (Total)			7	?	10	79	45				5	30	40	3	26	32	134	250	12	78	26		96
Gastropod Identfiable	1	8		?		1							74	1	7			99	57	1			
Gastropod Unidentfiable				?																			
Pelecy.? Identifiable				?																			
Pelecy.? Unidentifiable				?																			
Other																							
Unclassifiable	5	26	6	67??	6	21	42	1			8	39		31	4	35	56	4		50	31		71
Total	7	57	28	54	29	172	174	12	1	17	23	114	158	45	48	102	270	379	92	211	86	9	305

Appendix D
RI-44: Distribution of Faunal Remains, Shovel Tests

N30E10	N30E20	N30E30	N30E40	N30E50	N30E60	N40E30	N40E40	N40E50	N40E100
12	2	2	3	3	1		1		
8	4	2	2	1		1			1
2			2						
	1								
24	9	4	13	1			5		
18	9	1	5	2			3		
11	6	1	25						
			1						
17	5	6	12	3				1	
92	36	16	63	10	1	1	9	1	1

APPENDIX E
OTHER ARTIFACTS

Artifacts Recovered During 1999 Excavations

Site	EU	Level	#	Item	Material	Size (cm)	Comments
17	1	1	19	Burnt Clay	clay		irregular forms
17	1	2	1	Worked Sherd	clay	D2.9	rounded
17	1	3	12	Burnt Clay	clay		irregular forms
17	1	3	2	Earrings	shell	.9 x .6/7 x .6	earrings?
17	1	4	1	Bead	clay	3.1 x 1.3	monochrome
17	1	4	1	Bead	clay	2.0 x 1.4	monochrome
17	1	4	9	Burnt Clay	clay		irregular form
17	1	4	4	Burnt Clay	clay		irregular form
17	1	5	13	Burnt Clay	clay		irregular form
17	1	5	1	Nail	iron	3.7 x 1.0	square-headed/cut nail
17	1	6	1	Brick	clay		
17	1	6	17	Burnt Clay	clay		irregular form
17	1	7	36	Burnt Clay	clay		irregular form
17	1	7	1	Greenstone	greenstone	1.3 x .9	natural
17	1	8	13	Burnt Clay	clay		irregular form
17	1	8	2	Burnt Clay	clay		wattle impression?
17	1	9	20	Burnt Clay	clay		irregular form
17	1	10	4	Burnt Clay	clay		irregular form
19	1	1	1	Bead	clay	1.3 x .9 (.4)	ovular
19	1	2	1	Earspool	clay	1.6 x 1.3 (.4)	red-slipped, burnished
19	1	2	1	Earspool	clay	1.5 x .9 (.4)	red-slipped, burnished
19	1	4	1	Earspool	clay	1.5 x 1.2 (.4)	red-slipped, burnished
19	1	4	1	Earspool	clay	1.1 x 1.3 (.3)	red-slipped, burnished
19	1	4	1	Flute	clay	5.4 x 1.2/3.1	monochrome, decorated with human face effigy
19	1	5	1	Burnt Clay	clay	3.0 x 2.6	irregular form
19	1	5	1	Earspool	clay	2.1 x 1.1 (.3)	red-slipped, burnished
19	1	6	1	Earspool	clay	1.7 x 1.3 (.4)	red-slipped, burnished
19	1	8	1	Earspool	clay	1.4 x 1.4 (.3)	red-slipped, burnished
19	1	8	1	Earspool	clay	1.1 x 1.7 (3)	red-slipped, burnished
19	1	8	1	Worked Stone	adesite		rounded, fine incisions/circular designs on both sides
19	1	10	1	Earspool	clay	1.4 x 1.9 (.4)	red-slipped, burnished
19	1	12	1	Earspool	clay	1.4 x 1.9 (.4)	red-slipped, burnished
19	1	12	1	Earspool	clay	1.0 x 1.1 (.3)	red-slipped, burnished
19	2	1	1	Earspool	clay	1.8 x 1.8 (.4)	red-slipped, burnished
19	2	1	1	Earspool	clay	1.9 x 1.3 (.4)	red-slipped, burnished
19	2	2	1	Bahareque	clay	3.6 x 2.5	2 wattle impressions
19	2	2	1	Bahareque	clay	2.7 x 2.2	1 wattle impression
19	2	2	1	Bahareque	clay	5.6 x 3.6	2 wattle impressions
19	2	2	2	Burnt Clay	clay	1.3 x 1.7 y 3.3 x 4.1	irregular form
19	2	2	1	Burnt Clay	clay	4.3 x 2.5	irregular form
19	2	2	1	Burnt Clay	clay	2.1 x 1.8	irregular form
19	2	2	1	Burnt Clay	clay	3.3 x 2.4	irregular form
19	2	2	1	Earspool	clay	2.1 x 1.4 (.4)	red-slipped, burnished
19	2	2	1	Earspool	clay	3.2 x 2.0 (.6)	monochrome
19	2	2	1	Earspool	clay	1.1 x .9 (.3)	red-slipped, burnished

19	2	2	1	Earspool	clay	2.2 x 1.6 (.3)	red-slipped, burnished
19	2	2	1	Earspool	clay	1.8 (.4)	red-slipped, burnished
19	2	2	1	Worked Sherd	clay	3.9 x 1.9 (.9)	rounded
19	2	2	1	Worked Stone	basalt	9.2 x 3.0	ovular
19	2	3	1	Bahareque	clay		2 wattle impression (1=2.1 width, 1.5 depth)
19	2	3	1	Bahareque	clay		2 wattle impression (1=1.9 depth)
19	2	3	1	Burnt Clay	clay		irregular forms
19	2	3	1	Burnt Clay	clay		irregular form
19	2	3	1	Earspool	clay	1.7 x 1.2 (.4)	red-slipped, burnished
19	2	3	1	Earspool	clay	1.0 x 1.1 (.3)	red-slipped, burnished
19	2	3	1	Earspool	clay	1.6 x 1.2 (.3)	red-slipped, burnished
19	2	3	1	Earspool	clay	(.4)	red-slipped, burnished, incised
19	2	3	1	Worked Sherd	clay	2.2 x 2.1 (1.1)	rounded, red-slipped
19	2	3	1	Worked Sherd	clay	4.6 x 1.8 (.7)	rounded, monochrome
19	2	3	1	Worked Sherd	clay	4.1 x 3.9 (1.0)	rounded, red-slipped (7.5R4/6[red])
19	2	3	1	Net Sinker	clay	1.7 x 1.5	notched, monochrome
19	2	4	1	Bahareque	clay	2.1 x 2.9 (1.4/1.2)	1 wattle impressions
19	2	4	1	Burnt Clay	clay	2.1 x 2.7	irregular form
19	2	4	1	Earspool	clay	2.8 x 1.3/1.5 (.5)	red-slipped, burnished
19	2	4	1	Earspool	clay	1.6 x 1.7 (.4)	red-slipped, burnished
19	2	4	1	Earspool	clay	1.9 x 1.1 (.4)	red-slipped, burnished
19	2	4	1	Earspool	clay	1.4 x 1.0 (.3)	red-slipped, burnished
19	2	4	1	Earspool	clay	1.4 x 1.6 (.4)	red-slipped, burnished
19	2	4	1	Earspool	clay	1.7 x 1.5 (.3)	red-slipped, burnished
19	2	4	1	Earspool	clay	.9 x 1.6 (.3)	red-slipped, burnished
19	2	4	1	Earspool	clay	1.7 x 1.7 (.4)	red-slipped, burnished
19	2	4	1	Worked Sherd	clay	4.1 x 3.9 (.9)	rounded, monochrome
19	2	5	1	Earspool	clay	.9 x.9 (.4)	red-slipped, burnished
19	2	5	1	Earspool	clay	1.8 x .9 (.3)	red-slipped, burnished
19	2	5	1	Earspool	clay	1.5 x .9/1.4 (.3)	red-slipped, burnished
19	2	5	1	Earspool	clay	2.3 x 1.4	red-slipped, burnished
19	2	5	1	Earspool	clay	2.3 x 1.0 (.5)	red-slipped, burnished, incised
19	2	5	1	Earspool	clay	1.4 x 1.3(.4)	red-slipped, burnished
19	2	5	1	Net Sinker	clay	5.8 x 3.4	notched, monochrome, burnished
19	2	5	1	Worked Sherd	clay	5.0 x 4.5/3.5 (.9)	red-slipped exterior, 2.5 YR4/4 (reddish brown)
19	2	6	1	Earspool	clay	1.5 (.4)	red-slipped, burnished
19	2	6	1	Earspool	clay	2.4 x 1.2, .4	red-slipped, burnished
19	2	6	1	Earspool	clay	1.2 x 1.1 (.3)	red-slipped, burnished
19	2	6	1	Earspool	clay	2.9 x 1.9 (.4)	red-slipped, burnished
19	2	6	1	Earspool	clay	1.7 x 1.8 (.5)	red-slipped, burnished
19	2	6	1	Earspool	clay	2.5 x .9/1.4 (.3)	red-slipped, burnished
19	2	6	1	Earspool	clay	1.6 x 1.1 (.3)	red-slipped, burnished
19	2	6	1	Earspool	clay	1.9 x 1.3 (.3)	red-slipped, burnished

19	2	6	1	Earspool	clay	1.7 x 1.1 (.3)	red-slipped, burnished
19	2	6	1	Earspool	clay	2.9 x 1.2 (.4)	red-slipped, burnished
19	2	6	1	Earspool	clay	2.6 x 1.3 (.4)	red-slipped, burnished
19	2	6	1	Earspool	clay	1.5 x 1.4 (.3)	red-slipped, burnished
19	2	6	1	Worked Sherd	clay	4.3 x 3.9 (.7)	rounded, monochrome
19	2	6	1	Worked Sherd	clay	4.3 x 3.4 (.7)	monochrome, burnished exterior
19	2	7	1	Earspool	clay	2.6 x 1.8 (.4)	red-slipped, burnished
19	2	7	1	Earspool	clay	1.8 x 1.0/1.3	red-slipped, burnished, incised
19	2	7	1	Earspool	clay	2.7 x 1.1/1.5 (.3)	end= red-slipped, burnished, length= monochrome
19	2	7	1	Earspool	clay	2.7 x 1.8 (.3)	red-slipped, burnished
19	2	7	1	Handle	clay		monochrome, polished, 2 fine incisons
19	2	7	1	Worked Sherd	clay	4.4 x 4.6 (1.0)	rounded, monochrome
19	2	7	1	Worked Sherd	clay	6.5 x 4.2 (.9)	monochrome, polished exterior
19	2	8	1	Earspool	clay	2.4 x 1.1 (.9)	red-slipped, burnished, incised
19	2	8	1	Earspool	clay	2.2 x 1.8 x 1.5 (.4)	red-slipped, burnished, incised
19	2	8	1	Earspool	clay	1.9 x 1.3 (.2)	red-slipped, burnished
19	2	9	1	Earspool	clay	** x .6 (.4)	red-slipped, burnished
19	2	9	1	Earspool	clay	2.0 x 1.9/1.1 (.3)	red-slipped, burnished
19	2	9	1	Earspool	clay	1.7 x 1.8 (.4)	red-slipped, burnished
19	2	9	1	Earspool	clay	1.2 x 1.2 (.4)	red-slipped, burnished
19	2	9	1	Pendant	bone	5.2 x 1.4 (.2)	perforated, polished, rectangular
19	2	9	1	Worked Bone	bone	1.2 x 1.8 (.8)	tubular, 1 circular incision around diameter
19	2	9	1	Worked Sherd	clay	6.2 x 5.7 (.8)	rounded, red-slipped/burnished exterior
19	2	10	1	Burnt Clay	clay		irregular form
19	2	10	1	Earspool	clay	3.4 x1.3 (.4)	red-slipped, burnished
19	2	10	1	Earspool	clay	2.1 x .9/1.2 (.4)	red-slipped, burnished
19	2	10	1	Earspool	clay	1.4 x 1.8 (.6)	red-slipped, burnished, incised
19	2	10	1	Earspool	clay	1.4 x 1.3	red-slipped, burnished
19	2	10	1	Earspool	clay	2.1 x 1.4/1.5 (.3)	red-slipped, burnished
19	2	10	1	Earspool	clay	2.2. x 1.1 (.4)	red-slipped, burnished
19	2	10	1	Earspool	clay	2.1 x 1.3 (.4)	red-slipped, burnished
19	2	10	1	Earspool	clay	1.5 x 1.2 (.4)	red-slipped, burnished
19	2	10	1	Earspool	clay	1.7 x 1.0 (.4)	red-slipped, burnished
19	2	10	1	Earspool	clay	1.6 x 2.0	red-slipped, burnished
19	2	10	1	Earspool	clay	1.6 x .8 x 1.0 (.2)	red-slipped, burnished

19	2	10	1	Earspool	clay	1.7 x 1.5 (.4)	red-slipped, burnished
19	2	10	1	Earspool	clay	1.6 x 1.4 (.3)	red-slipped, burnished
19	2	10	1	Earspool	clay	3.3 x 1.4/1.1 (.4)	monochrome
19	2	10	1	Pipe	clay	4.2cm x 5.7cm	red-slipped (1 YR4/4 [weak red]), polished
19	2	10	1	Worked Sherd	clay	1.9 x 3.2 (.6)	perforated, monochrome, polished
19	2	10	1	Worked Sherd	clay	7.4 x 6.2 (.9)	Perforated, Chavez
19	2	11	1	Earspool	clay	3.5 x 1.8/1.2 (.5)	monochrome
19	2	11	1	Earspool	clay	3.1 x 1.8/1.4 (.5)	red-slipped, burnished, incised
19	2	11	1	Earspool	clay	2.7 x 2.3	red-slipped, burnished
19	2	11	1	Earspool	clay	1.9 x 1.4/1.1	red-slipped, burnished, quadrafoil incisions
19	2	11	1	Earspool	clay	1.7 x .9/.6	red-slipped, burnished, quadrafoil incisions
19	2	11	1	Earspool	clay	1.0 x .5	red-slipped, burnished
19	2	11	1	Earspool	clay		red-slipped, burnished, incised
19	2	11	1	Earspool	clay	2.3 x .8 (.3)	red-slipped, burnished
19	2	11	1	Earspool	clay	2.5 x 1.4 (.4)	red-slipped, burnished
19	2	11	1	Earspool	clay	1.3 x 1.4 (.3)	red-slipped, burnished
19	2	11	1	Earspool	clay	1.5 x .9 (.4)	red-slipped, burnished
19	2	11	1	Earspool	clay	1.6 x 1.0 (.4)	red-slipped, burnished
19	2	11	1	Earspool	clay	2.1 x 2.0 (.3)	red-slipped, burnished
19	2	11	1	Earspool	clay	1.1 x .9 (.3)	red-slipped, burnished
19	2	11	1	Earspool	clay	1.8 x 1.4 (.4)	red-slipped, burnished
19	2	11	1	Earspool	clay	2.4 x 1.5 (.4)	red-slipped, burnished
19	2	11	1	Earspool	clay	2.2 x 1.5 (.4)	red-slipped, burnished
19	2	11	1	Earspool	clay	2.7 x 1.6 (.4)	red-slipped, burnished
19	2	11	1	Earspool	clay	1.9 x 1.4 (.7)	red-slipped, burnished
19	2	11	1	Worked Sherd	clay	5.9 x 6.7 (.8)	rounded, monochrome, polished exterior
19	2	11	1	Worked Sherd	clay	3.3 x 4.3 (.6)	rounded, red-slipped polished exterior, 2.5 YR3/2 (dusky red)
19	2	12	1	Earspool	clay	3.0 x 2.1 (.4)	red-slipped, burnished
19	2	12	1	Earspool	clay	1.5 x 1.5 (.4)	red-slipped, burnished
19	2	12	1	Earspool	clay	2.4 x 1.3 (.4)	red-slipped, burnished
19	2	12	1	Earspool	clay	2.4 x 1.4 (.4)	red-slipped, burnished
19	2	12	1	Earspool	clay	2.6 x 1.5 (.4)	red-slipped, burnished
19	2	12	1	Earspool	clay	1.8 x 1.3 (.4)	red-slipped, burnished
19	2	12	1	Earspool	clay	2.4 x 1.6 (.3)	red-slipped, burnished, incised
19	2	12	1	Earspool	clay	2.2 x 1.1 (.4)	red-slipped, burnished
19	2	12	1	Earspool	clay	1.1 x 1.2 (.3)	red-slipped, burnished
19	2	12	1	Earspool	clay	1.0 x 1.1 (.4)	red-slipped, burnished
19	2	12	1	Earspool	clay	2.4 x 1.1 (.3)	red-slipped, burnished
19	2	12	1	Earspool	clay	.8 x 1.0 (.3)	red-slipped, burnished
19	2	12	1	Earspool	clay	1.2 x 1.4 (.3)	red-slipped, burnished

19	2	12	1	Earspool	clay	1.2 x 2.0 (.4)	red-slipped, burnished
19	2	12	1	Earspool	clay	1.8 x 1.1 (.3)	red-slipped, burnished
19	2	13	1	Bahareque	clay	2.7 x 2.1 (1.8/1.6)	1 wattle impression
19	2	13	1	Bahareque	clay	1.2 x 1.2 (1.8/1.5)	1 wattle impression
19	2	13	1	Earspool	clay	1.9 x 1.7/1.0 (.4)	red-slipped, burnished
19	2	13	1	Earspool	clay		red-slipped, burnished
19	2	13	1	Earspool	clay	1.9 x 2.7 (.3)	red-slipped, burnished
19	2	13	1	Earspool	clay	2.0 x 1.2 (.4)	red-slipped, burnished, incised
19	2	13	1	Earspool	clay	1.9 x 1.0 (.4)	red-slipped, burnished
19	2	13	1	Earspool	clay	1.9 x 1.4 (.5)	monochrome
19	2	13	1	Earspool	clay	1.5 x .9 (.3)	red-slipped, burnished
19	2	13	1	Earspool	clay	1.5 (.3)	red-slipped, burnished
19	2	13	1	Earspool	clay	1.2 x 1.5 (.4)	red-slipped, burnished
19	2	14	1	Earspool	clay	3.1 x 1.7 (.3)	red-slipped, burnished
19	2	14	1	Earspool	clay	2.4 x 1.4 (.4)	red-slipped, burnished
19	2	14	1	Earspool	clay	1.3 x 1.6 (.6)	red-slipped, burnished
19	2	14	1	Earspool	clay	1.7 x 2.4 (.4)	red-slipped, burnished
19	2	15	1	Earspool	clay	1.8 x 1.4 (.4)	red-slipped, burnished
19	2	16	1	Earspool	clay	1.0 x 1.4 (.3)	red-slipped, burnished
19	2	19	1	Earspool	clay	2.3.x 1.4 (.4)	red-slipped, burnished
19	3	1	23	Burnt Clay	clay		irregular form
19	3	1	1	Earspool	clay	1.5 x 1.1 (.3)	red-slipped, burnished
19	3	1	1	Earspool	clay	2.2 x 1.2 (.3)	red-slipped, burnished
19	3	1	1	Earspool	clay	1.5 x 1.3 (.3)	red-slipped, burnished
19	3	1	1	Earspool	clay	1.3 x 1.1 (.3)	red-slipped, burnished
19	3	1	1	Earspool	clay	1.3 x .9 (.3)	red-slipped, burnished
19	3	1	1	Earspool	clay	1.0 x 1.3 (.3)	red-slipped, burnished
19	3	2	1	Earspool	clay	1.7 x 1.0 (.4)	red-slipped, burnished, incised
19	3	3	1	Earspool	clay	1.7 x 2.0 (.4)	red-slipped, burnished
19	3	3	1	Earspool	clay	2.4 x 1.7 (.4)	red-slipped, burnished
19	3	3	1	Earspool	clay	1.2 x 1.7 (.4)	red-slipped, burnished
19	3	3	1	Worked Sherd	clay	3.2 x 2.4	rounded, monochrome
19	3	7	1	Worked Sherd	clay	3.9 x 1.6 (.6)	rounded, perforated, monochrome
19	3	11	1	Earspool	clay	2.1 x 1.1 (.2)	red-slipped, burnished
19	3	11	1	Earspool	clay	(.3)	red-slipped, burnished
19	3	11	1	Earspool	clay	1.3 x 1.2 (.4)	red-slipped, burnished
19	3	13	1	Worked Sherd	clay	3.2 x 1.6 (.6)	monochrome, polished
44	1	6	1	Worked Sherd	clay	5.6 x 5.7 (.9)	rounded, Sacasa, perforated
44	1	7	1	Bead	clay	1.3 x .4	tubular, monochrome
44	2	2	1	Earspool	clay	1.3 x 1.5 (.3)	red-slipped, burnished
44	2	2	1	Net Sinker	clay	4.9 x 3.6 (1.0)	notched, red-slipped (7.5 R4/8 [red]), 1 punctate (partial perforation?)
44	2	3	1	Worked Sherd	clay	2.5 x 2.0 (.8)	rounded, monochrome
44	2	4	1	Worked Sherd	clay	3.8/2.2 x 2.9 (.6)	monochrome
44	2	6	1	Earspool	clay	.9 x 1.4 (.3)	red-slipped, burnished

44	2	10	1	Earspool	clay	1.9 x 1.3 (.4)	red-slipped, burnished
48	3	1	2	Bahareque	clay		irregular forms
48	4	1	1	Net Sinker	clay	3.3 x 2.2	monochrome, notched

Artifacts Recovered from 2000 Excavations.

Site	EU	Level	#	Item	Material	Size (cm)	Comments
44	N10E30	2	1	Polished stone	stone	D2.4	striations and thumb-sized indentation
44	N10E30	3	1	Worked Sherd	clay	D7.8	monochrome, burnished, perforation near edge
44	N10E30	3	1	Worked Sherd	clay	D5.9	monochrome, ovular, fragment with perforation near edge
44	N10E30	4	1	Worked Sherd	clay	4.5 x 6.5	rectangular, red-slipped rimsherd, perforation near one edge
44	N10E30	4	1	Worked Sherd	clay	4	ovular, monochrome, fragment with perforation near one edge
44	N10E30	5	1	Worked Sherd	clay	6.0 x .8	Sacasa Striated, rounded, broken
44	N10E30	6	1	Worked Sherd	clay		Papagayo:Papagayo, fragment with perforation near one edge
44	N11E30	2	1	Worked Sherd	clay	D3.7	Ometepe white-slipped, ovular, fragment with hole near edge
44	N11E30	3	1	Bead	clay	1.16 x .90 x .78	zoomorphic turtle carapace or frog body wih extremities curled by side
44	N11E30	3	1	Spindle Whorl	clay	Ht1.05 D3.35 Hl.46	made from Sacasa Striated
44	N11E30	3	1	Worked Sherd	clay	D6.9	red-slipped, rounded, one perforation near edge
44	N11E30	3	1	Worked Sherd	clay	D3.5	Papagayo Ind, rounded, one perforation near edge
44	N11E30	3	1	Worked Sherd	clay	D4.3	red-slipped, rounded, one perforation near edge
44	N11E30	4	1	Worked Sherd	clay	D7.9	Unk red-on-cream, ovular, half of worked sherd with perforation near edge
44	N11E30	4	1	Worked Sherd	clay	0.7	monochrome, rectangular, only ¼ of sherd
44	N11E30	6	1	Worked Sherd	clay	8.4	red-slipped, ovular, fragment with perforation near one edge
44	N11E30	6	1	Worked Sherd	clay	5.4	monochrome, ovular, fragment with perforation near edge

44	N11E30	6	1	Worked Sherd	clay		eroded, monochrome, polygon, fragment with perforation near edge
44	N11E30	8	1	Worked Sherd	clay	6.3	white-slipped, fragment with perforation near one edge
44	N16E16	1	1	Ceramic ball	clay	D.40	ball from ceramic support
44	N16E16	4	1	Ceramic object	clay	7.5 x 4.0	Cacao bean pendant? 1 perforation on each end, resembles half a football
44	N16E16	4	1	Fish Hook	bone	1.9	thin and fine
44	N16E16	4	1	Fish Hook	bone	1.8	thin and fine
44	N16E16	4	1	Worked Sherd	clay	5.2	cream-slipped, fragment with perforation near one edge
44	N16E16	4	1	Worked Sherd	clay		Sacasa Striated
44	N16E16	7	1	Worked Sherd	clay	5.0 x 1.2	monochrome, rectangular, broken
44	N16E16	8	1	Worked Sherd	clay	6.2 x 1.0	Sacasa Striated, partially prepared and rounded
44	N16E16	8	1	Worked Sherd	clay		Sacasa Striated
44	N16E16	8	1	Worked Sherd	clay		Sacasa Striated
44	N16E16	8	1	Worked Sherd	clay		Sacasa Striated
44	N20E30	4	1	Worked Sherd	clay	5.0 x .7	eroded, monochrome, rounded, broken in half and smoothed again
44	N20E30	5	1	Amber	stone	1.4 x 1.1	irregular form, golden amber, natural
44	N20E30	5	1	Earspool	clay	.92 x .25	burnished, D1.5 exterior rim, D1.2 exterior center
44	N20E30	5	1	Jewel	stone/shell	0.7	round stone/shell with brown edge and white/green color. Jewelry inlay?
44	N20E30	5	1	Net Sinker	clay	5.7 x 1.8	eroded, monochrome rimsherd, notched
44	N20E30	5	1	Worked Sherd	clay	D5.1	Ometepe period sherd, fragment with peforation near edge
44	N20E30	6	1	Worked Sherd	clay	D5.0	red-slipped, irregular polygon, fragment with hole near edge
44	N20E30	6	1	Worked Sherd	clay	D5.0	eroded, irregular polygon, fragment with hole near edge
44	N20E30	6	1	Worked Sherd	clay	8.7 x 2.0	rectangular, thick rimsherd
44	N20E30	7	1	Ceramic ball	clay	D1.18	smooth, ball from ceramic support
44	N20E30	7	1	Pick	bone	8.5 x .8	1 tip broken off. Weaving pick?
44	N20E30	8	1	Bead	stone	0.45	½ of red stone bead
44	N20E30	8	1	Needle	bone		eye of needle

44	N20E30	8	1	Net Sinker	clay	5.0 x 4.1(1.19)	Papagayo Ind, notched
44	N20E30	8	1	Worked Sherd	clay	4.7 x .9	monochrome, partially prepared and rounded
44	N20E30	8	1	Worked Sherd	clay	5.5 x 7	monochrome, ovoid
44	N20E30	10	1	Baharaque	clay	8.0 x 6.0 x 2.5	cane impression: 1.5 wide for length of sample, .7 impression depth
44	N20E30	10	1	Worked Sherd	clay		Ind white-slipped
44	N20E30	11	1	Bead	clay	D2.3	decorated w/incised goggle eyes, "Tlaloc fangs", white paint remains in incising
44	N20E30	11	1	Ceramic ball	clay	D1.76	rough and chipped, ceramic support ball
44	N20E30	11	1	Net Sinker	clay	5.3	monochrome, fragment with 2 notches
44	N20E30	11	1	Vessel	clay	7.0 x 7.5	olla with small bowl as lid. 3.0 cm orifice
44	N20E30	11	1	Vessel	clay	2.7 x 9.0	subhemispherical, formed lid to olla, ind type with black horizontal lines on interior with alternating double vertical lines and uprigh hook pattern below rim
44	N20E30	11	1	Vessel	clay	7.0 x 8.3	burnished olla with small bowl as lid. 3.8 cm orifice
44	N20E30	11	1	Vessel	clay	2.5 x 6.8	burnished subhemispherical bowl, formed lid to olla.
44	N20E30	11	1	Worked Sherd	clay		white-slipped Ometepe period, fragment with hole near one edge
44	N20E30	16	1	Awl	bone		broken at one end
44	N20E30	16	1	Figurine	clay	7.78, 5.5 at head	moldmade Papagayo, women with breasts and round belly (pregnant?), belly button, earspools, cross-hatched garment around breasts and below arms, large upward slanting eyes, arms legs headdress top broken off
44	N20E30	17	1	Needle	bone		eye of needle, broken below eye
44	N20E30	17	1	Worked Sherd	clay	5.6 x .8	red-slipped rimsherd, ovoid
44	N20E31	7	1	Worked Sherd	clay	6.0 x 1.0	Sacasa Striated, rounded
44	N20E31	8	1	Ceramic ball	clay	D1.72	ball from ceramic

							support
44	N20E31	8	1	Worked Sherd	clay	D4.5	Madeira, irregular fragment with perforation near edge
44	N20E31	8	1	Worked Sherd	clay	D3.2	Papagayo Ind, fragment with perforation
44	N20E31	9	1	Worked Sherd	clay	4.5	rectangular, monochrome, fragment with perforation near one edge
44	N20E31	9	1	Worked Sherd	clay	4.7	Papagayo Ind., fragment with perforation near one edge
44	N30E10	1	1	Spindle Whorl	clay	Ht8.9 D3.87 Hl.40	ovular long side, 3.58 short side. Made from irregular worked sherd
44	N30E10	7	1	Bead	shell	.40 x .74	hole large enough for 1 ply cotton thread
44	N30E10	7	1	Worked Sherd	clay	3.2	white-slipped, fragment with perforation slightly off center
44	N30E10	12	1	Earspool	clay	7.0 x 1.0	burnished, D.9 exterior rim, D.78 exterior center
44	N30E41	5	1	Bead	clay	.93 x .39	formed to have 3 sections
44	N30E41	5	1	Spindle Whorl	clay	Ht1.92 D5.0 Hl.76	incised pattern on flat side: sets of diagonal lines representing textile pattern
44	N20E30	1	1	Baharaque	clay		irregular form
44	N11E30	9	1	Bead	shell	.6 x .5	hole large enough for 1 ply cotton thread
44	N20E30	6	1	Net Sinker	clay	6.0 x 4.8	monochrome, notched
44	N10E30	3	1	Net Sinker	clay	4.8 x 2.4 (1.1)	red-slipped, notched
44	N20E30	8	1	Net Sinker	clay	2.6 x 1.0	eroded monochrome
44	N10E30	3	1	Worked Sherd	clay	5.4 x 5.4	red-slipped, perforation near edge, rimsherd, rectangular
44	N20E30	9	1	Worked Sherd	clay	5	Pataky rimsherd, rectangular, perforated near edge, fragment
44	N10E30	2	1	Worked Sherd	clay	4.5 x 6.7	Ind cream-slipped, ovoid, perforated near edge, second hole not completed
44	N20E30	6	1	Spindle Whorl	clay	D2.5 .Ht.7 Hl.6	red-slipped worked sherd
44	N20E30	6	1	Spindle Whorl	clay	D4.0 Ht.6 Hl.5	made from Sacasa Striated
44	N20E30	6	1	Spindle Whorl	clay	D2.7 Ht.7 Hl.3	made from Bagaces period sherd
44	N20E30	8	1	Ceramic ball	clay	D1.77	fugitive white slip, ball from ceramic support
44	N20E30	17	1	Ceramic ball	clay	D1.18	smooth, ball from

							ceramic support
44	N16E16	4	1	Worked Sherd	clay		Sacasa Striated sherd
44	N10E30	3	1	Worked Sherd	clay		Ometepe period sherd
44	N16E16	7	1	Figurine	clay		Papagayo, fragment
44	N20E30	5	1	Figurine	clay		Ind Painted ware, fragment
44	N30E41	5	1	Worked Sherd	clay		Sacasa Striated sherd
44	N10E30	3	1	Jar fragment	clay		polished monchrome with effigy face
44	N20E30	5	1	Worked Sherd	clay		monochrome sherd
44	N16E16	3	1	Worked Sherd	clay		Madeira sherd
44	N16E16	3	1	Worked Sherd	clay		monochrome sherd
44	N20E30	12	1	Figurine	clay		Papagayo, fragment
44	N11E30	5	1	Sherd w/adobe	clay		monochrome
44	N20E30	7	1	Worked Sherd	clay		monochrome sherd
44	N20E30	5	1	Figurine	clay		Papagayo, fragment
44	N30E10	8	1	Worked Sherd	clay		Madeira sherd
44	N20E31	9	1	Figurine	clay		Papagayo, fragment
44	N16E16	9	1	Worked Sherd	clay		red-slipped sherd
44	N16E16	5	1	Worked Sherd	clay		monochrome sherd
44	N16E16	5	1	Deer pelvis	bone	23 x 5.5	
44	N30E40	3	1	Worked Sherd	clay		Sacasa Striated sherd
44	N16E16	8	1	Worked Sherd	clay		red-slipped, one side
44	N16E16	6	1	Pendant	shell	2.7 x 1.16	tapers to blunt point, triangular shape
44	N20E31	1	1	Worked Sherd	clay		red-slipped, both sides
44	N20E30	10	1	Worked Sherd	clay		eroded, monochrome sherd
44	N16E16	8	1	shell	shell	4.8 x 5.3 x 3.43	natural
44	N16E16	8	1	shell	shell	4.5 x 3.8 x 3.25	natural
44	N16E16	8	1	shell	shell	3.4 x 2.5 x 2.48	natural
44	N16E16	6	1	antler	antler	19.4	repaired, 2 prongs, worked tip
44	N10E30	2	1	Vessel	clay	12 x 4.0	Mandador semihemispherical
44	N16E16	2	1	Vessel	clay	22 x 8.0	Granada hemispherical
44	N10E30	4	1	Vessel	clay	32 x 15	red-slipped
44	N30E40	5	1	Vessel	clay	28 x 4.0	Papagayo, everted lip
44	N16E16	8	1	Figurine	clay		Papagayo, fragment
44	N16E16	2	1	Base of pot	clay		Papagayo:casares
44	N16E16	6	1	Figurine	clay		Ind white-slipped
44	N16E16	6	1	Worked Sherd	clay		monochrome sherd
44	N16E16	6	1	Worked Sherd	clay		red-slipped sherd, one side
44	N16E16	6	1	Worked Sherd	clay		Sacasa Striated sherd
44	N16E16	6	1	Worked Sherd	clay		red-slipped sherd, one side
44	N16E16	5	1	Figurine	clay		Papagayo, fragment
44	N10E30	4	1	Worked Sherd	clay		monochrome sherd
44	N10E30	7	1	Figurine	clay		Papagayo, fragment
44	N30E40	5	1	Earspool	bone	2.5 x 1.3	
44	N30E41	1	1	Worked Sherd	clay		Papagayo sherd

44	N30e40	4	1	Worked Sherd	clay		Papagayo:manta sherd
44	N30E40	4	1	Figurine	clay		Papagayo, fragment
44	N30E40	wall	1	Spindle Whorl	bone	D4.75 Ht1.29 Hl.7 B.64	
44	N20E30	9	1	Worked Sherd	clay		Ometepe period sherd
44	N30E10	5	1	Worked Sherd	clay		Ometepe period sherd
44	N20E31	1	1	Figurine	clay		Bagaces period, fragment
44	N20E30	12	1	Worked Sherd	clay		Papagayo rimsherd
44	N20E30	9	1	Worked Sherd	clay		monochrome sherd
44	N20E31	1	1	Worked Sherd	clay		Sacasa Striated sherd
44	N20E31	7	1	Worked Sherd	clay		eroded, Mombacho sherd

Artifact Recovered from 2000 Shovel Tests.

Site	STP	#	Item	Material	Size (cm)	Comments
44	N0E10	1	Ceramic ball	clay	D1.59	ovular, ball from ceramic support
44	N0E20	1	Ceramic ball	clay	D1.31	round ball from ceramic support
44	N0E20	1	Figurine	clay	16.2 x 4.0	red-slipped Bagaces period, molded, headless, hands on hips, breast, probable pregnant belly with naval, legless below thighs
44	N0E20	1	Worked Sherd	clay		Monochrome
44	N0E70	1	Ceramic ball	clay	D1.6	ovular, ball from ceramic support
44	N0E70	1	Ceramic ball	clay	D1.71	ovular, ball from ceramic support
44	N10E0	1	Worked Sherd	clay	D6.0	Papagayo Ind, ovular, half of worked sherd with perforation near edge
44	N10E10	1	Net Sinker	clay	5.7 x 3.2	Ometepe period, notched
44	N10E10	1	Net Sinker	clay	3.7	Papagayo Ind, fragment, one notch
44	N10E20	1	Awl	bone	4.5 x 1.0	
44	N20E0	1	Net Sinker	clay	5.2 x 3.3 (.95)	eroded, monochrome, notched
44	N20E0	1	Worked Sherd	clay	D5.0	one side red-slipped, ovular, fragment with hole off center
44	N20E0	1	Worked Sherd	clay	D3.6	Vallejo, ovular, fragment with hole close to edge
44	N20E0	1	Worked Sherd	clay	D3.6	monochrome, ovular, fragment with perforation near edge
44	N20E10	1	Net Sinker	clay	8.5 x 4.7 (.97)	red-slipped, notched
44	N20E10	1	Spindle Whorl	clay	D4.72 Ht1.14 Hl.6	made from worked monochrome sherd

44	N20E30	1	Baharaque	clay	4.8	cane impressions in three places: 1.2 x .8 deep, 1.2 x .4 deep, 1.1 x .3 deep. Orange/brown-colored
44	N20E30	1	Bead	bone	.43 x .80	
44	N20E30	1	Ceramic ball	clay	D1.21	irregular, ball from ceramic support
44	N20E30	1	Worked Sherd	clay		red-slipped (one side)
44	N20E40	1	Worked Sherd	clay		Sacasa Striated
44	N30E50	1	Worked Sherd	clay	D6.4	Papagayo:Casares, ovular, half of worked sherd with perforation near edge
44	N40E0	1	Worked Sherd	clay	5.9 x .8	Sacasa Striated, rounded, broken in half
44	N40E0	1	Worked Sherd	clay	5.2 x .7	Papagayo Ind, ovoid, broken in half
44	N10E20	1	Worked Sherd	clay		Sacasa Striated sherd
44	N0E100	1	Worked Sherd	clay		Monochrome sherd
44	N11E30	1	Worked Sherd	clay		eroded Papagayo sherd
44	N0E10	1	Worked Sherd	clay		Sacasa Striated sherd
44	N0E80	1	Worked Sherd	clay		Sacasa Striated sherd
44	N20E0	1	Figurine	clay		Papagayo, fragment
44	N20E70	1	Figurine	clay		Papagayo, fragment
44	N10E40	1	Figurine	clay		Papagayo, fragment
44	N0E60	1	Figurine	clay		Papagayo, fragment
44	N30E40	1	Figurine	clay		Papagayo, fragment
44	N10E30	1	Worked Sherd	clay		cream-slipped sherd
44	N10E30	1	Worked Sherd	clay		red-slipped sherd
44	N0E40	1	Worked Sherd	clay		Monochrome sherd
44	N10E20	1	Figurine	clay		Papagayo, fragment
44	N10E10	1	Worked Sherd	clay		Sacasa Striated sherd
44	N20E10	1	Figurine	clay		Papagayo, fragment
44	N10E0	1	Worked Sherd	clay		Madeira sherd
44	N10E10	1	Figurine	clay		Papagayo, fragment
44	N0E10	1	Worked Sherd	clay		Monochrome sherd
44	N10E10	1	Worked Sherd	clay		red-slipped sherd

TOTAL # OF ARTIFACTS = 383

APPENDIX F
RADIOCARBON DATES

	Beta Sample #			
	140585	140588	140587	140586
Provenience*	Site Ri-19 EU 2 Level 7	Site Ri-19 EU 2 Level 8	Site Ri-19 EU 2 Level 17	Site Ri-44 EU 1 Level 8
Conventional (BP)	1580 +/- 100	1470 +/- 70	1630 +/- 100	1030 +/- 90
Intercept (AD)	445	610	420	1005
Sigma Range (AD)	390-600	540-650	330-545	955-1040

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