BIG TRANSITIONS IN A SMALL FISHING VILLAGE:

Late Preceramic Life in Huaca Negra, Virú Valley, Peru

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I dedicate this dissertation to Mila†, the cat who spent half of his life waiting for me back home

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Focusing on the data unearthed from the 2015 excavation in Huaca Negra, this dissertation aims to illustrate early human occupation in the Virú Valley to answer three research questions. (1) How can we add to our knowledge of the Late Preceramic Period and its transition to the Initial Period in the north coast of Peru, mainly in the Virú Valley and neighboring valleys? (2) Are there diachronic changes in economic activities? How do they shed light on possible social change? (3) How does an analytical perspective at the scope of the community help to address overlaps between public and domestic aspects of social life, and to enable a better understanding of early Andean societies?

The fruitful results from the work at Huaca Negra provide new evidence for answering the abovementioned questions. First of all, the dating confirms that this site was continuously occupied between 5,000 to 3,200 CalBP, forming a rare case of uninterrupted cultural deposits from the Late Preceramic to Initial Period. Absolute dates and a detailed study of stratigraphy enable the reconstruction of four occupation phases, the foundation for diachronic comparison. Secondly, three interconvertible forms of "capital," economic, cultural, and social capital, constitute the framework for analyzing unearthed materials and for assessing the nature of activities in Huaca Negra. Current data suggests that economic capital, in the form of subsistence, witnesses the most dramatic change: the importance of fishing activity declines while shellfish collecting becomes more significant over time. Subtle changes can also be discerned in the other two categories. Both the importance of cultural capital, in the form of craft production, and social capital, in the form of exotic goods, increase slightly, and there are more exotic goods being incorporated into people's daily life in the later context.

Through the examination of material remains and archaeological contexts, I suggest that two traditionally dichotomized social spheres, the public and the domestic, are juxtaposed in the same spatial contexts at Huaca Negra. This dissertation thus takes a "community" scope that

encompasses both spheres in order to reveal the overall lifeways in this long-term occupied fishing village.

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1.0 INTRODUCTION

This dissertation presents the results of excavation and research at the site of Huaca Negra de Guañape (hereafter Huaca Negra). Huaca Negra was a fishing village located on the margin of the Virú Valley. It was occupied for nearly two millenniums (~5,000- 3,200 CalBP) and witnessed the transition from the Late Preceramic to Initial Period in the north coast of Peru. This time span is vital in many ways. First of all, the occupation first began around the time that climate reached today's standard, making it more comparable with recent data, and on the other hand, it witnessed a population that progressively adapted to the environment with new technologies and strategies (Lanning, 1965, 1963; Richardson, 2006, 1983, 1981; Richardson and Sandweiss, 2008; Sandweiss et al., 2009).

This environmental setting lays the foundation for the first question to be answered by this dissertation: *are there diachronic changes in economic activities during the Late Preceramic, and from the Late Preceramic to Initial Period? If so, how do the changes shed light on social organization*? Based on the archaeological context and the long-term occupation reconstructed by the archaeological investigation, three aspects of economic activity in this ancient fishing village will be discussed, subsistence, craft production, and inter-community exchange, and their cause-and-effect relationship with an overall process of social development will be investigated.

Under a stabilized climate pattern, Andean people adjusted themselves to the environmental system and exploited new resources (e.g., Moseley, 1975, 1985, 1992), which in this part of the world ultimately led to the onset of complex society, mainly evidenced by the presence of monumental construction. Monumental construction has long been the focus of archaeological investigation of early societies in and beyond the Andes. This tendency is not merely because of the fact that early monuments are larger scale sites and easier to identify. Rather, archaeologists tend to take ancient monuments as the primary indicator of social complexity under the presumption that large-scale construction required leaders to plan in advance, to manage the building process, and to mobilize substantial labor (e.g., Renfrew, 1973; Trigger, 1990).

However, I contend that to reveal how people (labor) are organized requires not only the study of the monument itself but also other aspects of social contexts. For example, in a relatively small-scale society, households are critical units of social organization, and any kind of communial labor or leadership would happen through households (e.g., Bermann, 1997; Eerkens, 2009; Prentiss et al., 2012). A household perspective investigates practices of basal social units and domestic activities (e.g., Hirth, 1993, 2009a, 2009b; Wilk et al., 1982), as well as offering the potential for examining the whole spectrum of social variation within a given society. In addition, rather than passive recipients of social change or homogeneous social units, households can also be treated as active participants that play different social roles within a community (Hendon 1996; Robin and Robin 2003).

Unlike other early monumental sites, Huaca Negra is a community on a relatively small scale, and it forms a unique intersection where larger public architecture and domestic activities happened at the same location. As will be discussed later, this intersection stimulates further consideration of the way archaeologists think of the dichotomy of the public and domestic sphere within a community. Through the material study and reconstruction of archaeological contexts, it is argued here that the concept of community can be a useful way to incorporate both ends of the spectrum, household and monumentality. Thus, the second question of this research would be: *is the dichotomy of domestic and public spheres the most fruitful concept for investigating early society? If not, how does a community scope help to address overlaps between public and domestic* *ends of social life?* Huaca Negra can serve as an example for incorporating various social aspects such as domestic life, community, and monument construction to thoroughly assess an early community.

The third question that the investigation of Huaca Negra aims to contribute is: *how can we expand our knowledge of the Late Preceramic Period and its transition to the Initial Period in the north coast of Peru?* More specifically, *how can Huaca Negra broaden our knowledge from a culture-historical perspective*? The two periods are separated by the utilization of ceramic in the Initial Period, but in other ways the Initial Period appears to be a continuation and expansion of Preceramic patterns (Quilter, 2014, but see Pozorski and Pozorski 1990). Huaca Negra provides a rare chance for studying the long-term developmental trajectory of economic activities during the Late Preceramic and across the transition to the Initial Period, and, as will be discussed in the following chapters, it reveals dramatic changing patterns from various aspects. The results provide insight into how early Andean complexity, which tends to be associated with mound construction, was also related to household subsistence activity, community economy, and other daily routines.

Following the three research questions mentioned above, the first section of this chapter brings up the corresponding themes of research and reviews the related theoretical background. The second part of the chapter previews the layout of this dissertation.

1.1 RESEARCH THEMES

1.1.1 Digging Down to Early Complexity: A Long-Term Developmental Trajectory

Archaeology is a study that examines past human society and culture in time-depth. While this goal can be fulfilled by various methods of investigation, site excavation is one way that physically represents the "depth of time." As will be discussed in Chapter 3, this is especially true in the case of Huaca Negra because the two-thousand-year-long occupation created continuous cultural deposits that are deeper than 5 meters. The excavation of Huaca Negra thus provides a rare chance to explore an early community on the north coast of Peru through time.

The Late Preceramic and the Initial Period of the central and north coast of Peru were the setting for the emergence of early complex society. There are important scholarly debates about this complexity: between models of peer polity (Creamer et al. 2014) and state-like social organization (Shady 2006), and between hierarchical and less/non-hierarchical organization based on monument construction (Burger and Salazar 2012; Pozorski and Pozorski 2008, 2012). On the one hand, diverse ways to interpret data have led to different conclusions about social organization. But in addition, it is now evident that there was no single developmental trajectory that dominated all the early societies in the different valleys along the Peruvian coast. Each of the valleys in the central Andes can be taken as an independent system, developing trajectories that were genuinely different. This is another reason for divergent scholarly perspectives on early complexity.

However, this scenario of multi-lineal trajectories is mainly based on the investigation of early monument construction, accompanied by regional scale data. Less attention has been placed on issues such as "*how did people live their life under different kinds of social organization*?" Or, "*did changes in social organization affect everyday life*?" How can archaeologists examine these trajectories towards complexity from a bottom-up perspective and contribute to regional culture history?

This research focuses on the community and household level, in the hope that answering these questions can shed light on this long-term debate. Starting from the excavation of Huaca Negra, the time-depth of occupation history is reconstructed, and the unearthed materials are analyzed to reveal the scenario of early village life and its changing patterns in this corner of the north coast of Peru.

Among all the valleys in the central and north coast of Peru, the Virú Valley is famous for Gordon Willey's pioneering systematic regional survey and related research on settlement patterns back in the 1940s and 50s (Willey 1953). Under the same project, excavations done by William Strong and Clifford Evans (1952) and by Junius Bird (1948) also laid the foundation for reconstructing the cultural sequence in the north coast of Peru, especially for the (Late) Preceramic (Cerro Prieto) and Initial (Guañape) Period (e.g., Billman, 1996).

Since that time, however, despite active research on early human occupation in other valleys (e.g., Elera 1999; Mauricio 2015; Milan 2014; Nesbitt 2012a; Pleasants et al. 2009; Pozorski 1976; Prieto 2015; Toshihara 2002), less attention has been paid to the early Virú Valley. In the past decades, there have been only sparse investigations in the inland valley area (e.g., Zoubek 1997, 2000). This project returns to the subject of early coastal developments in this critical valley, after seventy years since the Virú Valley Project. With careful excavation and sampling, this research gains fine-grained resolution on the early occupation history at Huaca Negra, aided by AMS dating that was not available in the late 40s. The higher resolution of occupation history also makes it possible to discuss not only the transition from the Later Preceramic Period to the Initial Period but also the *gradual* change that happened within the Late Preceramic Period and indeed throughout the site occupation.

Overall, this research at Huaca Negra focuses on the excavation of a small-scale, early fishing village that is important both for its deep occupation history and its strategic location as a missing puzzle piece in the north coast of Peru. The current work produces a rare opportunity to examine the entire stratigraphic sequence spanning the Late Preceramic to Initial Periods. This archaeological context then constitutes the foundation for realizing the other two research themes: the study of the manipulation of forms of capital, and the reconsideration of the public/ domestic dichotomy.

1.1.2 Resources and the Manipulation of Resources: Understanding Early Societies

By analyzing material remains, archaeological investigations can well illustrate different kinds of economic activities and resource usage in the past human societies (e.g., Dark 1995). In addition, being able to produce and accumulate appropriate resources can be a crucial factor that fuels the development of ancient social complexity (e.g., Earle 1997; Mann 1986). With these ideas in mind, the unearthed archaeological remains are treated as potential resources. As will be described in the following sections, the overarching layout for material analysis and its interpretation is borrowed from Bourdieu's concept of inter-convertible forms of capital (Bourdieu 1986; Bourdieu and Wacquant 2013). Theories that relate to this work, both at a general level and for specific cases from the Andes, will be summarized.

1.1.2.1 The Three Forms of Capital and their Manipulation

The current research takes most of the archaeological remains as the result of different kinds of economic activity, which is considered pervasive in human societies and provides a critical lens to discern embedded social relationships and social organization (e.g., Wilk and Cliggett 2007). As established by Polanyi's influential work on nonmarket economic institutions, social and economic processes are integrated in an early community, in reciprocity, redistribution, and exchange (Polanyi 1957). More specifically, economy is an aspect that encompasses the behaviors associated with production, distribution, consumption, and stratification. These activities are intertwined, and the investigation of archaeological economic activities can reveal the relationship between population and resources (e.g., Dark 1995; Feinman 2008).

It is a common practice for archaeologists to distinguish political economy from domestic economy. The former reflects a social relation that is “based on unequal access to wealth and power” (Roseberry 1989:44), and the latter relates more to everyone’s daily consumption (e.g., Johnson and Earle 2000, c.f., Smith 2004). Although focusing on the aspect of political economy does help reveal different political systems, and answer the question of how the system mobilized and manipulated economic resources (e.g., Cobb 1993; D’Altroy et al. 1985; Polanyi 1957; Smith 2004; Stanish 1992, 2004; Stein 1998), I consider this distinction less useful when dealing with early societies, given the fact that there might be no clear cut division between these realms.

Instead of distinguishing between the domestic and political economy, for investigating a relatively egalitarian society or a society at its transitional point from egalitarian to non-egalitarian one, I propose to apply Bourdieu's concept of inter-convertible forms of capital as an analytical tool, which provides a flexible framework to study early economic activities in a society. In Bourdieu’s structure, symbolic capital is the social status and prestige that is transformed from the other capitals; individuals thus depend on accumulating and manipulating different forms of capital to gain their position (symbolic capital) within a society (Bourdieu 1986, Bourdieu and Wacquant 2013). His economic, cultural, social and symbolic capitals can be plausibly transformed to archaeological data.

In modern societies, economic capital refers to money and institutionalized property rights (Bourdieu 1986:47). In an archaeological context, economic capital can be considered as subsistence resources that sustain people's basic needs. Cultural capital, on the other hand, can exist in objectified forms (ibid: 47), so that craft products such as textiles and the decorated vessel can be taken to represent this category. Lastly, social capital is the social network (ibid: 51) that is rooted partly in *local social relationships* such as to kin and corporate group. Moreover, institutionalized social networks can also encompass more extensive *connections to foreign social groups*. I consider exotic materials to represent participation in an exchange network, meaning they can be used as an indicator for the latter kind of social capital. Although there are many other ways to categorize archaeological datawith this framework, the purpose here is to deal with archaeological remains in a comprehensive fashion while also recognizing that the three forms of capitals can be manipulated by aggrandizers and converted into symbolic capital (Bourdieu and Wacquant 2013).

Under this framework, most unearthed archaeological remains that represent economic activities can be categorized into different forms of capital. The growth and decline of different forms of capital could then illustrate the possible changing pattern in emphasized activities. Together with information about archaeological context, whether or not a kind of resource was *evenly* distributed between social units would also shed light on the degree of inequality or heterogeneity in a society (e.g., McGuire 1983; Paynter 1989). The inter-convertible nature of Bourdieu's capitals constitutes a flexible framework for examining and interpreting archaeological remains in contexts of early society, and the study of flows of capital has the potential to enrich archaeological interpretations. In addition, echoing to Earle's critique that a "political economy approach denies agency" (Earle 2002a), the proposed framework leaves space for agency and manipulation. The interchangeable nature of economic, social, and cultural capital enables the proposed framework to deal with resource manipulation in a more flexible way and helps to discern the possible strategies applied by potential aggrandizers or by the community at large.

1.1.2.2 Subsistence Activities as Fuel of Societal Development

Natural resources have been taken as one of the most important sources of social power (e.g., Hayden 1995). Food is the crucial resource, as its production supports the population. Moreover, an efficient subsistence system helps to produce surplus and to free labor for other group projects, thus constituting an early form of the division of labor and initiating the developmental trajectory of society. For example, Earle (1997) takes the position that control over subsistence resources could be an effective source of power. Taking Chaco Canyon as an example, Earle discusses the use of staple finance, and investigates how a chiefly elite mobilized surpluses from a commoner population and allocated it to people working for the financing institutions (Earle 2001). In fact, many scholars take subsistence abundance as a necessary condition for triggering persistent inequality (e.g., Aldenderfer 2005; Clark and Blake 1994). Similar to the idea of convertible capital mentioned above, Bender suggests that it was the individuals who were able to accumulate food surplus and transform the surplus into valued items who caused social change (Bender 1978).

How does food surplus fuel social change, especially in early society? One meaningful way is by hosting feasts, which can be broadly defined as "any sharing between two or more people of special foods in a meal for a special purpose or occasion (Hayden 2001:28)." Hayden's long-term research can be considered as an excellent expression of the model mentioned above. His interest in feasting behavior sheds light on the social mechanism by which economic resources are accumulated and eventually form a pathway to power. Competitive feasting, from Hayden's point of view, is the principal approach that ambitious individuals took to develop and consolidate power in society (Hayden 2001, 2014; Hayden and Villeneuve 2010, 2011). Hayden also notices that while there are huge varieties from one society to another, rich subsistence resources and the ability of some individuals to control them are necessary conditions that fuel societal development (e.g., Hayden 2014). Following this logic, subsistence resources can be considered as economic capital not only fundamental for population survival but also a vital power strategy.

1.1.2.3 Craft Production and its Products

Craft production is another critical aspect of understanding past economic activity. On the one hand, craft products can be produced for subsistence activities, such as fishing equipment in the Andean coast. On the other hand, craft production represents cultural tradition and associated knowledge. It involves the transformation of raw materials into artifacts. The implication is that "production is organized to meet the needs of consumers" (Costin 2004:191). Costin defines craft as "transformational process involving skill, aesthetic, and cultural meaning," and skill can be referred to as knowledge, ability, and effort (Costin 2005:1035). Thus, craft goods fit the criteria of cultural capital discussed here. They also reveal multiple facets of human culture, such as material culture, economic organization, sociopolitical organization, and exchange (e.g., Costin 2005; Schortman and Urban 2004).

Craft production can also be discussed on a more fundamental level, such as the domestic context that is handling basic needs. For example, Hirth emphasizes the importance of domestic production. He proposes that households can take craft production as a strategy to facilitate their survival and to enhance their possible social network (2009b, 2009a). Hirth also suggests that households would take intermittent or multi-crafting strategies for craft production, as the former helps to raise household productivity and the latter reduces the market risk of demand fluctuation. Hirth's approach is insightful because people (or household units) actively took craft production as a strategy in response to problems or an individual's ambitions. Archaeological investigations in Mesoamerica also suggest that part-time production at the household level can be a sufficient foundation for supporting a regional market system (e.g., Masson et al. 2016).

Other than the social organization of craft production, the accumulation of craft products constitutes another important aspect of archaeological investigation. Accumulating the final products implies not only access to specific resources but also the control of labor and knowledge related to production (e.g., Arnold 1993, 1995, 1996; Cobb 1993). Olausson attempts to take craft expertise as one factor in aggrandizer strategy (Olausson 2008). Other than skill/ knowledge, archaeologists also suggest that being able to monopolize needed goods or knowledge is a way to affirm established power relationships (e.g., Schortman and Urban 2004, Stein 1998). Furthermore, monopolizing goods or knowledge to produce / accumulate craft products can be done through private property, and archaeologists have argued that the privatization of property is one important condition for the emergence of leaders. For example, Eerkens takes shell beads and obsidian from California's Owens Valley as an example to discuss the correlation between privatized property and the emergence of leadership. In this case, being able to claim new resources or technology facilitated aggrandizers' power strategy (Eerkens 2009).

Craft production can also create prestige goods that shed light on ideology or symbolic meaning. When discussing the control of ideology as a source of social power, DeMarrais and colleagues emphasize materialization as an essential strategy: in their argument, portable symbolic objects, among several forms of materialization, facilitate communication among individuals and are ideal signifiers of social position (DeMarrais et al. 1996:18). When discussing the origin of prestige goods, Plourde defines the function of prestige goods as to "signal elevated social status as well as to assist in augmenting status" (Plourde 2008:374). More importantly, Plourde hypothesizes that craft products can distinguish skilled individuals from unskilled ones and reveal the value of the associated knowledge and expertise (ibid). These discussions provide another angle to see how craft goods contain cultural meaning and constitute a form of cultural capital.

As this current research focuses on a less complex social context, the primary purpose here is to see how craft goods reflect changes in daily social life, and to examine whether complexity of craft production (i.e., mode of production, diversity of products, etc.) increased over time alongside the development of more “complex” social and political patterns. Thus, the craft goods discussed here are mainly utilitarian, locally made objects, (e.g., Hayden 1993, 1998). Under this definition, the category of craft goods can be distinguished from exchange or exotic artifacts. Craft goods thus reflect the control or utilization of local material resources and related activities.

1.1.2.4 Exotic Goods as Social Capital

Among all archaeological material remains, non-local, exotic goods tend to be the ones that lure archaeologists’ attention most, as they are usually symbolically-charged (e.g., Emerson et al. 2013; Thompson et al. 2017), serve as evidence of cultural interaction (e.g., Ortega et al. 2014), and can be taken as an indicator of exchange that contains sociopolitical implications (Blanton et al. 1996; Cobb 1993; Earle 2002; Smith 2004; Stanish 1992; Stein 1994; Steponaitis 1991). It is common to associate the presence of exotic goods with exchange activities. On the one hand, exchange is the economic behavior that assures that needed or valuable non-local goods/ resources can be supplied. On the other hand, the manipulation of exotic goods/ resources or exchange can be a way to establish and maintain social or power relationships (Ortega et al. 2014).

Although there are many ways to define social capital, the framework provided here is mainly for categorizing material remains. Thus, here I focus mainly on non-local exotic goods or materials that represent long-distance exchange as a form of social capital. Thus, subsistence-related materials exchange (e.g., Murra 1972; Murra 1985; Szremski 2017), if encountered, will be discussed alongside other evidence of subsistence activities.

The social capital discussed here is mainly based on the presence of exotic goods, a potential marker for exchange behavior. The attempt is to discern the social relationships beyond the local community and to assess possible inter-community networks. Often, exchange is treated as a power strategy in many archaeological discourses. As exotic goods tend to contain special value or social meaning, people who are able to control these goods, to access and to manipulate interregional exchange, may have obtained higher status in the community (Helms 1993). An example comes from the Moundville and Pocahontas regions, where Steponaitis discusses how different exchange networks for prestige goods worked in these different regions. In this case, the long-distance exchange network constituted an important driver for social development at Moundville, and control over exchanged prestige goods was an important source of power (Steponaitis 1991). Welch also argues the ability to import goods in Moundville society was directly related to the maintenance of alliances and reciprocal exchange relationships with other polities (Welch 1996).

Unlike archaeological discussions of exchange that are from a regional, or inter-regional scale, the current investigation focuses only on a single, small-scale village. Albeit it is hard to illustrate a complete picture from this single point, this first step constitutes a fundamental element for future discussion. At this point, the purpose is to examine the distribution of exotic goods and how the pattern of distribution changed over time.

1.1.2.5 Labor: The Source of Capitals in Small-scale Society

Although the discussion of different capitals and associated economic activities constitutes the framework for understanding this early fishing village, there is another crucial factor that should be mentioned here: the available labor in society. This element is important because it is the amount of labor that affects the activities of concern. In a small-scale society with limited manpower, labor allocation is crucial both for household strategies (i.e., aggrandizers) and for the community as a whole. Broadly speaking, labor can also be considered as a form of social capital for aggrandizers to manipulate. In the current work, it is treated as an independent category, for its non-material form doesn't fit the framework designed for analyzing archaeological material remains. It is also more feasible to take labor investment as a proxy by evaluating the weight of each kind of economic activity.

The discussion of labor in society is prevalent in anthropological and archaeological discourse, and there are many examples where the deployment of labor is considered very important to better understand the society of interest. Labor is a key element for Sahlins' domestic mode of production, which is especially appropriate when working with small-scale society (Sahlins 1972). As the total population is relatively limited, it can be expected that the total amount of "capital" would also be restrained. In the realm of political economy, Wolf discusses the idea of "mobilization and deployment of social labor," through which he distinguishes three kinds of social labor mobilization: ordered by kinship (corresponding more or less to Sahlins' domestic mode of production), ordered by tributary relationships, and by the capitalist (Wolf 2001). Following this idea, being able to distinguish the mobilization of social labor ordered by kinship and by tributary relationship sheds light on the nature of society. Incorporating political economy into the realm of archaeology, Cobb considers labor and the deployment of labor as the core of the political economy. To Cobb, the ability to manipulate surplus labor is the key to assess differential access to wealth or power (Cobb 1993)..

Taking the complex hunter-gatherer society from Channel Island as an example, Arnold argues that population-resources imbalance and elite manipulation of household labor were vital stimuli that encouraged the emergence of complex society. More specifically, it was when labor was controlled by individuals outside the family/ household that stimulated the process of restructuring social organization (Arnold 1992, 1993). Her argument parallels Wolf's distinction between kin-organized labor and other forms of labor organization.Stanish argues that cooperative labor organizations in ranked societies can produce more wealth than the same amount of labor organized at a domestic level, because economic efficiency can be achieved from specialized production (Stanish 2004:8). The implication here is that the *organization of labor also affects efficiency in creating the desired forms of capital*. Thus, the allocation of labor to create a certain kind of capital also reflects the agency of decision making and capital manipulation in society.

1.1.3 Monument, Household, and Community Perspectives

The last issue this research aims to address is the traditional dichotomy between the public monument and the private household. In archaeological contexts, it is a common practice to divide public and domestic areas as two distinct spheres. Archaeologists tend to associate the former with monumental architecture, which usually contains the religious or civic aspects of society (e.g., Cobb 1993; Trigger 1990). On the other hand, the domestic sphere of the community is considered to be comprised of households, suitable for investigating daily domestic activities and practice from the aspect of basal social units (e.g., Hirth 1993, 2009, Wilk and Rathje 1982). Although the two spheres are spatially distinct in many archaeological sites, they are not always isolated from each other. In fact, they can exist in the same places, especially in early societies where people might work together at the supra-household level.

In the early coastal Andes in the Late Preceramic and Initial Period, most archaeological investigations support correlating monument construction with complex society (e.g., Haas 1987; Haas et al. 2004; Shady 2006). Others reveal a gradual, incremental process of monument construction that could have been done by a small group of people, without permanent leaders, over a long period of time (e.g., Burger and Salazar 2012; Dillehay 2004; Sara-Lafosse and Vega-Centeno 2007; Vega 2010). That is, it requires either a long-term project or a huge labor investment (beyond the capacity of individual households) for mounds to be built. However, it should be kept in mind that the process and purpose of mound construction varies in different cultural contexts, from being purely accumulation of occupation, to a communal burial mound, to a stage for civic activities, to mounds dedicated to individual burial. Thus, the *presence of a mound* doesn't directly speak to the nature of society, and to understand this requires other facets of the social context.

In contrast to the larger scale, community effort of mound construction, the household is taken as the smallest social unit, and one of the most useful for examining social organization (e.g., Hendon 1996; Hirth 1993a; Kuijt et al. 2011; Smith 1987). It is also the context where domestic activities, such as daily food consumption and utilitarian craft production, take place (e.g., Ames 1995; Arnold 2006; Bermann 1997). Household archaeologists remind us that, rather than passive recipients of social change or homogeneous social units, we should take households as active participants that play different social roles within a community (Henden 1996, Robin 2003). In addition, household practice can reflect the mutual impacts between large-scale sociopolitical or economic institutions and archaeological agency (e.g., Cutright 2010; D'Altroy and Hastorf 2001; Smith 1987). More importantly, the assessment of differences between these basal social units, mainly through household structure and domestic remains, enables archaeologists to address the issue of social inequality and hierarchy (e.g., Wright 2014). For example, architecture is one indicator that directly reflects household wealth, and, implicitly social status (e.g., Smith 1987:327).

Although discussions of monumentality and household archaeology both lead to fruitful archaeological discourses, the dichotomy is so strong that there is very little discussion focusing on the scenario where the two settings are juxtaposed. Following Yaeger and Canuto's definition of community as "an ever-emergent social institution that generates and is generated by supra-household interactions" (Canuto and Yaeger 2000:5), I propose to incorporate the idea of community into consideration, as it bridges the two ends of the spectrum and helps to overcome the issue mentioned above. This is especially true when economic activities at the domestic level and larger scale construction are both present in the same archaeological contexts, and when supra-household labor allocation is considered as a crucial factor reflecting change in social activities, a scenario in Huaca Negra that will be discussed in the following chapters.

Yaeger and Canuto's definition allows a dynamic aspect of agency practice that starts from the household; meanwhile, the focus on supra-household interaction can be useful to understand mound construction, as mounds are considered as a product of interaction or supra-household cooperation. Two related examples come from Dillehay's work: In Chile, Mapuche societies take mound building as a vital process to form lineage identity, because it contributes to the continuity of local social groups and institutions (Dillehay 1990:235). In the Zaña Valley, the construction and use of U-shaped monuments are argued to have been a community strategy to deal with risk and uncertainty and to delay political centralization (Dillehay 2004). Dillehay's case studies link monument constructions to agency at the level of the community, in which monuments become a strategy for the society to fulfill specific communal social goals.

The overall research goal of the investigation of Huaca Negra is to access early lifestyle and its change over time in this fishing village. To that end, I propose that *household and community perspectives are both necessary to understand the nature of mound construction*. As Arnold argues, "the examination of the household economy, leadership, and labor relations is integral in understanding villages and wider regions"(Arnold 2006:270), which is especially true for a long-term occupied village and crucial for discerning social change over time. As the relationship between households can be applied to assess the dynamic process of early societies (e.g., Yanagisako 1979), the supra-household interaction is a crucial component forming the community. As a community is constituted by multiple households and is the product of supra-household interaction, it becomes an appropriate scope to accommodate activities at two ends of a spectrum: the public mound and the domestic sphere. I use this framework to explain the archaeological findings in Huaca Negra. In the current work, the main factors used for discerning early village life include the forms of capital, their manipulation, and the deployment of labor-power, and those are parts of the domestic mode of production proposed by Sahlins (Sahlins 1972). The construction and use of the monument is used to gain insight into the community perspective.

1.2 STRUCTURE OF THE DISSERTATION

Eight chapters constitute this dissertation. Following the theoretical review of research themes presented above, chapter 2 summarizes the regional and cultural background that Huaca Negra is associated with. The aim of the chapter is to relate the relevant Andean case studies to the abovementioned theoretical framework so that the further analysis and interpretation of data from Huaca Negra can be prepared. The main focus of chapter 2 will be on the Late Preceramic Period in coastal Peru, while relevant data retrieved from Middle Preceramic and Initial Period data will also be addressed.

With the broader theoretic and culture-historical scope in mind, chapter 3 narrows down the coast of the Virú Valley. In the first part of this chapter, the environmental setting and the results of previous research at Huaca Negra are summarized. Based on the pre-existing knowledge of the site, the second part of chapter 3 provides a detailed description of the 2015 fieldwork, including the excavation methodology, and the summary of results. The stratigraphy and absolute dating results enable the reconstruction of a 4-phase occupation history, which forms the foundation for the following comparisons and interpretation.

Chapter 4 presents the archaeological remains related to subsistence activities. This chapter firstly deals with the quantitative data from each excavation unit; following the analysis, the interpretation of the results will also be presented. The two most important subsistence resources from Huaca Negra are fish and shellfish remains. Thus, information such as preferred catchment zone and species diversity will also be assessed. Other kinds of subsistence resources such as mammal, bird, and botanical remains are much less significant in quantity, but diachronic changing patterns in them are also discerned and presented in this chapter.

Following the same logic for diachronic change, chapter 5 focuses on the remains related to local craft production, including lithic tools, textiles, and ceramics. Chapter 6 studies the exotic materials that represent exchange beyond the local community. The two chapters aim to illustrate two kinds of economic activities. However, it is noteworthy that in some cases there is no clear cut division between local production and exchange goods. This is especially true in Huaca Negra as the evidence suggests local modification applied to exotic materials. Although the overall quantity of artifacts in each category is limited, chapter 5 and 6 shed light on diachronic changes in craft production, and how the usage of exotic materials changed over time.

Chapters 4, 5, and 6 each represent one of the three kinds of capitals discussed in the previous section. By comparing the selected types of material between different occupation phases in Huaca Negra, the overall scenario in each period can be illustrated. Following these three chapters, Chapter 7 takes one step further and compares how the three kinds of resources were distributed in the contemporaneous excavation units. This synthetic comparison reveals not only diachronic change in the usage of space, but how labor allocation differed from one unit to another in each discussed phase.

Echoing the research themes mentioned in this first chapter, chapter 8 summarizes the main results from the analyses done in chapter 4 to 7 and relates them to the guiding concepts of capital discussed here. The results of the current research also lead to a reflection about future directions.

2.0 MOUND, HOUSEHOLD, COMMUNITY AND ECONOMIC ACTIVITIES IN THE LATE PRECERAMIC AND INITIAL PERIOD OF PERU

To lay the foundation of the research themes, this chapter reviews significant work that has built up our current knowledge of the early Andes, mainly in the Late Preceramic Period (ca. 5800-3600 BP) and the Initial Period (ca. 3600-3200 BP) on the north coast of Peru. The purpose here is not to review a culture-historical sequence, but to illustrate the scenarios that correspond to the research interests in this study, including the community setting and different economic activities.

2.1 SETTING THE STAGE: DOMESTIC AND PUBLIC SPHERES IN THE EARLY ANDES

The beginning of sedentary life can be considered as a "cultural transformation," and it brought significant consequences in human societies, including intensified food production, population growth, changes in inter-personal interaction, and changes in social organization (e.g., Bandy and Fox 2010; Hastorf 2010; Flannery 1972). These consequences also led to the processes that constructed communities and witnessed the beginning of village life, which can be considered as the platform that accommodated both public and domestic social life. This global statement is also valid in the Andes, where the idea of community or village plays an important role for understanding ancient society. For example, Vaughn takes a "village approach" to assess broader social complexity from both local and regional scales. His case study of subsistence and political economy in the rural Marcaya community (Early Nasca period) reveals the dynamic process of how a community integrated into regional polities (Vaughn 2009).

Two recent investigations of community focus on the early coastal Andes. The long-term project focusing on Huaca Prieta and its surrounding areas reveals a continuous occupation between 15,430 and 3455 BP. With a focus on ritual economy, Dillehay argues that the Preceramic population in Huaca Prieta formed a community that was a cooperative network by nature. To Dillehay, this community also emphasized the maintenance of cohesion rather than being a hierarchical and competitive one (Dillehay 2017). Another example comes from the Moche Valley: working with a bottom-up perspective, Prieto applies the community approach to examine the Gramalote site, an Initial Period fishing village (Prieto 2015). Focusing on both a detailed household study and the assessment of the public area, Prieto discusses the practice of "community-level ceremony" and concludes that "early, small-scale settlements were capable of a complex system and cultural practices that went beyond food production" (Prieto 2018a).

Dillehay and Prieto both take ideological factors and ritual practices as a crucial element for constructing a sense of community, although one assesses community through monumental architecture, and the other starts from a household perspective. Albeit with different research focuses and disproportionate amounts of research, these two aspects together – monument and household – constitute the body of our knowledge about the early Andes in the Late Preceramic and Initial Period

2.1.1 The Interpretation of Early Andean Monuments

As one of the primary centers where complex society developed independently, research on the early Andean coast tends to focus on early monuments and the hypotheses related to the emergence of complex social organization. This tendency is especially true for the Late Preceramic Period, as this period is distinguished from earlier ones by the proliferation of monumental constructions. Late Preceramic platform mounds, courts, plazas, and structures with multiple rooms were usually constructed in several phases, and these large architectural complexes are considered the places for ceremonial activities or other public events. The required labor and organization make archaeologists consider the monuments of the Late Preceramic Period to be evidence of the emergence of Andean civilization (e.g., Haas and Creamer 2012; Pozorski and Pozorski 2018; Quilter 1991; Shady 2009).

Although archaeological investigation on this topic began quite early (Bird 1948; Bird and Hyslop 1985; Engel 1963; Feldman 1980; Lanning 1963, 1965, 1967, Patterson and Edward Moseley 1968; Quilter 1985), it is in the last two decades that archaeologists have paid more attention to alternative interpretation frameworks for the social implications of monuments and the nature of societies in the Late Preceramic Period (e.g., Alva 2008; Chu Barrera 2011; Dillehay et al. 2012; Dillehay 2017; Haas et al. 2004; Haas and Creamer 2006; Mauricio 2015; Pozorski and Pozorski 1990b; Shady et al. 2001; Shady 2006; Vega-Centeno Sara-Lafosse 2005; Sara-Lafosse and Vega-Centeno 2007). The debate of whether it is appropriate to associate monumental architecture with complex society in the Andes is even more pronounced later in the Initial Period. Burger draws on the Lurín Valley in the central coast to argue for a gradual process of monument construction, and for social organization that was not necessarily strongly hierarchical (e.g., Burger and Makowski 2009; Burger and Salazar 2012). On the other end of the spectrum, the Pozorskis draw on their data from the Casma Valley, especially from Las Llamas-Moxeke and Huaca A, to propose hierarchical societies with permanent leadership and complex bureaucratic organization (e.g., Pozorski and Pozorski 1986, 1991, 1993, 2008, 2012). Although the two extremes seem to contradict each other, the various cases presented below, both from the Late Preceramic and the Initial Period, indicate that diverse trajectories could happen in different areas. The two stances should not be treated wholly as an interpretive debate, but a reflection of this diversity, through which our knowledge of early complex society can be enriched.

In this section, I take the Norte Chico case from central Peru as an example to illustrate how archaeologists interpret early monumental constructions. I also review the Late Preceramic case studies of the mounds from nearby Chao, Moche and Chicama Valleys.

In the Late Preceramic Supe Valley and Norte Chico region, Shady's long-term work in Caral enables her to argue for the state-level social organization (Shady 1999, 2004, 2006, 2009). Caral is a site constituted of six large platform mounds, two sunken circular plazas, many other platforms in smaller scales, and residential areas with domestic architecture. The most massive platform mound, the 18-meter-height Piramide Mayor, measures 150 by 160 meters, and the other larger mounds are around 60 by 45 meters and 10 meters high (Shady et al. 2001). According to her archaeological investigations, there are only one or two major construction phases for building these mounds, and the technique of shicra was widely applied for the construction.

The dating results confirm the antiquity of Caral, which can be traced back to 4829-4295 CalBP (date calibrated by the author with OxCal 4.3, SHCal 13 curve) (Shady et al. 2001). Based on the scale of construction, well-preserved evidence for various construction/ remodeling phases, and the complex planned city with both monumental and residential architecture, Shady argues that Caral stands for the earliest civilization of the Americas (Shady 1999, 2004). While suggesting centralized government power over local communities and authorities, Shady excludes military power as a way to control the population; instead, she emphasizes that "religion functioned as an instrument of effective cohesion and coercion" (Shady 1999, 2006: 57), sufficient to support a state level of social organization.

While also assuming the existence of leaders who demanded monument construction, Haas and Creamer's work in the surrounding Supe Valley and other parts of the Norte Chico region reaches a different conclusion about social structure (Haas et al. 2004; Haas and Creamer 2006, 2012; Creamer et al. 2014). Huge mounds and sunken circular courts are found at more than 30 localities (aside from Caral) within an 1800-square-kilometer area, representing an unusually high density of construction. To the investigators, rapid, large-scale constructions characterize the whole Norte Chico. As there is no clear hierarchical relationship between monuments, the researchers abandon the evolutionary scheme that categorizes society as chiefdom or state, and argue for the peer polity interaction in this region (Creamer et al. 2014). Not only the purpose of leaders but the agency of followers in Norte Chico was considered by the researchers: Haas and Creamer discuss the religious and material benefits followers could get by fulfilling leaders' requests. They also consider the "refusal cost" from both ideological and economic perspectives, through which the unusual density of monument construction can be explained (Haas and Creamer 2012:304-306).

Although work on the Late Preceramic sites in the central coast originally lay the foundation for discussing the origin of Andean civilization (e.g., Feldman 1980, 1985; Fung 1988; Quilter 1985), not as many archaeological investigations focus on the Late Preceramic Period in the North Coast of Peru. The Pozorskis' work at Alto Salaverry in the coast of the Moche Valley is one of the most relevant to the current study (Pozorski and Pozorski 1977, 1979). According to the excavators, Alto Salaverry is constituted of domestic, semidomestic, and non-domestic architecture. Unlike the monuments discussed above, the non-domestic architecture that might be associated with public activities is a circular subterranean structure about 10 meters in diameter, and its non-domestic nature is suggested by the absence of refuse or artifact remains. Although the research focus is not on the social organization inferred from the monumental construction, Pozorskis argue for a preliminary rank society in Alto Salaverry based on the difference in architectural complexity between domestic and semidomestic construction (ibid).

To the south of the Virú Valley is a recent investigation into the Late Preceramic occupation in the Chao Valley. Following Cárdenas' work (1999) , Mauricio conducted her dissertation fieldwork on the Los Morteros site (2015). Mauricio considered the Los Morteros as an early monumental-ceremonial mound that was unique in this micro-region before yielding its place to the Salinas de Chao site. Although she interprets the architecture on top of the mound to have been for congregating a small group of people, and there is no direct evidence of social inequality, the quantity and diversity of the concentrated subsistence resources in Los Morteros (in comparison to the surrounding sites) makes Mauricio hypothesize the emergence of elite in this community (ibid:433-435).

In the Chicama Valley, Huaca Prieta has been recognized as an important site since the 40s. Under the Virú Valley Project, Bird chose to excavate Huaca Prieta to assess Preceramic occupation (Bird 1948; Bird et al. 1985). The site was associated with the Late Preceramic Period (circa 5,500-3,500 CalBP), and the investigators suggested the site function was limited to occupation and burial mound, not ceremony (Bird et al. 1985). Dillehay and Bonavia led an interdisciplinary investigation between 2006 and 2013 focusing on not only Huaca Prieta but also the nearby Paredones site and surrounding localities (Dillehay 2017; Dillehay et al. 2012).This latest investigation reveals a much longer history of human occupation dated back to 14,500 CalBP, with the mound construction and usage (now interpreted as a place for ritual and mortuary activity) occurring between 7,800 and 3,500 CalBP (Dillehay et al. 2012, Dillehay 2017). Dillehay takes a somewhat different approach when considering the nature of Huaca Prieta's population. First of all, he emphasizes ontological knowledge and practice rather than focusing *only* on socioeconomic and techno-environmental features. For example, he argues the use of ritual fire and saltwater as "opposing forces… (that) played important roles in formulating the cosmology and ideology (Dillehay 2017:11)." More importantly, as there is no sign of formal leadership, Dillehay proposes that the social, economic, and ontological practices in Huaca Prieta, Paredones, and the surrounding area were based on cooperation, and that social organization was deliberately designed to "oppose to aggrandizing an elite component of society (ibid: 12)."

To Dillehay, Huaca Prieta represents a case in which monumental architecture is a *social process* of community construction, as the site became a place for groups of people to integrate. This process had less to do with leaders' and followers' distinct agency or interests as discussed in the Norte Chico region by Haas and Creamer (2012). The contrast of Huaca Prieta and the Norte Chico region, as well as the cases from Alto Salaverry and Los Morteros, reveal the diverse nature of public architecture in the Late Preceramic context; they also reveal the difficulty of basing interpretations of social organization solely on mound architecture and use. On the one hand, this contrast serves as a reminder to place each mound in its specific context. On the other hand, it reminds us that mounds should not be taken as the only evidence for understanding early societies; other aspects of society need to be incorporated into consideration.

2.1.2 The Household as Basic Social Unit

From the discussion of the early monuments, it is clear that how people were organized for constructing or using mounds might vary in different social contexts. Thus this single aspect, monumentality, is not enough for understanding social life in the past. The other end of the community, the study of households, is an essential aspect for reconstructing early social life, and it also offers the potential for examining the whole spectrum of social variation within a given society as both commoners' and elites' everyday life can be revealed (Hirth 1993b, 2009b; Smith 1987; Wilk and Rathje 1982).

Residential components are common in archaeological contexts in the Andes, yet they have been studied relatively little in comparison to monumental structures or tombs. The limited work on households in Andean archaeology tends to focus on later periods and more complex societies, where social hierarchy can be discerned from the size, location and wealth of the residential structures (e.g., Bawden 1982, 1990; Chapdelaine 2009; Costin Timothy K. et al. 1989; Nash 2009). Especially noteworthy in this work is that aspects of domestic consumption and practice can help to reveal the interaction between households and broader social contexts such as Andean states. For example, Cutright (2010) examines domestic culinary practice and discusses how the local people were incorporated in the Chimu state. Another example is the UMARP study focused on diachronic change in the Wanka area, which also shows how the changing sociopolitical and economic context affected the domestic economy. This sudy reveals how agency can be reflected in household practice, and changes in production and consumption patterns at the household level could themselves cause major sociopolitical transformations (D'Altroy and Hastorf 2001). A similar approach can also be seen in Bermann's discussion of Lukurmata in responding to the intrusion of the Tiwanaku polity (Bermann 1993, 1997).

In the Initial Period and Late Preceramic Period, work on households is very limited in contrast to studies of monuments. One important example of an early household study is at Gramalote in the coastal Moche Valley, which forms an important comparison case for the current research at Huaca Negra. As a coastal fishing village, Gramalote yields abundant material remains and illustrates both domestic life and ceremonial activity in the Initial Period (Prieto 2014, 2018a). Unlike the prevalent idea that considers coastal sites as satellites that supported the larger inland centers during the Initial Period (Pozorski & Pozorski, 1993), Prieto argues that Gramalote presents a whole spectrum of activities and complete social functions, rather than merely being affiliated to other sites. This idea is supported by the presence of public architecture within the community, as well as the household sectors. Overall, the archaeological context in Gramalote represents "daily practice of a maritime way of life…… (which) bonds among the members of the household(s)" (Prieto 2014:1101). Similar to Dillehay's approach to Huaca Prieta, but from a household perspective, Prieto argues that the formation of a sense of community can be discerned as villagers in Gramalote shared ways of life and ideological activities.

Gramalote is not the only early site that can be identified as a "village with a temple." On the contrary, Williams uses this as one of his typological categories of early Andean sites, taking Bandurria, a coastal Late Preceramic site located south of the Huaura River, as the type site (Williams 1980: 382). At Bandurria, one of the rare investigations focusing on the Late Preceramic households was conducted by Chu (2011). In his dissertation, Chu focuses on the analysis of household subsistence remains, through which he can evaluate social differentiation between units. Combining both archaeological contexts and unearthed material remains, Chu concludes that Bandurria was a transegalitarian society in which some households attempted to control access to the temple. But overall, multiple lines of evidence retrieved from household contexts such as the relatively even distribution of resources, the lack of direct evidence for permanent leaders, and the emphasis on staple finance, make Chu suggest that Bandurria was a corporate or group oriented polity (Chu 2011).

Another relevant case study of Late Preceramic households comes from Alto Salaverry in the Moche Valley. As mentioned in the previous section, the Pozorskis reported a spectrum of architecture from domestic, semi-domestic to non-domestic structures. Although there is no significant difference in the construction technology of the different types of architecture, the investigators use the way the architecture was finished to distinguish different social meanings and assess possible social stratification. At Salaverry, domestic structures often come with interior walls plastered; on the contrary, semidomestic structures usually had the walls plastered on the exterior. Pozorskis interpret this tendency as evidence that higher-rank groups (households) attempted to impress other members in the community (Pozorski & Pozorski, 1979). Albeit Alto Salaverry seems similar to Gramalote or Bandurria in that it is a small village constituted of both domestic and public/ community realms, there is no systematic comparison of subsistence and craft good remains at Alto Salaverry between households or between domestic and semi-domestic contexts. Thus, stronger evidence for the social organization is still lacking at this point. It is noteworthy that, at Alto Salaverry, both domestic and semi-domestic contexts yielded evidence suggesting the consumption of marine resources, mainly fish, which played a crucial role in the villagers' daily life (ibid).

Recently, Dillehay reported the preliminary survey result of more than 20 domestic house mounds, dated back to 7000-4000 CalBP, on the Sangamon terrace near Huaca Prieta (Dillehay 2017). While the limited data prevents Dillehay from making a finer chronological sequence, various accretional depositions of domestic middens were registered, which suggest intensive or long term use of the site (ibid: 558). Dillehay proposes that Huaca Prieta served as a ritual node, to which many domestic sectors such as Sangamon were associated. Depending on the site locality, each of these domestic mounds could be specialized in littoral or inland economies (ibid: 565-566).

The survey conducted under the Huaca Prieta Project provides a rare opportunity assessing domestic aspects of early human occupation while also deciphering the data from a regional scale. Although the preliminary data require further investigation and analysis before archaeologists can reach a conclusive idea about the role of these domestic mounds, a similar pattern of long-term, accretional domestic mound can be observed in the earlier occupation of Huaca Negra, which makes Huaca Prieta an ideal case for future comparative analysis to understand early domestic life in the north coast of Peru.

The selected case studies make it clear that a household perspective is fruitful for archaeologists to understand social life, social organization, and possibly the formation of community. This perspective is not only applicable to later occupation but also a great tool for assessing early society. To date, there has been no diachronic investigation of household contexts spanning from the Preceramic to the Initial Period in monumental centers of coastal Peru. The occupation history of Huaca Negra provides one such example for the future discussion of this topic.

2.2 RESOURCES AS FOUNDATION OF SOCIAL CHANGE AND COMPLEXITY

The three major categories of economic activities, subsistence, craft production, and exchange, have been discussed in the previous chapter. It is also proposed that Bourdieu's idea of interconvertible capitals is applicable for constructing a framework to incorporate all the material remains into the discussion. While local craft products and exchange goods are commonly present in Late Preceramic contexts, subsistence resources always constitute the majority of archaeological remains during this period, especially for the coastal sites. The picture changes in the later Initial

Period as the importance of the other two categories increases in various contexts. The following sections focus on reviewing subsistence (mainly maritime resources) as the foundation of early Andean civilization. The role of craft products and exchange goods in early coastal society will also be addressed.

2.2.1 Marine Resources as the Fuel for Early Coastal Peru

The exploitation of marine resources in Peru has a profound history from the Terminal Pleistocene until today (e.g., Reitz et al. 2008). As can be seen from the cases mentioned above, most Peruvian coastal sites relied on marine products as the major subsistence resources. But the pattern of resource exploitation was not unchanged since the beginning of the human occupation. In the 60s, Lanning first proposed the idea that the climate pattern settled into what we see today by around 5000 years ago, and the following dry environment led populations to shift from hunting in the terrestrial loma (fog vegetation) to a marine way of life (Lanning 1963, 1965). Similarly, Richardson suggests that a stabilized shoreline and a stable, current climate system by ca. 5000 years ago are the two crucial factors for understanding the rise of maritime complex society (Richardson 1981, 1983, 2006). Researchers have emphasized the importance of diachronic change in maritime adaption and environmental factors for assessing the socio-economic transition into the Late Preceramic Period from preceding periods (Sandweiss et al. 2009; Sandweiss and Richardson III 2008; Sandweiss et al. 1989; Richardson III and Sandweiss 2008). This research on paleoenvironment and climate change also set the stage for the Maritime Hypothesis, reviewed in the following section.

2.2.1.1 The Maritime Hypothesis and Responses to it

Starting in the 1960s, several scholars noticed that the high productivity of marine resources led to increasing population, which provided the foundation for complex society on the Andean coast. As mentioned above, Lanning had proposed that post-Pleistocene climate change caused the retreat of lomas and led to an extensive maritime subsistence pattern (Lanning 1963). Around the same time, Fung also suggested that the exploitation of rich marine resources caused increasing population, which further facilitated social interaction and provided the foundation of Andean civilization (Fung 1969, 1972). Synthesizing this earlier work, Moseley proposed his famous Maritime Foundation of Andean Civilization (MFAC, also known as Maritime Hypothesis) in 1975. Moseley first uses the cases from Aspero, El Paraiso, and Rio Seco to support the idea that abundant and stable marine resources provided the coastal population with sufficient caloric support not only to constitute their economic basis, but to enable the emergence of complex social organization (Moseley 1975).

Moseley's hypothesis soon evoked critiques, which mainly focus on the caloric value of marine and agricultural products, and the possible sampling bias against plant remains in an archaeological context (e.g., Osborn 1977; Raymond 1981). Another example comes from Wilson, who argues a marine adaptation could support a smaller population than an agricultural system (Wilson 1981). There were also concerns about the stability of the resource supply, which might be affected by the El Niño Southern Oscillation event (Osborn 1977, Wilson 1981). Working with human skeletons in Paloma that reflect marine-associated subsistence behavior and nutrition, Quilter and Stocker (1983) demonstrate the importance of marine resources and how the coastal populations were capable of exploiting them. Taking it one step further, Quilter and Stocker argue that this marine-dependent population was able to cope with natural disaster (such as El Niño) while agricultural products would also be affected severely by natural events. Overall, Quilter and Stocker propose that terrestrial and marine resources were not mutually exclusive but complemented each other (ibid).

In the later revision of his Maritime Hypothesis, Moseley incorporates the idea that the climate pattern along the Peruvian coast stabilized by around 5000 years ago, opening the opportunity for humans to exploit small shoal fish such as anchovy (Moseley 1992). This timeframe matches the beginning of the Late Preceramic and the beginning of large-scale construction. Moseley also proposes a geological range between 8° and 15° south latitude where his theory applies, based on the presence of early monumental architecture; it is noteworthy that Virú Valley is very close to the north boundary of this range (ibid:14-22).

A recent investigation that supports the Maritime Hypothesis assesses this topic from the aspect of craft production. Drawing on the Rio Ica estuary in southern Peru, Beresford-Jones and colleagues (2017) suggest that the "silence" of monumental construction in the south coast cannot be explained by a lack of fish resources. Rather, it was the exploitation of terrestrial resources that made better *fishing technology* (i.e., fine nets) possible, which then facilitated early coastal civilization in the central and north coast. In their argument, "the circumscribed estuarine environments in the south were… vulnerable to overexploitation of gathered wild plant resources (bast fibers)" for improving fishing technology (ibid: 21). Thus, factors such as increasing population, sedentism, and broad spectrum coping strategies did not lead to monumental civilization in the south coast during the Late Preceramic Period. It was the utilization of plant fiber technology that affected the efficiency of marine resource exploitation, which then differentiated the south and central-north coast of Peru even though there was no significant difference in available marine resources (Beresford-Jones et al. 2017).

2.2.1.2 Examples of Diverse Subsistence Strategies from the North Coast

With the accumulation of data over the last few decades, the importance of marine resources in early coastal Peru is now widely recognized. However, it should be kept in mind that different sites at different localities had their unique coping strategies. Early on when arguing with Moseley's Maritime Hypothesis, Quilter and Stocker already emphasized that different sites might rely on "different proportion of foods in their economic" pursuits (Quilter and Stocker 1983:554). This section provides several examples from the north coast of Peru to illustrate the diversity of subsistence systems during the Late Preceramic and Initial Period.

Alto Salaverry is an early work that suggests both marine and terrestrial resources were exploited. Here, the Pozorskis registered that fish bones constitute the majority of subsistence remains, shellfish takes second place, and bird and sea lion are occasionally present. In addition, cultivated plants such as beans, ají pepper, fruits, and industrial cultigens such as cotton and gourd were registered from the excavation. Although the nature of material preservation makes the quantity of fauna and botanic remains incomparable, the result of excavation suggests both fishing and cultivation were conducted (Pozorski and Pozorski 1977, 1979a).

Another case indicating the exploitation of both marine and terrestrial resources comes from Huaca Prieta. Dillehay suggests that both Huaca Prieta and Paredones were located on freestanding terraces purposely to access multiple resource zones. Cultigens and the plant products from Huaca Prieta were registered and studied by Bird in the 1950s (Bird 1948; Bird et al. 1985), and Dillehay's work demonstrates the long history of maize usage since as early as 6,500 BP (Dillehay 2017, Grobman et al. 2012). In Huaca Prieta, Dillehay notices a diachronic transition from heavy exploitation of marine invertebrates in earlier period, transitioning to more seabird and sea lion to the later Phase 4 (ca. 5308-4107 BP) occupation.

In Los Moteros and other sites in the Chao Valley, Mauricio reports six sea mammal species, more than thirty kinds of fish and shark, seventeen taxa of seabird, thirty-five marine invertebrates, and eight edible plants from the excavation (Mauricio 2015:403). A noteworthy aspect of fish consumption is that *big fish* was preferred in comparison to smaller fish such as sardine or anchovy. Although the preservation of botanical remains is poor, the analysis of two human coprolites suggests a high diversity of food types, and a higher proportion of botanic component (64-83%) than fauna content (Mauricio 2015). The case study in Chao reveals a trajectory slightly different from the contemporaneous sites in the north, emphasizing more botanical resources and bigger fish rather than anchovy.

In the excavation of the Gramalote, the Initial Period fishing village in the Moche Valley, Prieto uncovers a rather different pattern of marine resource exploitation. While expecting to encounter a large quantity of "staple food" such as anchovy, he finds that Gramalote yields a much higher quantity of large game, mainly shark and sea lion. Even though different recovery methodologies between different projects may have affected the retrieval rate of small bones such as from anchovy, there is still an astonishingly large amount of shark and sea lion at Gramalote compared to other sitesThe estimated anchovy meat is 7.38 kilograms while shark remains are estimated to be 5835 kilograms (Prieto 2015:1108). One would expect very different fishing technology for capturing small shoal fish such as anchovy, and for large fish such as shark weighing more than 10 kilograms each. Thus, this pattern suggests a distinct preference among the local fishermen as well as a different technology. Prieto also proposes that it is possible the shark and sea lion meat was used for exchange with the inland community (ibid).

These cases from the north coast of Peru already illustrate diverse strategies of resource exploitation, which echoes Quilter and Stocker's idea that plant and marine resources are complementary to each other, and the proportion of different kind of resources varies between sites. It is clear now that it is not only the proportion of plant and marine fauna but also the kind of marine species people chose to take that differs from one site to another. While the overall importance of marine resources can be confirmed in these sites, the interaction of environmental setting, applicable technology, local preference, traditional foodways, and other social factors such as exchange purpose or representation of social identity, produced a mosaic scenario under the broader pattern of Maritime Hypothesis. As will be described in Chapter 4, the results from this project add another, surprisingly different trajectory, transitioning from small fish to shellfish exploitation, which confirms the impression that early coastal resource exploitation varied tremendously based on local environments, on the available strategies, or on the preferences of local inhabitants.

2.2.2 Craft Production and Exchange

Andean archaeologists have engaged in fruitful discussion regarding craft production and exchange, from both domestic and political economic perspectives (e.g., Bandy 2004; Chapdelaine 2009; Costin 2004; Costin Timothy K. et al. 1989; Shimada and Wagner 2007; Szremski 2017; Tschauner 2006; Vaughn 2004, 2006). Unlike subsistence activities, however, craft production and long-distance exchange, while they demonstrably existed, didn’t attract much attention or strongly inform theoretical discourse in the context of early Andean society. Research focused on the Preceramic Periods is relatively scarce and emphasizes much more environmental setting, monumental construction, or associated social organization. More importantly, craft products are not abundant in Preceramic contexs. The majority of encountered craft goods are mainly made of local materials and serve for daily utilitarian use, with a few exceptions of ornaments made of lithic material, animal bone or shells (see Quilter 1991). It is thus necessary to consider the two aspects together in the following sections.

2.2.2.1 A Glance at Early Craft Production

In early social contexts, craft production tends to be treated as an extension of the subsistence system and serves the need of subsistence activities. This is especially true when dealing with coastal fishing villages that relied on a certain "technology" for their fishing activities. In a recent study, Reitz and colleagues suggest that the complexity of making a living safely and reliably from the sea calls upon tools, skills, and knowledge (Reitz et al. 2008:129). One interesting case study, already mentioned above, is Beresford-Jones and colleagues' suggestion that maritime exploitation in the south coast was constrained by the lack of a technological transition from bast to cotton fibers (Beresford-Jones et al. 2017:27).

Fiber technology is an important component of Preceramic craft production, and Huaca Prieta, with the largest fiber-based assemblages in the early period of South America, is one place where a systematic study has been conducted. Bird conducted pioneering research on the techniques applied to basketry, matting basketry, textiles, and other fiber construction, including weaving (Bird et al. 1985). In his study, constant proportions of twining (ca. 70%) and of weaving (ca. 4%) techniques are discerned, and Bird argues the community was "conservative in its customs (ibid: 199)." Founded on Bird's work, and with advanced methodologies and analytical tools, recent research at Huaca Prieta confirms the earliest known use of indigo in the world, and the milkweed fiber, which was unknown in Bird's time, is also identified (Dillehay 2017: 522). Other than the fibers themselves, there is only one weaving tool found in Huaca Prieta, which is associated with a female burial. Overall, there is no clear evidence suggesting either specialists or non-specialists who produced the fiber artifacts, but the investigators suggest a longer weaving tradition in Huaca

Prieta as the collection (dated between ca. 6500 and 3400 CalBP) was already sophisticated when it first appeared (ibid: 524).

2.2.2.2 Discourse on Exchange and Inter-regional Interaction

The existence of long-distance exchange in the Preceramic Andes has long been noticed by archaeologists, mainly based on the presence of exotic goods from other regions. For example, investigators registered a high frequency of spondylus from Ecuador and tropical feathers from the Amazon region in burial or offering contexts in La Galgada (Grieder 1988). Quilter suggests it is the ideal location between the coast and the highland that facilitated La Galgada being the locus for interregional exchange (Quilter 1991, 2014, see also Vaughn 2006:318-320). Other than the significant case of La Galgada, it is common that exotic goods are present in Late Preceramic contexts, but the scarce amounts prevent further interpretation. Although Quilter emphasizes the evidence of long-distance exchange for possible prestige goods, he also hesitates to claim the "cotton production and exchange system" as the primary mover for social transformation in his classic review (Quilter 1991: 429).

Other than the exchange of craft products, it is the exchange of subsistence resources between the coastal and inland communities that dominates the archaeological discourse on early exchange systems. The presence of fishbone or shells in inland sites is a straightforward indicator for this interaction. The coast-inland relationship is also a significant part of the Maritime Hypothesis debate (e.g., Quilter 2014, Shady 2006; Creamer, Haas, and Rutherford 2014; Nesbitt 2012). For example, the presence of marine remains in Caral, the massive inland city, is used to argue for its potential connection with Aspero in the coastal area (Shady 2006). Echoing this idea, the Pozorskis' work dated back to the late 70s uses data from Caballo Muerto and Gramalote in the Moche Valley to argue that Gramalote was the satellite village that provides Caballo Muerto with marine resources, the primary source of animal protein (Pozorski 1979a). Although the recent research at Gramalote emphasizes the autonomy and internal complexity of this site (Prieto 2015, 2018), the inland-coastal bond remains valid. Indeed, the complexity of coastal communites and potential interaction between coast and inland sites are not mutually exclusive. Thus, further evaluation of the nature of coastal-inland interaction, or what was exchanged, still awaits examination.

2.3 BRINGING VIRÚ VALLEY AND HUACA NEGRA INTO PLAY

Archaeological investigations in the Virú Valley have a long tradition. Bennett conducted a survey dated in 1936, and 37 sites were listed. With the survey data, Bennett constructed the prototype of culture sequence in the Virú Valley (Bennett 1939). Larco studied Cupisneque ceramic and suggested it represents the earliest human occupation in the Virú Valley (Larco 1941). The most significant work in the Virú Valley is the very first systematic regional survey and research on settlement patterns, conducted by Gordon Willey under the Virú Valley Project (Ford and Willey 1949; Willey 1953). This influential work laid the fundamental knowledge on the culture-history sequence in this part of Peru. More importantly, Willey attempted to deal with diachronic change in settlement patterns, arguing that the location of settlements moved from coastal to inland as the population increased and focused on agriculture (Willey 1953).

Complementing Willey's regional perspective, Collier, and Strong and Evans excavated targeted sites that were significant in each period (Collier 1955, Strong and Evans 1952). The unearthed data (mainly ceramics) were used to define cultural characteristics (Strong and Evans 1952). Along with Strong and Evans' work, Bird's excavation of Huaca Negra revealed the

Preceramic occupation in the Virú Valley, although Bird soon shifted to work in Huaca Prieta in Chicama Valley (Bird 1948).

After the 50s, archaeological investigation in the north coast of Peru shifted from Virú towards Moche and other valleys. There was no significant investigation focusing on early human occupation in the Virú Valley until Zoubek's work on the Initial Period (Zoubek 1997, 2000). Regarding later time periods, Millaire's work on Gallinazo enrich the discussion of subsequent sociopolitical change in the north coast (Millaire 2009, 2010; Millaire and Eastaugh 2011, 2014). In his dissertation, Downey focuses on statecraft in the Puerto Morin and Virú Period (Salinar and Gallinazo). His regional survey and ceramic analysis reveal changes in political centralization and political authority (Downey 2015). He also emphasizes the importance of distinguishing domestic ceramics from corporate ceramic wares, as they are different objects made for diverse purposes. To Downey, there are two timelines or rates of change of the two types of ceramics, so lumping the two together for defining ceramic chronology will cause problems (ibid: 203). Under his classification, only domestic ceramic (Guañape) appears in the Initial Period. Thus, Downey implies a simpler social organization and the domestic nature of most contexts during the Initial Period.

Although both Bird and Strong and Evans recognized a long-term occupation from the Late Preceramic to Initial Period at Huaca Negra, they did not see significant changes in lifestyle or social organization throughout the occupation history. However, my current research on Huaca Negra does find significant change in economic activities over time. In this village where community space, larger scale construction, and evidence of domestic activities all exist, the evaluation of economic activities assesses the intersection of these social spheres and sheds light on early lifestyle from a bottom-up perspective.

To conclude, research on other Late Preceramic Period sites reviewed in this chapter especially that focused less on monument construction and more on activities, reveals significant diversity. In the Late Preceramic Period and the following Initial Period, exotic goods started to be present in many archaeological contexts, suggesting the existence of long-distance exchange. Utilitarian craft goods are registered, although there are few studies focusing on the technology except for textiles. Research that correlates craft production with social organization is also lacking for the Initial Period. However, the subsistence system is one theme that is heavily addressed in Late Preceramic studies, mainly due to the abundance of archaeological remains and the influential Maritime Hypothesis. Most of these studies provide *static* scenarios of the Late Preceramic lifestyle, implying that there was little or no change within this timeframe. Taking advantage of the in-depth excavation and abundant dating results, this research in Huaca Negra emphasizes diachronic change *within* the Late Preceramic Period and sheds light on both regional cultural history and the issues discussed above.

3.0 THE ENVIRONMENTAL SETTING AND THE EXCAVATION OF HUACA NEGRA

3.1 THE NATURAL ENVIRONMENT: VIRÚ VALLEY AND COASTAL AREA

The detailed environmental setting of Virú Valley can be found in previous work or projects conducted by the government (e.g., ONERN 1973; PECH 2010; Willey 1953), and this section provides some fundamental environmental factors of the Virú Valley for illustrating a general picture of the valley as a whole. In addition, the coastal area north of Virú River, especially a small sector of Pampa de las Salinas, where the site located, will be described in more detail.

3.1.1 The Virú Valley in General: Landscape and Climate

The Virú Valley is one of the river oases on the north coast of Peru in the Pacific coastal desert area. It is located between latitude S 8°20’ and S 8°32’, and longitude W 78°36’ and W 78°57, around 35 km south of the Moche Valley and 20 km north of the Chao Valley. The main Virú River, approximately 22 km in length, is fed by two drainages, the Upper Virú and Huacapongo, which converge at 400 meters above the sea level in the northeast and run toward southwest until reaching the Pacific Ocean. With the Virú River being the principal source of water, the valley fan is measured as wide as 14 km and in total encloses approximately a 150 square kilometer area. As can be imagined, the entire Virú Valley contains several micro-regions from the upper valley to the coastal area. For example, Willey divided his research area into seven sections by factors of elevation and the left/ right bank (north/ south side) of the Virú River. Researchers have suggested that the inhabitants in Virú managed resources in a variety of ways in response to different micro-environments from steep valley neck to flat fertile valley fan to sandy littoral zone (e.g., Parsons 1968; West 1980, 1981). Although the landscape does affect people's way of life, it is noteworthy that the natural resources in the Virú Valley are distributed horizontally. West argues that "altitude changes play no role in determining the availability of agricultural resources"; thus, the idea of "verticality" is not valid in the Virú Valley area (West 1981).

The environment in the Virú Valley can be classified as Sub-tropical Desert Formation. Like other valleys in the north coast of Peru, the coastal area in Virú Valley is affected mainly by the cold Humboldt Current, which sweeps along the coast and brings moisture-filled, cool air. Though situated in the tropical latitude, the Virú Valley thus has an average annual temperature as low as 19°C in the lower valley (ONERN 1973). In addition, the warm land mass prevents rainfall from clouds: the moisture remains in the air until the cloud reaches the higher Andes Mountains and the air is cooled again (Quilter 2014). About 80% of the annual rainfall occurs in the austral summer (December to May) in the higher elevations of the valley (West 1981). While foggy weather is typical in the lower valley, the annual precipitation there is usually less than 10 mm. Records from meteorological stations at low altitude (5 and 25 meters above sea) show the average annual precipitation from 1955-1959 and 1967-1970 are all less than 5 mm (ONERN 1973). In fact, El Niño Southern Oscillation (ENSO) events, in which the tropical current shifts southward and elevates sea surface temperatures every 7 to 20 years, is the only phenomenon that can bring significant, sometimes destructive, rainfall to the lower valley.

As can be expected, the accessibility of water resources is the crucial factor in agricultural activities. Other than the conventional methods of canal irrigation, floodwater irrigation, and bucket irrigation that take water directly from Virú River, artificial *pukios* (sunken fields) are another way to take advantage of the shallow water table and to retain water for cultivation. Cases of relic *pukio*s have been observed on both sides of Virú River but seem more common in the north (see Willey

1953). In fact, Puerto Morin, the closest village to Huaca Negra, is one of the villages where ancient pukio could still be observed and studied in the 1970s (West 1979, 1981). The availability of water also influences the distribution and type of vegetation. The vegetation in the valley is mainly xerophytic, mainly scrub types such as algarrobo (*Prosopis* sp.) and huarango (*Acacia* sp.). The vegetation changes to the halophytic plants when getting closer to the sea, as the soil is characterized by high salinity (ONERN 1973).

3.1.2 The Coastal Plain and Pampa de las Salinas

In the Virú Valley area, the coastal plain is 4 km wide at maximum, while some parts are only hundreds of meters in width. Unlike the fertile area of the lower valley, the coastal zone is mainly constituted by the unfertile beach, sand dune and saltpeter-laden soil (locally known as "*salitre*"). The coastal area north of the Virú River is characterized by a large sandy area. The landscape, in general, is flat, without significant hills, but there are a few exceptions such as Cerro Guañape and Duna Purpur near the site of Huaca Negra (Figure 3.1). Duna Purpur is a massive sand dune located 5 km northeast of Huaca Negra and is constituted by fine aeolian sand. It is measured 56 meters above the sea level and forms the biggest sand dune by volume along the Peruvian coast. Cerro Guañape, 4 km southwest of Huaca Negra, is a 216-meter-high outcrop of the Andean foothills that extends into the sea and forms a peninsula. It is noteworthy that Cerro Guañape is the only rocky habitat for certain kinds of shellfish along the coastal line near the site Huaca Negra.

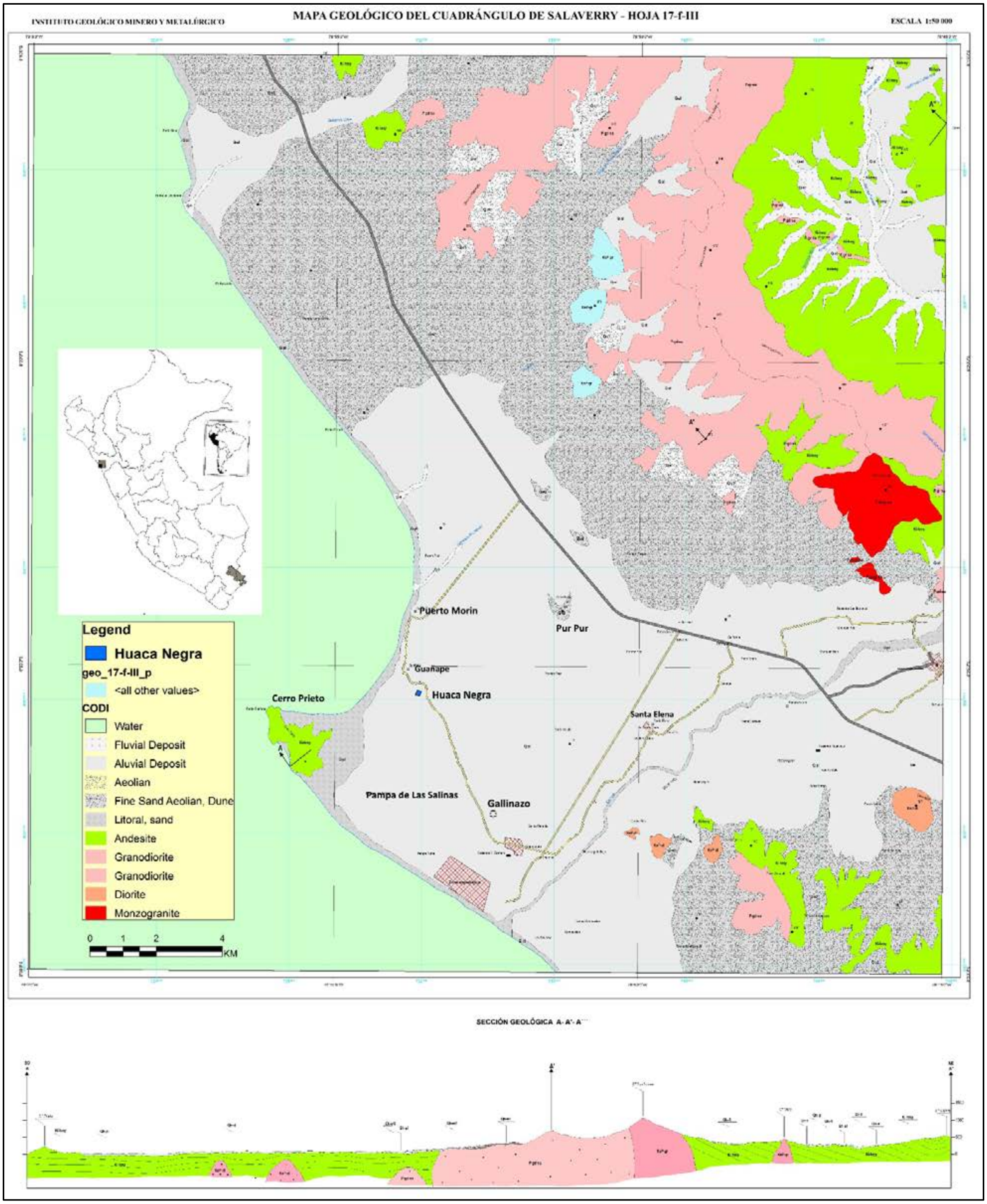

Figure 3.1 Huaca Negra and its surrounding environment

Other than Cerro Guañape, the current shoreline is mainly constituted by a fine-grained sandy beach, which is 300 meters wide on average and opens up to 1 km around the Cerro Guañape area. North of the Virú River, further inland from the beach area, is an alluvial soil zone, where gravel, sand, clay, and silt together constitute a relatively flat plain.

Pampa de las Salinas, the micro-region associated with Huaca Negra, is a narrow stripe located between Cerro Guañape and the country road 619, right beyond the irrigable plain area (Figure 3.1). The nature of the soil is Solonchak. Its poor quality and high degree of salinity are the results of the coastal environment, which also mean the soil in this zone is classified as not appropriate for either agriculture or afforestation. Major species growing in this area include reed carrizo (*Arundo donax*), caña brava (*Gynerium sagittatum*), willow or sauce (*Salix sp*.), molle (*Schinus molle*), saltgrass (*Distichlis spicata*) and heliotrope (*Heliotropium sp*.) (ORNER 1973).

Geologically speaking, Pampa de las Salinas is constituted by two major sediments: (1) the marine deposit of conglomerate, gravel, and fine sand from the edge of Cerro Prieto to 1 km inland. (2) The alluvial deposit further inland, a mixture of fine sand, clay and silt deposit. Although the barren soil is not suitable for agriculture or cultivation, Pampas de las Salinas has easy access to marine resources. The closest natural habitat is the sandy beach for shellfish, and there is also a small portion of the rocky environment available a bit closer to the Cerro Prieto peninsula. The Cerro Prieto peninsula also creates a bay environment with calm water, where schools of fish tend to gather together. In addition, this area is also rich in salt; INGEMMET (Instituto Geológico, Minero y Metalúrico) identified a source of salt 2.5 km southwest of the site area.

3.1.3 The natural setting of Huaca Negra

Huaca Negra is a mound located in the northwest of the Virú Valley (Figure 3.1), and more specifically, on the northeast corner of Pampa de las Salinas. The site is 1.2 kilometers from the current shoreline, right on the boundary of two different sediments: marine deposit and alluvial deposit. While the surrounding area is mostly barren soil with high salinity and the site is not directly located on arable land, accessing cultivable land would not be hard for people who lived in this area. By the 40s, when the Virú Valley Project team surveyed this area and excavated the site, it was reported that a series of lagoons bordered the south end of Huaca Negra. The freshwater body even reached the south margin of the site. While researchers were told the lagoons were formed by "deliberate flooding of the low area……in an attempt to reforest the area with its natural coverage of algarroba and spin bush," the surrounding sunken fields made them believe that the water table was always high in this area (Strong and Evans 1952:17).

By the time the current project surveyed and excavated the site, those abovementioned lagoons were no longer existing. It is the new modern canal that brings water to the surrounding area. With water supply, local people are able to cultivate fruit trees, sugar canes, and tomatoes in this area. The gardens are also used to grow reeds for manufacturing purposes.

Strong and Evans argued that Cerro Prieto, while now attached the coast with a low and flat sandy area (Pampa de las Salinas), was once an island. Based on this, they also argue that Huaca Negra was much closer to the shoreline (ibid). This inference might be true as the site is located on the margin of the alluvial sediment zone. In addition, the Virú Valley was in an aggradational stage from the end of the Pleistocene until late prehistoric/ early historic times (Willey 1953:19). However, since there is no clear dating result to demonstrate that the low flat zone between Cerro

Prieto and the coast was formed after 5,000 B.P., the beginning of the occupation at Huaca Negra, this issue remains unsettled at this point.

3.2 PREVIOUS RESEARCH AT HUACA NEGRA

Huaca Negra was surveyed and registered as V-71 under the Virú Valley Project during the 1940s (Willey 1953). It was recorded as a midden mound, approximately circular in shape and around 300 meters in diameter. Huaca Negra is one of the few cases in the central and north coast of Peru that shows a continuous occupation from the Late Preceramic well into the Initial Period. The previous excavation was directed by Strong and Evans in 1946 for reconstructing regional cultural history. Under this project, five test pits and one stratum cut were excavated to reveal the stratigraphy (Figure 3.2). While Bird also briefly investigated this site before shifting his focus to Huaca Prieta in the late 40s, there was no significant difference between his result and data retrieved by Strong and Evans (Bird 1948, Willey 1953), so the latter work remained the main source dominating our knowledge of the site in the past seventy years.

The results of the excavation made by Strong and Evans also set the tone of our understanding of Initial Period occupation in Virú and the neighbor valleys in the past seventy years (e.g., Billman 1996; Elera 1998). For the purpose of providing a comprehensive view of Huaca Negra, the results of Strong and Evans' excavation are summarized as followed.

Figure 3.2 Distribution of previous excavation units

3.2.1 Strong and Evans' Work on the Preceramic Occupation at Huaca Negra

Among the six units excavated by Strong and Evans, two of them (Test Pit 1 and Test Pit 2, Figure 3.2) only yielded evidence for Preceramic occupation (locally known as Cerro Prieto Period). In TP1, Strong and Evans encountered a house structure constituted by 8-15 cm wide, plastered clay walls. The clay walls formed a rectangular room (around 5.75 by 3 meter area was revealed by the excavation), and at the east of this room, small algarroba wood beams and canes overhanging a clay wall were unearthed. The investigators suggest that these beams were materials for some kind of roof, which might be used to cover a storage space (Strong and Evans 1952: 19).

In the south of the site, TP2 was excavated without control of stratigraphy as the purpose of excavation was to determine the depth of the refuse deposit and to examine whether there were ceramic remains. In this unit, multiple clay floors were encountered at different depths from 0.5 to 2 meters below the surface (Figure 3.3), suggesting repetitive occupation and modification of living space. One clay wall, formed in the same way as those in TP1, was encountered at 2 meters below the surface, which was the only evidence of a house structure at this corner of the site.

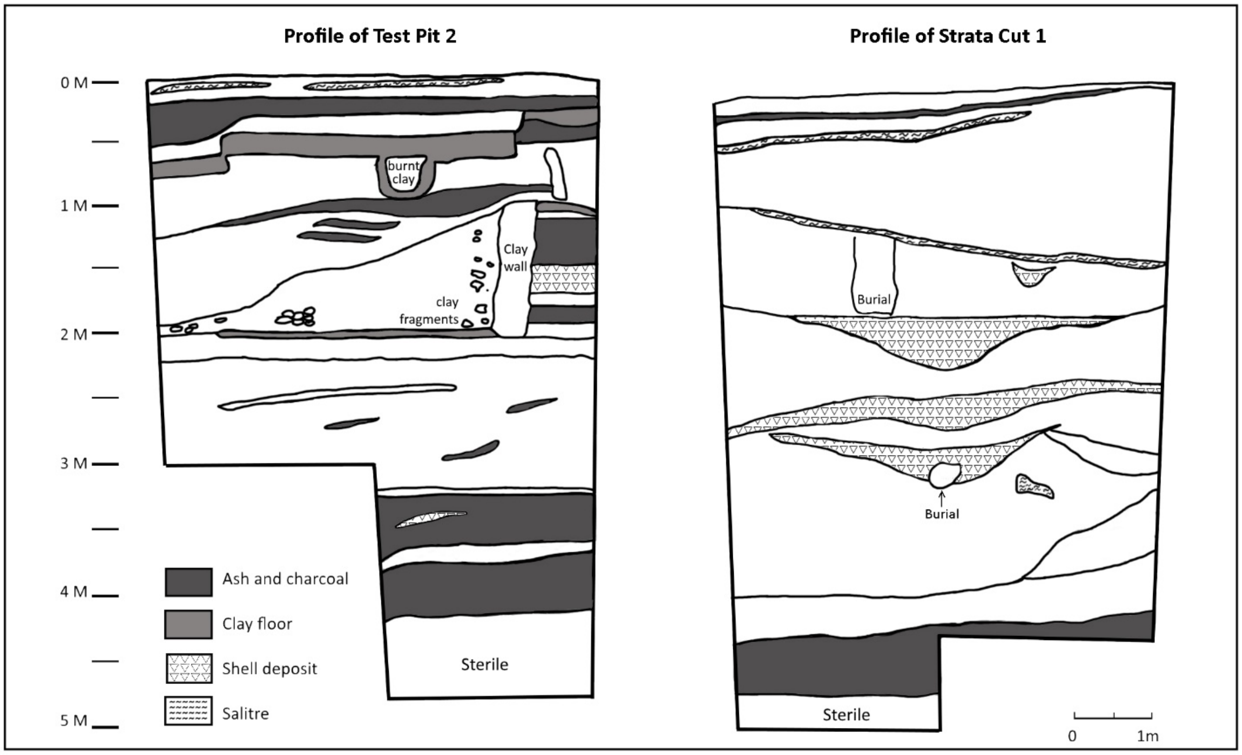

Figure 3.3 Two profiles produced from Strong and Evans' excavation (Redrawn by the author)

Other than the two test pits that only yielded evidence of Preceramic occupation, the excavation at Strata Cut 1, near the Templo de las Llamas, also reached the Preceramic occupation, which began at 4 meters below the surface. As there was no gap between the Late Preceramic and Initial Period occupation, investigators suggest that the site had been continuously occupied from one period to another. No Preceramic Period floor or structure was identified in Strata Cut 1, but the archaeological remains are similar to those found in TP1 and TP2 in general.

As Strong and Evans' research aimed to reconstruct the cultural sequence in the Virú Valley by studying the ceramic sequence, the Preceramic occupation was beyond their scope, and the other three test pits was done in quickly: TP3 and TP4 were more like shovel tests, both stopped when the abundance of materials was confirmed so that the location of a larger stratigraphic pit (Strata

Cut 1) could be decided. Therefore, while both units yielded a certain amount of archaeological remains, the possible Preceramic occupation below was not confirmed. TP5 was designed to determine the nature of a small mound next to the main area of Huaca Negra, which was then proved to be a natural, wind-blown sandy mound.

According to Strong and Evans, material remains from the Preceramic occupation are relatively limited, but a glimpse of the Preceramic lifestyle can still be discerned from their report. The house structure and repetitive floor construction indicate a sedentary life. The omnipresent fire-cracked rocks, ash, and charcoal implied the ways of cooking. A few cases of cotton yarn, twined cloth, fragments of open mesh, and a wad of chewed fiber, plus fragments of gourd, all made Strong and Evans believe that the Preceramic occupants in Huaca Negra were able to cultivate those plants. The large mussels, usually found in deep water habitat, various fish remains and one case of fishhook made of shell, depict a scenario in which acquiring marine resources constituted the major part of subsistence activity. The lack of sea lion, bird, and land mammal remains in Preceramic strata also reinforces this idea.

There is not much evidence can be related to ritual life in the Preceramic occupation encountered by Strong and Evans. There are two cases of human skeletal remains, one adult and one child. Both individuals were scattered in TP2 and associated with refuse. The treatment of the dead was careless, as there was no special burial arrangement and no grave goods were discerned. No further conclusion could be made about the deathways, ritual or social meaning of burials in Huaca Negra with limited information. On the other hand, there were several cases of quartz crystals and smooth pebbles, suggesting these items were gathered by the inhabitants on purpose. As these materials were considered non-utilitarian ones and without actual function, Strong and Evans postulated those objects might serve as charms or amulets (ibid: 22).

3.2.2 Strong and Evans' Work on the Initial Period Occupation

The Initial Period occupation in Huaca Negra (locally known as Early and Middle Guañape Period) was revealed in TP3, TP4 and Strata Cut 1. As mentioned above, TP3 and TP4 were designed to test the abundance of material remains and were not excavated through. Following the TP3 and TP4 excavation, the location of Strata Cut 1 was decided and the excavation yielded a complete stratigraphy that represented the history of human occupation (Figure 3.3). Strong and Evans categorized sherds found above 1.75 meters up to the surface as Middle Guañape, corresponding to Coastal Chavín (Cupisnique) style; ceramics between 1.75 and 3.75 meters below the surface were coarser and with less diversity of decoration, defined as Early Guañape. There were no ceramics found beyond 3.75-meter depth while evidence of human occupation was still evident. This lower section of strata thus was taken as (the Late) Preceramic occupation.

Although Strong and Evans didn't identify the Initial Period house structures or floors within the limited excavation area, they took a large number of fire-cracked rocks and the accumulation of shell as direct evidence of *food consumption and domestic activities*, which in turn supported their conclusion that the site was a domestic midden mound.

The artifacts yielded from the Initial Period context include utilitarian ceramics, sherds with Cupisnique designs, true weaving cloth, pebble pendants, jet mirror fragments, one hammerstone, quartz crystal fragments, stone bowl fragments, ground slate blades and spindle whorls; most of these artifacts also represent domestic activities. Faunal remains suggest that deep water mussels and fish were common throughout the sequence; sea lion and porpoise bones were also incorporated into the inventory starting in the Initial Period.

Two aspects of evidence shed light on ritual life in Initial Period occupation: the burials and public architecture. Four burials were found in Strata Cut 1 at different depths. None of these burials was associated with impressive grave goods, and their appearance within the midden context might suggest their low status in the community or even the possibility of cannibalism. The sample size is small, and the general context of burials is similar to the preceding period. Thus, the details of burial behavior at Huaca Negra remain unsettled.

The second line of evidence is a significant structure, Templo de las Llamas, named after the findings of four sacrificed llama burials. This structure was different from other excavated structures in both scale and building material. It is built from fine-grained andesite, which can only be acquired from Cerro Prieto, at least 4 km southwest of the site, as there is no closer natural outcrop of rock present in the surrounding area. The structure appears on the surface, 40 meters northwest of Strata Cut 1, and presents andesite rock walls that enclose a 20 meter by 16-meter quadrangular area (Figure 3.2).

Strong and Evans excavated along the walls to delimit the boundary and depth of this structure and dug two trenches at right angles inside to examine the features and deposits within the architecture. Inside the structure, they found stone-made steps leading to a 1-meter-high platform with a foundation of rocks in mortar. Another rock platform, measuring 1.1 by 2.4 meters, was located abutting the middle of the north wall on the interior. While Middle Guañape ceramics were encountered, the excavation yielded no other remains related to daily activities. The nature of the structure thus made Strong and Evans propose that it functioned as a small scale, communal religious structure (Strong and Evans 1952).

3.2.3 Strong and Evans' View of Diachronic Changes in Huaca Negra

In Strong and Evans' excavation, the site stratigraphy showed no interval between the Preceramic and Initial Period, suggesting a continuous, gradual local cultural development in Huaca

Negra. While their work mainly focuses on ceramics that are only present in the Initial Period, Strong and Evans' excavation implicitly depicts a broader picture of diachronic change in patterns of the economic activities which are the focus of interest in the current research, and can be summarized as followed:

(1) The subsistence system:

Strong and Evans didn't systematically collect faunal remains, neither did they provide any quantitative analysis related to this topic. From their description, it is learned that the subsistence in Huaca Negra focused on marine resources in both the Late Preceramic and Initial Period, and land mammals were absent in earlier phase of occupation. Deepwater mussels and fishes such as sharks and rays were common, but other local resources such as sea lion and bird bones were not present in TP1 (the Late Preceramic context). The Initial Period context contained more variety of fauna species: shellfish, fish and crabs, sea lion and bird bones were common in all Initial Peroid contexts, and porpoise appeared in strata correlated to the Early Initial Period. The pervasive fire-cracked stones through time suggest a similar way of cooking was practiced throughout the long-term occupation.

The botanical remains found in 1946 are limited to a few gourd fragments and abundant cottonseeds. This is due to the poor preservation at the site caused by the high water table. The two cultigens made the excavators believe that, while lacking direct evidence of food crops, agriculture could have provided a significant food supply (ibid: 41). Overall, no significant change in the subsistence system was discerned in the previous excavation.

(2) Craft production:

While focusing on ceramic seriation, Strong and Evans' report offers little other information regarding craft production. Textile and lithic are the two kinds of artifact that are addressed. Textiles from Huaca Negra shed light on the change of craft production from the Late Preceramic to Initial Period, distinguished by the transition of technique from “twined technique” to “true weaving” as observed by the investigators (ibid: 25). In addition, spindle whorls found in the Initial Period context also suggest a scenario of local production of textiles.

The variety of lithic remains increased from early to later occupation. In the Late Preceramic Period, only one grinding stone, few polished pebbles, and quartz crystals were found. In the following period, in addition to quartz crystals, more tools such as a basalt tablet and flakes, pebble pendent, hammer stones, polished sandstone, perforated small rock disk, and stone bowls diversified the lithic inventory.

(3) The exchange network:

There is no direct evidence of exchange goods in the Preceramic occupation excavated by Strong and Evans. However, the discovery of anthracite artifacts (in the form of bowls, rectangular flat, and small fragments) from the later occupation was one of the most significant lines of evidence for inter-valley exchange, because the closest known source of anthracite is from either Santa or Chicama Valley (Carrascal and Silva 2000).

Overall, this work suggested the lifestyle didn’t change much from the Late Preceramic to the early part of the Initial Period (i.e., Early Guañape), the only difference between the two is the adoption of ceramic and true weaving. The diversity of cultural contents seemed to increase in the latter part of Initial Period (i.e., Middle Guañape or Cupisnique) as anthracite was concentrated on the upper part of the strata and different types of lithic tools were found in this context.

3.3 ARCHAEOLOGICAL CONTEXT REVEALED BY 2015 EXCAVATION

Based on previous excavation, current excavation strategies were designed to answer the research questions mentioned in Chapter 1. The excavation was conducted between 26th August and 04th December 2015, under the permit, Resolucón Directoral N°343-2015-DGPA-VMPCIC/MC, issued by Ministerio de Cultura, Peru. To provide a foundation for understanding the analysis and interpretation of the data, the sampling strategy, methodology, and the results of the 2015 excavation are summarized as follows.

3.3.1 Strategy for Data Collection

3.3.1.1 The Excavation Strategy

There were several considerations when designing the excavation for the 2015 field season. Due to the nature of deep cultural deposits, rectangular rather than square excavation units were dug so that some space could be left as platforms as the excavation was going on, which facilitated the excavation process and ensured the stability and safety of the unit. The rectangular units could also capture wider profiles of stratigraphy for further analysis and comparison, to make the work of stratigraphic correlation easier.

Variation between excavation units and between archaeological contexts was expected. Thus, density was taken as the main proxy to compare the unearthed materials in a standardized way, which made soil volume an essential factor to register during the fieldwork. Part of the field record was the count of 15-liter buckets in each context, so that soil volume could be calculated. This strategy ensured that further comparison regarding material quantity could be made on the basis of density rather than absolute numbers.

There are only two references of stratigraphy profiles in Huaca Negra from Strong and Evans' excavation, in which shell midden deposits and many distracting micro-strata that refer to multiple and continuous human activities can be discerned (Figure 3.3). Based on the profiles, it is clear that (1) the cultural deposits and the nature of possible spatial functions at different parts of the site vary a lot; and (2) intense, but relatively small scale, human activities created various, unevenly distributed micro strata. Since there is no clear cut division between Late Preceramic (Cerro Prieto) and Initial Period (Guañape), and various micro-strata might significantly slow down the excavation progress, the primary strategy in this project was to excavate in arbitrary 10-cm layers. When an archaeological feature of human activity was encountered, such as a trash/ storage pit, hearth, burial or special concentration of materials, this feature context was distinguished from the general one. The materials and records were also kept separate. In addition, when we encountered a living floor within the arbitrary level, materials would be separated based on the context of "above the floor" and "below the floor," so that the context and proper association could be assured.

While the fieldwork excavation followed arbitrary levels, the overall purpose was to reconstruct the general occupation sequences within Huaca Negra based on the stratigraphy profiles in each unit, associated materials, and absolute dating results. After correlating the stratigraphy between units and obtaining the absolute dating results, all the arbitrary levels were categorized into corresponding occupation phases. The results will be presented in this chapter.

3.3.1.2 Material Collection

To collect the archaeological remains, all the excavated soil, both from general context and from features, was screened with 4 mm mesh. The screened materials were scrutinized, artifacts and ecofacts were collected and then bagged with separate containers.

While the 4 mm screen is ideal for collecting most artifacts in an efficient way, the screen size was not fine enough to capture all small fish bones such as anchovy or sardine, and small botanical remains also pass through the screen. A strategy of systematic soil samples was thus designed to mitigate the dilemma between working efficiency and collecting very small remains. This approach is crucial, as the presence of anchovy, sardine or botanical remains plays an important role in shedding light on the local subsistence system and its change through time.

During the excavation, several soil samples were collected from each cultural context, including the general context of each occupation phase and distinct archaeological features such as a hearth or storage pit. Each sample contained 4 liters of soil. Half of the systematic soil sample (2 liters) was dry screened with a 2 mm sieve in the field. The other half was processed by flotation. All the heavy material from the floated soil sample was also collected using a 2 mm screen, and 0.3 mm fine screen was used for collecting floated botanical remains. While the total volume of soil samples are much smaller than the general context, these systematic samples do reveal the significant quantity of small fish remains, which will be analyzed and discussed in Chapter 4.

3.3.2 Location of Excavation Units

Before the 2015 excavation, a preliminary field survey was conducted in July 2014. The attempt was to bridge the seventy-years-gap between previous archaeological excavation and the current situation of the site. The result revealed that, unlike seventy years ago, the apron area of the site is now part of a private hacienda with canal irrigation, and there are no more traces of lagoon around the site or in the surrounding area. The preserved site area is in an irregular shape, about 4.2 ha in size. The central occupation area (110 by 190 meters, measured around 2 ha) can be divided into west and east sectors by a shallow slope. The majority of the mound is 2 to 7 meters higher than Templo de las Llamas and the surrounding plain. A systematic intra-site survey documented surface artifacts by placing a total of 425 recording units (1 m^2 each) in a 10-meter grid over the site, resulting in 1% coverage. All artifacts within each unit were recorded. This surface survey showed that the western sector of the site lacks ceramic remains on the surface, and the eastern sector displays higher densities of Guañape ceramics.

Combining the conclusions that Huaca Negra was a domestic midden mound, and a spatial distinction between east and west sectors, the excavation units were designed to compare the diversity of activities within the site area by spatially dispersing the excavation units among the two sectors so that " the garbage" from different corners of the site could be compared.

During the 2015 field season, six excavation units (Unit 1, 2, 3, 5, 6, and 7, see Table 3.1 and Figure 3.4) were excavated. In the meantime, the fieldwork also included cleaning the surface where wall-like structures were discernable next to the apex of the mound in the west sector (Figure 3.4, the orange lines.). While the walls were described as piled clay for household structures in Strong and Evans' previous research, it was soon realized that the majority of the mound area, especially the western sector, is *not just a midden accumulation but an artificial mound*. The lines of walls in the west sector actually correspond to the one-meter contour line and are parallel to each other, which implies a possible three-tier platform at this side of the mound. Some traces of adobe walls can also be seen at the north-east corner of the east sector. Here the walls formed an enclosed room-like structure rather than a platform, but the actual function or layout of the structures remain unknown.

Table 3.1 The location of excavation units

N° of Unit	Sector	UTM_W	UTM_S	surface elevation (Meter above sea level)
1	W	731857	9068266	13.8
2	W	731830	9068204	12.9
3	E	731951	9068243	14.2
5	E	731924	9068211	18.2
6	E	731986	9068240	14.6
7	E	732014	9068201	14.3

The excavation units were then relocated around the mound rather than on top of the mound, as the goal of excavation was to collect evidence of economic activities. This decision was made because the limited area to be excavated would not have revealed the layout of this monumental architecture, and excavating the mound architecture itself would produce limited data for answering the current research questions. Only one excavation unit (Unit-5) was located in the center of the mound to gather stratigraphic information about the mound.

Among the six units, Unit 2 is located within an area where concentrated burials are encountered. The repetitive burial behavior severely disturbed cultural strata. While rich information about burials and associated grave goods was retrieved from the excavation, the nature of data and its disturbed context impede further comparison to answer the research questions raised by this dissertation. The faunal remains from Unit 2 are thus excluded from the following analysis. Other special artifacts will be taken as supplemental data when relevant. The materials from the rest of the five excavation units are all incorporated into the following analysis.

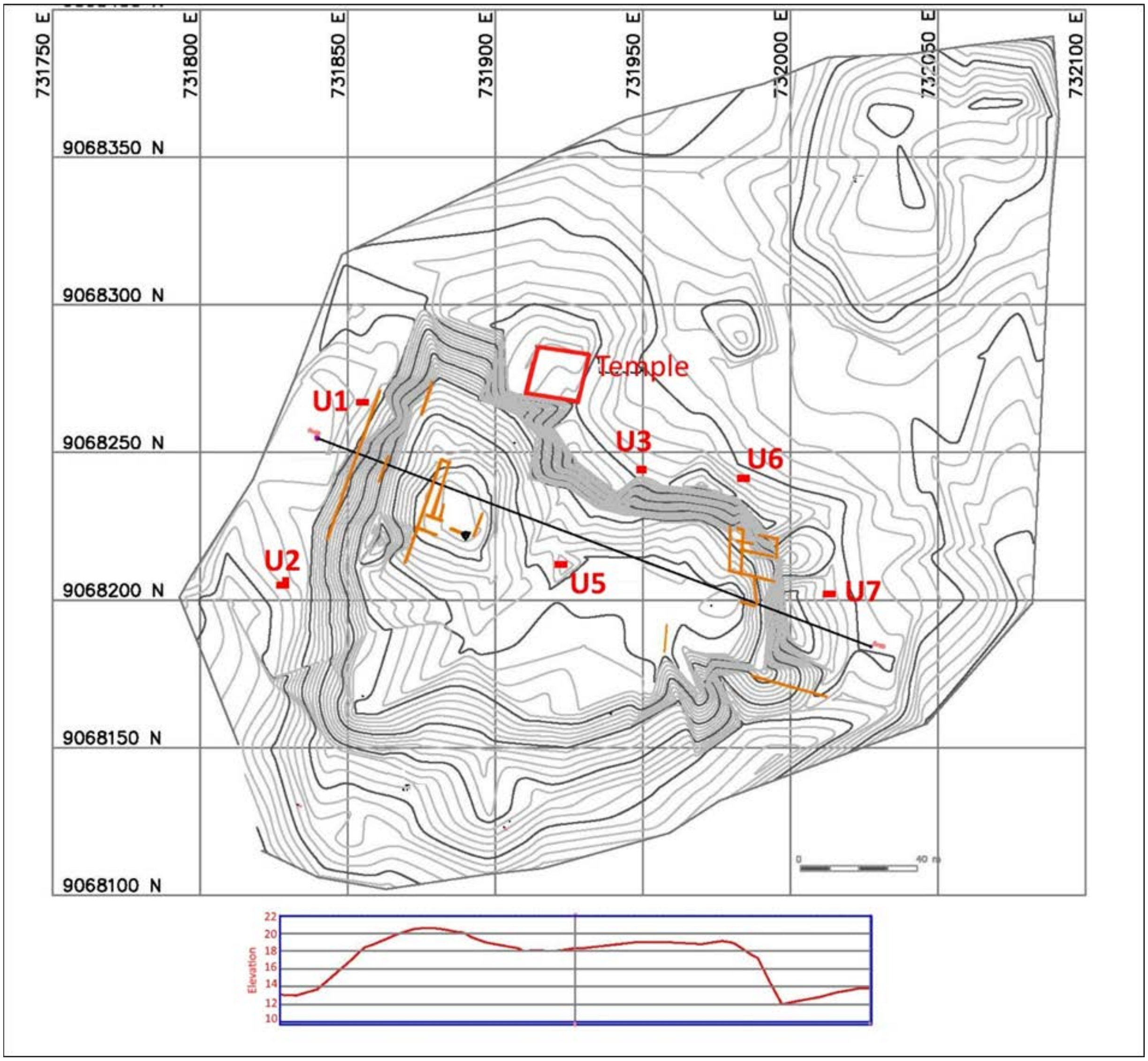

Figure 3.4 Topographic map of Huaca Negra and distribution of excavation units.

3.3.3 Excavation Summaries by Unit

As mentioned above, data from five excavation units will be incorporated into further analysis and comparison. Here, I summarize the context of each unit so that the foundation for further discussion can be laid. The purpose of this section is to provide general pictures of each unit, including stratigraphy, general content, structure, and significant features. The unearthed material remains will not be described in detail in this chapter, as those will be categorized into different categories in the following chapters.

3.3.3.1 Summary of Unit 1 Excavation

A. Excavation and Stratigraphy

Unit 1 is located right beyond the lowest platform of the western sector and on a slight slope decline from southeast to northwest. The excavation started with a 4 by 2 meter excavation area. A thin clay floor (Floor 1) and the base of a clay wall were soon encountered in the west half of the unit (Figure 3.5). These structures were about 10 cm below the surface and remain unexcavated for several reasons: (1) the structures extend toward north and west, and the complete layout could not be decided at the time of excavation; (2) we wished to retain direct evidence of architecture to demonstrate to local people and the project supervisor from the Ministerio de Cultura; and (3) the relation between the structure and deposits at the east needed to be clarified. The actual excavation area for Unit 1 is about 2 by 2 meters, starting 30 cm below the surface.

It was soon realized that, before reaching a thick salitre layer one meter below the surface, the upper part of Unit 1 was constituted by a thick fill episode, which aimed to level out the surface so that the observed floor and structures could be made. A few large chunks of clay pillar associated with Floor 1 (Figure 3.6) suggest this sector might be part of a larger structure next to the platform.

Below the thick salitre, a series of floors (Floor 2-4) were constructed between 1 and 1.8 meters below the surface. There was midden material and lenses of carbon directly associated with the floors. The pattern of multiple floors sandwiched with carbon and midden materials repetitively appears in different units.

The fifth floor (Floor 5) was encountered around 3 meters below the surface. Between Floor 4 and 5 is a thick deposit of midden materials in a sandy clay matrix. Below Floor 5 is another thick matrix with similar nature as the one above Floor 5. The only difference between the two strata is the lower deposit is less compact and sandier than the one atop Floor 5.

Another series of occupation and human activities began at 4 meters below the surface. Floor 6 and 7 are thicker floors formed by fine, compact clay. Below Floor 7 are intermittent human activities, including small-scale burning events and clusters of food remains, distributed within the pure sand matrix. Patchy and thin clay floors appeared in different parts of the excavation area, with one visible on the west profile. The sterile stratum appears at 480 cm below the surface. Below this point, the evidence of human activity disappeared, and only a few crushed fragments of shells were retrieved from the sand matrix, but there were no analyzable faunal or botanical remains collected from both 4mm, 2mm screen and floatation process.

It is noteworthy that ceramics were absent from the entire cultural deposit, which corresponds to the judgment that the west sector of the site is mainly constituted by the Late Preceramic occupation. Figure 3.7 is the field profile drawing of Unit 1 showing the strata described above.

Figure 3.5 Clay floor and walls near the surface

Figure 3.6 Unit 1 excavation at 150 cm below surface (Level 15):
1. Floor 1; 2. A chunk of clay as part of the structure; 3. Thick salitre; 4. Floor 2

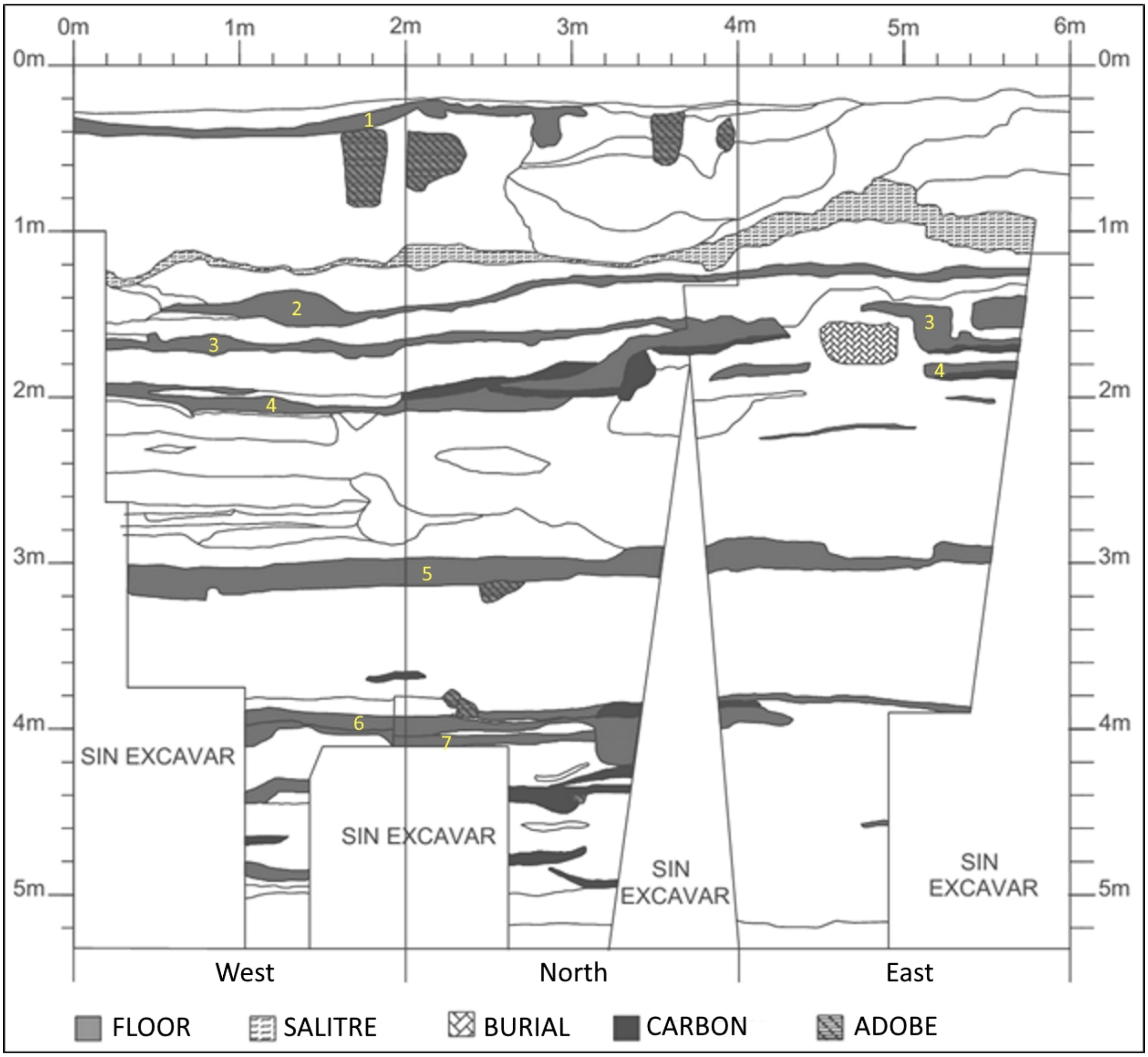

Figure 3.7 Profiles of Unit 1

<u>B. Infant Burial in Unit 1</u>

The most significant discovery of Unit 1 is an infant burial encountered at 155-183 cm below surface (Figure 3.7). This burial was located right on the east profile and extended toward the east and about 60 cm right below the thick salitre deposit, which made the excavation of the burial difficult and risky. A 50 by 50 cm extension area was made along the burial. In this way, the context of burial could be revealed. Limiting the excavation area also minimized the impact of the profile, so stability could be maintained.

For this burial, a grave pit was formed to place a reed (Schoenoplectus americanus, locally known as Junco) basket with wood frame, which was the container of the skeleton. The grave broke through Floor 3 and 4, suggesting the burial was associated with the Floor 3 occupation. On the west of the burial was a series of rocks and small adobes (about 10 cm in length) that formed a line parallel the burial, perhaps a spatial delimitation of the tomb (Figure 3.8).

The skeleton was identified as an infant around 4-months old, which made the rich grave goods especially noteworthy. Before reaching the burial itself, a cluster of 20 huge *Choromytilus Chorus* shells were placed atop of the burial as offerings. While the conditions were poor for preserving textile, it was observed that the remnant of a textile, maybe part of cloth or a band, was attached to the forehead of the skull, and its red pigment had been transmitted onto the skull. Aside from the offering of special shells, 21 pendants/ beads made of different materials were found around the neck of this infant. They included two stone pendants with a carved snake design and red pigment, three stone beads, one bead made of the otolith of a stark drum (Sciaena starksi, locally known as “robalo”), five beads made of mammal teeth (possibly sea lion teeth), and ten small bone beads (Figure 3.9). The careful spatial delimitation, and the significant number and quality of grave goods, in contrast to the examples recovered in the 1940s of human remains found in midden contexts without special treatment or grave goods, indicate that the Burial 1 infant was an exceptional individual in this community.

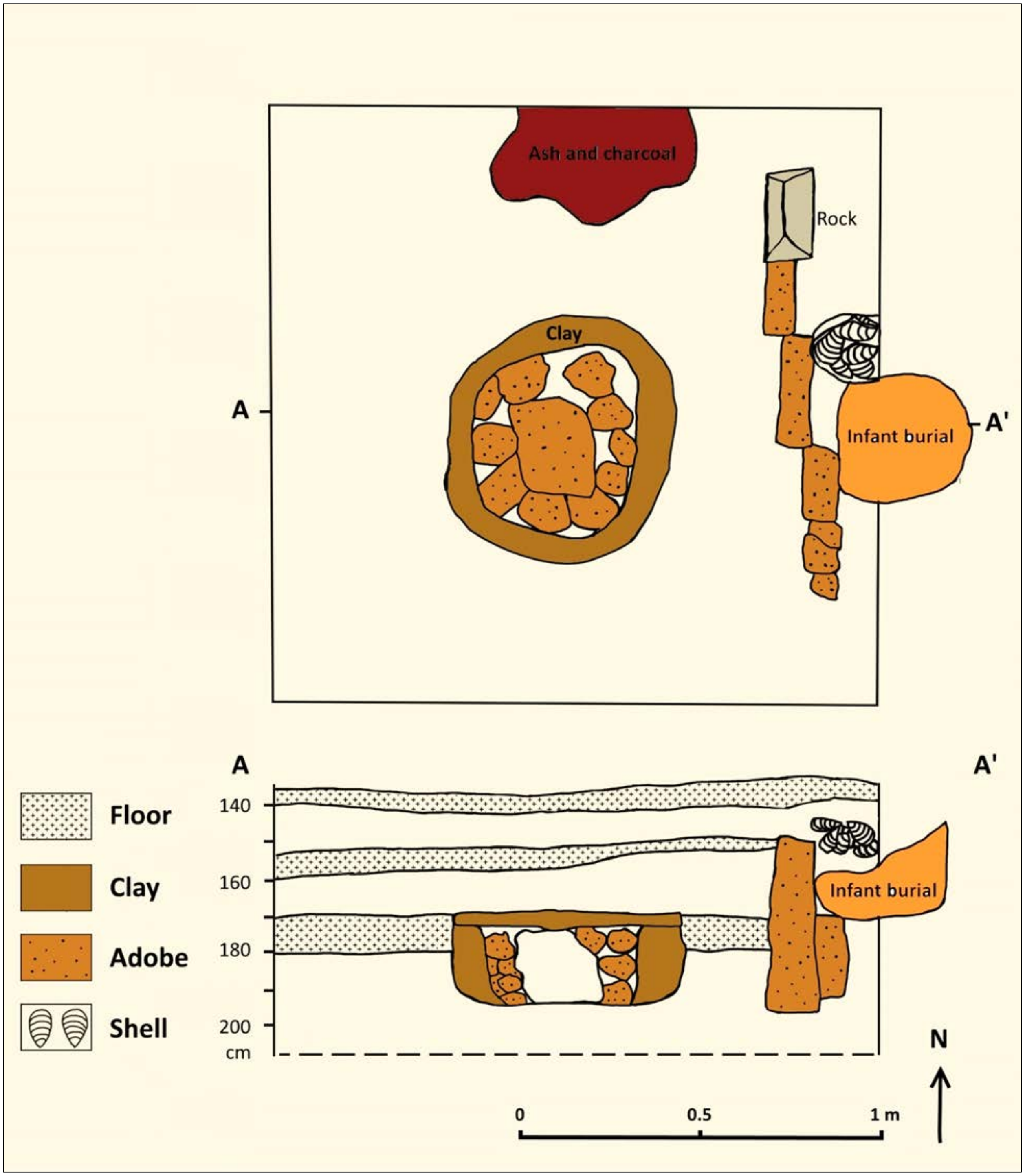

Figure 3.8 Plan and section of infant burial and a pit between Floor 2 and 4

Figure 3.9 Example of different kinds of pendants and beads as grave goods of the infant burial

C. Features in Unit 1

One significant feature is associated with Floor 4: a pit in an oval shape, 60 by 65 cm in size and 25 cm in depth (Figure 3.8). The pit is sealed with fine clay at the same level of Floor 4, and below the sealed clay is a hand-modeled clay wall that creates a separate space. While it seems to be a small storage pit, the cavity was filled with small adobes rather than any other materials such as food remains or craft goods (Figure 3.10). Outside the pit is a layer of carbon (R8 area in Figure 3.10), which is directly associated with Floor 4. The real function of the structure remains unknown, and storage remains the most logical inference, while the deliberate sealing with clay might also refer to a ritual or symbolic meaning.

A series of burnt clay features (Figure 3.11) were encountered in the matrix of sand or silt sand in the lower part of the excavation. For this kind of feature, it is observed that clay was hand-molded into the form of olla, usually 22-35 cm in diameter and 15-25 cm in height. Two burnt clay features were found closely associated with each other in Unit 1 at 380 cm below the surface. The two features here have an amorphous exterior and a clearer outline of the interior; both features were clearly associated with fire. The evidence suggests the features might have functioned as a hearth, a particular way to concentrate fire in a sandy environment.

Other features in Unit 1 include several postholes that appear at different depths of excavation, most of them also found in the lower half of the excavation (Figure 3.12). The postholes were all 8-15 cm in diameter, and no wood remains were found in the postholes. The limited excavation area prevents us from seeing the actual layout of the structure the postholes represented. However, postholes were found associated with clay floors. The small size and low density of postholes, and the faunal remains from the same context, imply a domestic nature of human activities in the earlier occupation of this part of the site.

Figure 3.10 Possible storage pit made of clay

Figure 3.11 Burnt clay features in Unit 1

Figure 3.12 Series of postholes associated with ash and lime, in Unit 1, 250 cm below surface.

3.3.3.2 Summary of Unit 2 Excavation

Unit 2 was located at the southwest edge of the mound. The archaeological investigation in this unit revealed a unique context with dense burial events. Close to the surface, the first burial (U2T1, T refers to Tumba) in Unit 2 is considered to be associated with later human behavior. At 20 cm below the surface, there is also a household structure with a quincha wall associated with a 2-cm-thick clay floor. A 1.5 by 2 meter north extension area was excavated to reveal the layout of the structure. However, the corner of the wall was not within the extended excavation area, and the measurement of the wall remained 0.5 m from east to west and more than 2.2 m from north to south (Figure 3.13). There were several burials within and outside the structure, but they remain intact for future investigation.

Beneath the quincha structure and its floor was a thick stratum of midden deposit, and patchy, disturbed clay floors were registered within this stratum. A considerable quantity of faunal remains was also collected from this unit. More importantly, eight other burials were registered during the excavation. As unearthing human remains would consume tremendous resources and delay the excavation process, only five out of the eight burials were excavated, and the excavation of Unit 2 ceased at 180 cm below the surface to avoid disturbing more burials. Because the stratigraphy was severely disturbed by the repetitive burial behaviors, data from Unit 2 is not incorporated into the discussion of the occupation history in Huaca Negra.

Figure 3.13 Quincha wall in Unit 2. Red arrows point to the burial bundles

3.3.3.3 Summary of Unit 3 Excavation

A. Excavation and Stratigraphy

Unit 3 was the last excavated unit in the field season in 2015. This unit was placed 3 meters east of Strong and Evans' Strata Cut 1 after realizing the strata profile yielded by Strong and Evans was not sufficient to provide enough detail and accurate information for interpreting the results of other excavation units. Unit 3 then provided a chance to re-evaluate their previous work. By directly comparing the two excavations, our understanding of Huaca Negra can be "calibrated," and our interpretation of the site can have a more solid foundation. The excavation of Unit 3 was done under a very tight schedule, and a 2 by 3 meter excavation area was designed for working efficiency. Soil samples were taken just for floatation due to the limited timeframe. The decision was also made because the data from other units suggested that there was no significant difference between 4 mm and 2 mm dry screen.

The stratigraphy recorded in Unit 3 represents a huge difference from Strong and Evans' previous work in many ways, and the most significant one is that multiple floors were encountered throughout the excavation. As can be seen on the profile (Figure 3.14, 15), the first meter of the excavation contains intense human activities, which caused a lot of intrusions upon one another. This stratum reflects the deposit of short-term activities and accumulation of daily trash. Within this stratum, only one clear clay floor (Floor 1) was encountered, but patchy, compacted use surfaces (locally known as "apisonado") appeared several times in this section. In the meantime, patchy salitre chunks were encountered between 10 and 40 cm below surface, and one thick layer of salitre appeared at 80 cm below the surface. Another floor (Floor 2) was identified right below the layer of salitre. 383 out of 387 registered ceramic sherds in Unit 3 were from the context above Floor 2, suggesting this floor was the earliest occupation in which ceramics became part of people's tool assemblage.

Below Floor 2 was a 20-25 cm layer of midden deposit containing charcoal, ash, fauna, and botanical remains before reaching Floor 3 at 130 cm below surface. From this point until 180 cm below surface, a repetitive behavior can be discerned in which formal pure clay floors were constructed (Floor 3, 4 and 5), with sandwiched layers of midden material in between.

A similar pattern continued from 220 to 340 cm below the surface as floors and midden matrix kept appearing one after another. However, two factors make this portion differ from the previous one: (1) the floors were made in a less formal way. They contained a higher proportion of sand, thus were harder to discern during excavation and in the profile. There were at least five of these floor-like ("apisonado"), compact layers of sandy clay deposits (Floor 6 to 10) which appeared when excavating lower part of Unit 3. (2) The layers between floors contained more organic materials and charcoal, so that the soil matrix was darker (10YR 1/3 Munsell color, see Figure 3.16). The frequency of floor formation was higher in the lower part of this section, where three floors (Floor 8, 9 and 10) were made within 50 cm interval.

The final section of stratigraphy in Unit 3 is similar to the lowest section in Unit 1: intermittent human activities formed thin, black layers within the pure sand matrix (Figure 3.17). Concentrations of crushed shells were found associated within these thin layers while the pure sand deposits yielded nothing related to human activity.

Sterile was reached after the last thin layer, at 440 cm below surface, and another meter was dug to assure no more human occupation or activity occurred below this point, before ceasing the excavation of Unit 3.

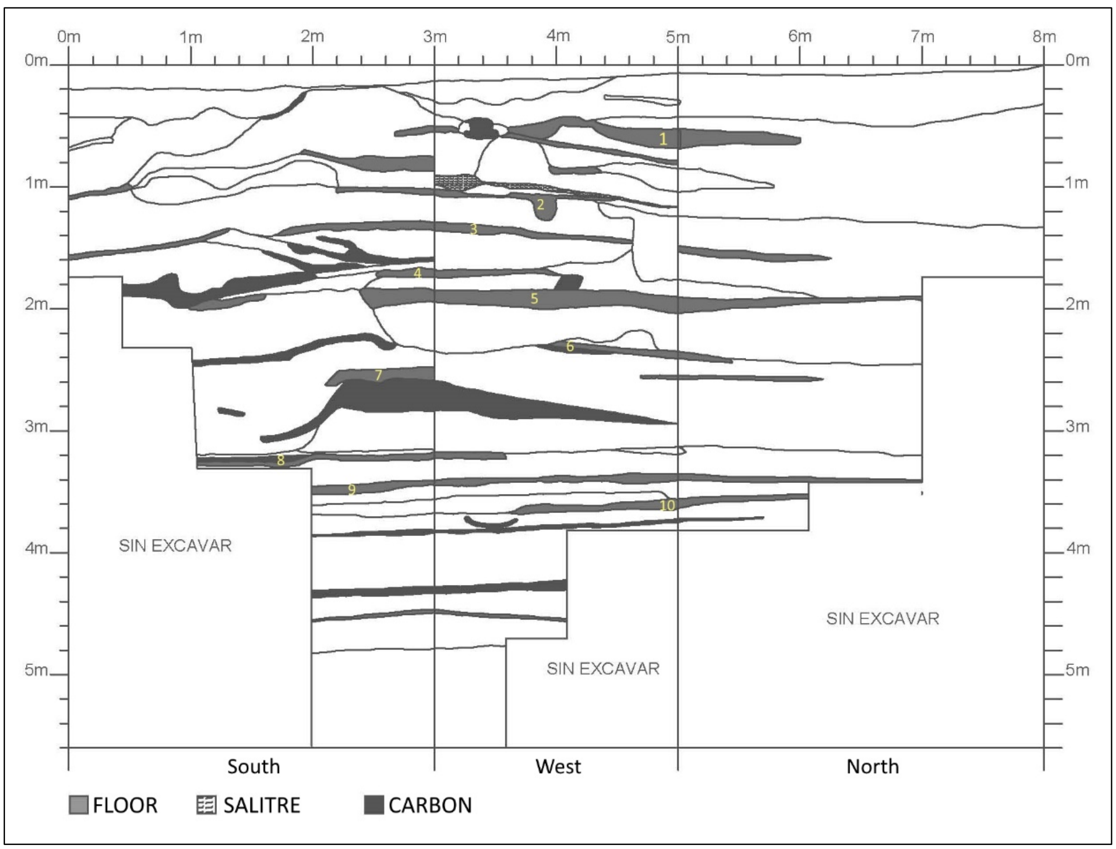

Figure 3.14 Profiles of Unit 3

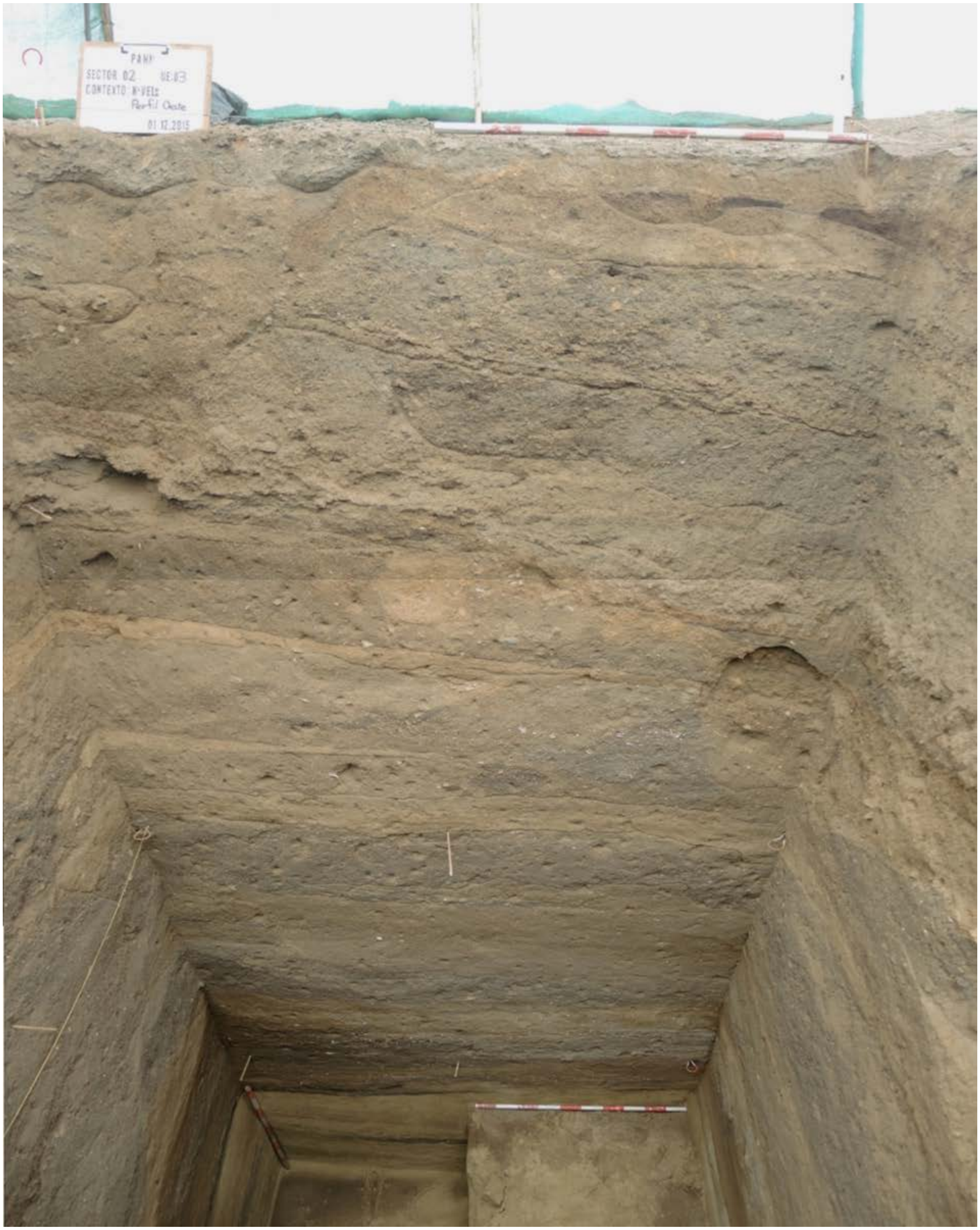

Figure 3.15 The west profile of Unit 3 provides the clearest sequence of occupation

Figure 3.16 Dark soil between Floor 5 and 6

Figure 3.17 Intermittent human activities in the sand matrix

B. Features in Unit 3

There was no burial encountered in Unit 3. However, many small-scale trash concentrations were found throughout the excavation. For example, a pile of sea lion bones, including scapula, ulna, and part of the mastoid process, was registered between 25- 45 cm below surface (Figure 3.18). Stains of human activities were often found on floors (Figure 3.19), although usually not accompanied with any specific kind of material remains.

Figure 3.18 Small concentration of sea lion bones in the southwest of Unit 3

Other than the clear floors, there was little direct evidence of architectural structures in Unit 3. One exception is a series of seven postholes found 305 cm below surface, associated with Floor 8 (Figure 3.20). The size and depth of these postholes are similar to those found in Unit 1, roughly 8-15 cm diameter and 5-10 cm in depth. Four of them are on the margin of the floor and can be directly associated with Floor 8. Three other postholes were a meter away from the floor. The two sets of postholes are slightly parallel to each other. While it is not possible to see the complete layout, the structure seems to be in a circular or semi-circular form rather than a rectangular one.

According to the stratigraphy, the two sets of postholes seem to be contemporaneous structures, and possibly one is appended to the other.

Figure 3.19 Stains of human activity on Floor 3, Unit 3

Figure 3.20 Two sets of postholes (1-4 and 5-7). White dots are traces of lime.

There was a pattern that can be seen in the lower part Unit 1 and 3 of scattered lime associated with the floor (Figure 3.12 and 3.20). On Floor 9 of Unit 3, a clearer concentration of lime, in the form of powder or small amorphous coagulum, was revealed during the excavation (Figure 3.21). Similar patterns of lime distribution repetitively occurs in other units, which implies possible lime production in the earlier occupation of the site.

Figure 3.21 Concentration of lime on Floor 9, Unit 3.

3.3.3.4 Summary of Unit 5 Excavation

A. Excavation and Stratigraphy

Unit 5 is the only excavation unit that was placed on top of the mound, right on a gentle slope declining toward the northwest. The excavation area was 2 by 4 meters. Not surprisingly, several architectural features were encountered as the excavation went on, which constitute part of the profile (Figure 3.22).

The excavation soon encountered a deposit of salitre starting 20 cm below surface, which is unevenly distributed across the excavated area regarding the thickness and depth from the surface. The first encountered floor (Floor 1, 30-45 cm below surface) is actually also salitre-impregnated clay, and various human activities including hearths, clusters of shells, and stains can be observed on this floor (Figure 3.23). Floor 2 was about 20 cm below the first one, and both Floor 1 and 2 are slightly higher at the east, which corresponds to the slope of the mound. The salitre-impregnated Floor 1 and 2 are similar to Strong and Evans' description of the Late Preceramic floor in TP1.

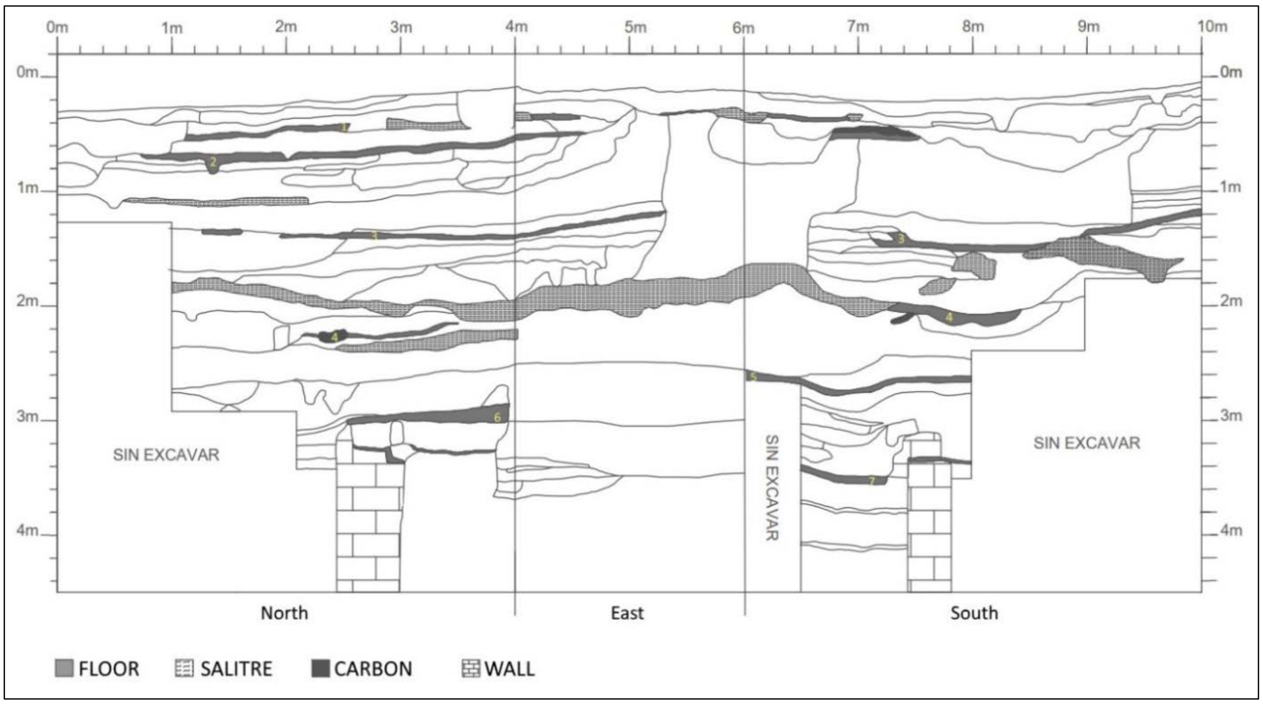

Figure 3.22 Profiles of Unit 5

Associated with the first two floors, the first meter of Unit 5 contains a lot of human activities and intrusions, a similar pattern to that already observed in the top portion of Unit 3. The intense human activities affected the profile so much that, even though they are only two meters apart, the north and south profile present entirely different patterns. 531 out of 538 registered ceramic sherds came from this first meter of deposit, which makes this portion of occupation the part associated with the Initial Period. The few sherds found deeper than this depth are not significant enough for further discussion, and might have come from the later intrusion.

Figure 3.23 Human activities on top of the mound

Floor 3 (115-135 cm below the surface) was registered 20-25 cm beneath the layer of salitre (around 100 cm below the surface) that divided the occupation with and without ceramics. A second thick salitre layer started at 155 cm below surface and covered the entire excavation area (Figure 3.22). Floor 3 is the only clear floor that was registered between the two salitre layers.

A significant change in the nature of space occurred below the lower thick salitre, where a portion of thick clay floor (Floor 4) was encountered in the middle of Unit 5. More importantly, the base of a wall (Wall-01), measuring 25 cm wide and 225 cm long, was encountered at 225 cm below surface (while not present on the profile). It divided the space into a north and south portion. The body of the wall had collapsed, but there were a few baseball-shaped adobes that remained in their position. There were also other small clay fragments next to the base of the wall, suggesting the wall was mainly made of adobes, while these adobes were not standardized. Two boulders were placed on top of mortar and next to the rectangular adobes. With another rectangular adobe in the southwest and a small piece of adobe in the northeast, another possible wall delimited a small space within the excavation area (Figure 3.24). All three spaces divided by the two walls revealed some human activities on the floor, including several burnt areas of circular shape (about 27 cm in diameter), the placement of bird (Peruvian booby, *Sula sp.*) bones in the north, organic-rich, dark sandy clay (10YR ¾) with high density of charcoal in the northeast corner, and dark burnt sand (7.5YT 2.5/2) in both north and south of the major wall.

Figure 3.24 Base of Wall-01 in the middle of Unit 5 at 230 cm below the surface. (Note the salitre deposit on the profile)

The base of the two walls ended at 245 cm below surface, where a thin layer of clay clots (about 10 cm) seemed to be placed below the wall to serve for refilling and leveling purpose. Floor 5 (265 cm below surface) was soon encountered, but its area was limited in the southeast corner of the unit. There was a small wall made of piled clay associated with Floor 5. Below Floor 5 and its associated walls were a formal hearth made by clay, and a boulder 35-cm-long in an ellipse shape. A human skeleton was found placed right beneath the hearth and boulder (219-310 cm below surface). The human remains, boulder and hearth are directly associated with each other before the construction of Floor 5, which made the burial a possible offering for larger scale construction.

At the same level of the human offering, another massive wall was encountered. This wall was made by adobe with clay mortar, and it extended to both the north and south profile with a width of 55 cm (Figure 3. 22 and 25). The west of the wall was left unexcavated after removing the first 30 cm layer as the narrow space impeded a worker working inside without damaging the wall. On the other hand, the space east of the wall was excavated for another 140 cm (up to 450 cm below the surface). The space right next to the top of the wall contained two floors (Floor 6 and 7), Floor 6 was better preserved at the north corner as the south part was intruded by the abovementioned human offering. Below Floor 7 was a thick stratum of clay fill. It can be inferred that this was a relatively large scale of activity: the previous space delimited by this massive wall was filled with clay, and then new floors were created on top of the leveled space.

Figure 3.25 The surface of the massive wall in Unit 5. “A” refers to Floor 6 and “B” to Floor 7. (The drawing shows the traces of adobes that can be observed after removing the mortar on top)

The excavation didn't reach the base of the massive wall or the end of clay fill when we stopped at 450 cm below the surface. The excavation ceased because we wanted to preserve the major structure so that the layout of the architecture could be revealed in the future. The preservation would be compromised if workers had to step on the wall from the west before they could continue the excavation at the east corner. In addition, the material remains were scarce within the meter-thick clay fill, so we decided to invest limited time and resources in other excavation units.

B. The human offering

While not the focus of this dissertation, the human remains found in Unit 5 is worth addressing. Based on the pelvis, the individual was identified as a female in her late forties. Her head was toward the west. The upper limbs were flexed towards the skull with the right hand under the jaw and the left near the thorax; the lower limbs were also flexed, but angled away from the torso, with the feet pointed eastward (Figure 3.26). Most of the bones revealed burnt traces, suggesting a postmortem event related to the clay hearth right above the body.

It is not the posture that makes this individual special. Instead, it is the unique archaeological context that demands attention. What makes the feature fascinating is the direct association between clay wall, circular hearth made of clay, a boulder and the human remains (Figure 3. 26 and 27). There was no grave pit, nor any grave good along with this individual. In addition, this individual was placed directly on the ground with the surrounding space filled with silt sand, ash, and residue of trash. The boulder and clay hearth was located right above this person, which might have served a sealing function before the new wall and floor were constructed right after this event. Based on this context, it is highly possible that this individual was an offering for beginning new construction. This finding confirms the distinctive character of the space we encountered in Unit 5.

Figure 3.26 Human offering in Unit 5. Upper left: the spatial context; upper right: a boulder placed atop the body

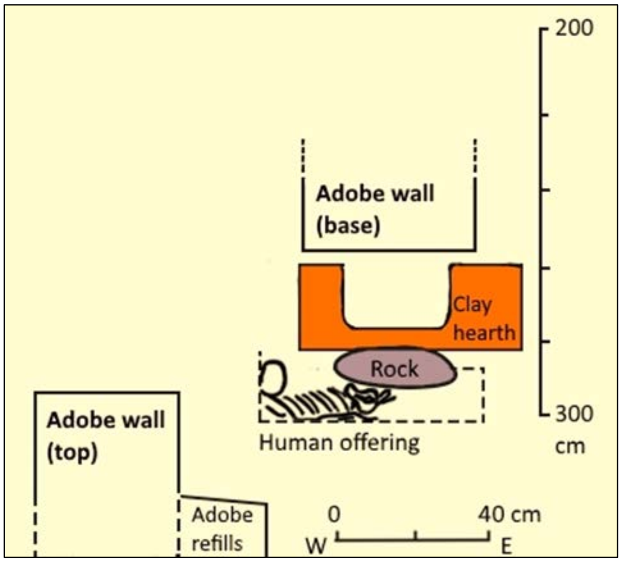

Figure 3.27 East-west cross section of the architecture and human offering. (The scale reveals actual depth in cm below surface)

3.3.3.5 Summary Unit 6 Excavation

A. Excavation and Stratigraphy

Unit 6 is another excavation unit that followed the original excavation protocol and has 2 by 4 excavation area. The stratigraphy here is similar to Unit 3, where clear floors can be discerned on the profile without too many intrusions (Figure 3.28).

Similar to Unit 5, the excavation soon met the patchy salitre all over the unit at 20-30 cm below surface. Unlike Unit 5, however, later human activities in this part of the site were significantly less intense than they were on top of the mound. While Floor 1 and 2 were registered in the first meter of excavation, and garbage from daily activities such as food remains or sherds from utilitarian pottery was scattered in the matrix, it never reached significant density or formed a clear pattern of concentration.

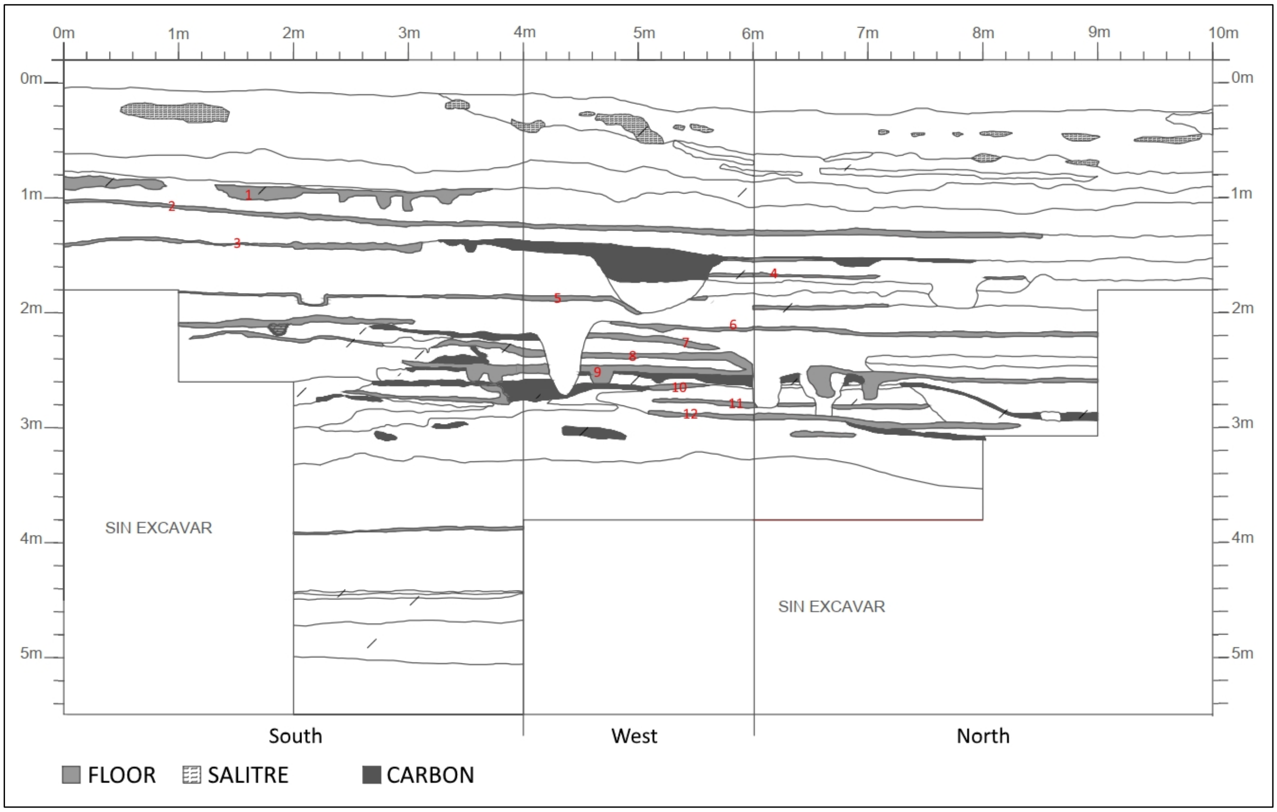

Figure 3.28 Profiles of Unit 6

The scenario changes slightly after one-meter depth, where the ceramics fade away. In this section, floors are made of fine, silty clay, and the degree of compactness, evenness, thickness, and area of coverage all suggest floor-making was done in a more formal way.

From 130 to 200 cm below surface, three floors (Floor 3-5) can be classified into this category. Meanwhile, more human activities were discerned in this section, and the soil matrixes between floors were mainly constituted by fine sandy clay, usually organic-rich in a dark brown color (10YR 3/3). While not as abundant as other units, faunal remains constantly appeared in each context. In addition, plenty of lithics were registered in this section.

Below Floor 5, the pattern changes again. The floors were now made of sandy clay and tend to be associated with either a layer of carbon or fine sand. The denser distribution of floors on the profile implies a higher frequency of floor construction or maintenance. While floors are patchier than the previous section, at least seven (6-12) can be identified on the profile from 210 to 300 cm below surface. Within this section of stratigraphy, there is one thing worth mentioning. In Strong and Evans' excavation, they registered wind-blown sand deposits in the lower part of their unit. The excavation in Unit 6 also encounters fine sand deposits, which forms independent strata. However, unlike the context described by Strong and Evans, the fine sand deposits in Unit 6 were deliberately brought into people's living contexts. A similar pattern can also be found in Unit 7. Thin layers of carbon were also commonly associated with the floors. A significant amount of human activities and features were found in this period and will be discussed in the following section.

Like the pattern observed in Unit 3, the soil matrix changed into fine sand beneath 300 cm below the surface, where the intensity of human activities decreased dramatically. Other than faunal remains and carbon, only one ground stone tool was encountered beyond the 4-meter depth. Sterile appears at 400 cm below the surface, where the matrix is constituted of pure fine sand without any artifacts or ecofacts.

B. Features in Unit 6

As mentioned above, no clear features occurred in the upper strata where the ceramics occurred (i.e., the Initial Period occupation). By contrast, each floor (Floor 3-5) that belongs to the lower (Preceramic) part of the stratigraphy contained clear traces of activities. Collapsed adobes and stains were found on Floor 3 (Figure 3.29). Floor 4 formed a layout with postholes on it (Figure 3.30), and the postholes are similar to the ones registered in Unit 1 and 3. Lastly, small scale trash pits were encountered on Floor 5 (Figure 3.31).


Figure 3.29 Human activities on Floor 3, Unit 6. Clots in the middle are collapsed adobes


Figure 3.30 Floor 4 at Unit 6 formed an irregular layout. Note the postholes on the floor

Figure 3.31 Traces of two trash pits on Floor 5, Unit 6

Figure 3.32 Lime and adobes scattered on Floor 7, Unit 6.
(Note the lower middle U shaped structure also made of clay and adobe)

More significant human activities started on Floor 7, where baseball-shaped adobes were scattered on the floor, and another set of adobes and clay formed a U-shaped structure with an unknown function. In addition, the floor was colored in white as the residue of lime, in the form of powder or amorphous clots, was present here in high density (Figure 3.32). A similar pattern was seen in Unit 3 and again confirmed that the use or production of lime played a role in this period of time.

The most significant features in Unit 6 are the olla-shape burnt clay features that have also been described in Unit 1 (Figure 3.11). Since the excavation area in Unit 6 is much larger, there are more examples present here from 210 to 280 cm below the surface. In total, six burnt clay features were registered, and there were another four which have a similar circular format made by compact clay, but without a clear trace of burning (Figure 3.33). The size of these features ranges from 25 to 45 cm, slightly bigger than the two found in Unit 1. Another observed difference is that the features in Unit 1 have the interior in a reduced environment with a black color, while the exterior was exposed to oxidizing and has a red color. The pattern is reversed in Unit 6 so that the interior tends to be red in color. The diversity might suggest different functions between various clay features, but the implication is that people here in the Preceramic era were forming olla-shaped and olla-sized clay, and using them somehow with fire. They weren’t making ceramics yet, but they were using clay and fire together for some unknown purpose. This could tentatively be interpreted as proto-ceramic experimentation, possibly suggesting the in situ development of ceramic technology.

The burnt clay features were not the only features associating with firing events. Slightly lower than the concentration of these features, there is a hearth delimited by aligned stones, identified right below Floor 12 (the deepest floor in Unit 6), with midden material scattered around, and abundant carbon inside the feature (R23, Figure 3.34). This was the only hearth found that was made of stone rather than clay in Huaca Negra.

Figure 3.33 Series of burnt clay features. The cross-section and plan view on the lower left come from the feature indicated with the red arrow in the main image

Figure 3.34 Hearth made by aligned stones

The earliest human activities associated with the pure sand stratum was reached in Unit 6. Thes is a concentration of shells (Figure 3.35). In total, at least 809 shells (numbers presented in NISP, MNI=422) were collected from a 36 x 30 x 10 cm area (10.08 liters in volume), with *Perumytilus purpuratus* (NISP= 446) and *Semimytilus algosus* (NISP= 330) dominating the species. Both of these are mussels whose habitat is a medio-littoral rocky environment. The closest suitable environment is at least 4 km from the site. This deposit is by far the most significant event in this earliest phase and will be discussed in the following chapter.

Figure 3.35 Shell concentration in the sand matrix

C. Burial in Unit 6

One burial was encountered within the upper part of the earliest occupation, in the very fine pure sand strata (Figure 3.36). The skeleton of this individual is in a very poor condition as the humid stratum decayed the bone structure. As a result, most of the bones can only be registered as imprints on the soil. Only long bone fragments were collected, but no further analysis could be applied. The individual is an adult with age and sex unidentifiable. The individual was placed with head toward the east, facing north, with the four limbs in a flexed position with upper limbs close to the face and lower limbs to the body. There is no grave pit nor grave goods associated with this individual. The only special treatment that can be observed is some clay clods placed among the lower part of legs and feet.

Figure 3.36 Burial found in Unit 6 with feet covered by clay clods

3.3.3.6 Summary of Unit 7 Excavation

<u>A. Excavation and Stratigraphy</u>

Unit 7 was excavated following the same protocol as Unit 5 and 6 in a 4 by 2 meter area at the east of the site. The stratigraphy at this corner of the site is significantly different from what has been observed in other units. Dense and repetitive human activities are discerned throughout the entire occupation sequence, and the compressed deposits caused difficulties for identifying the strata (Figure 3.37).

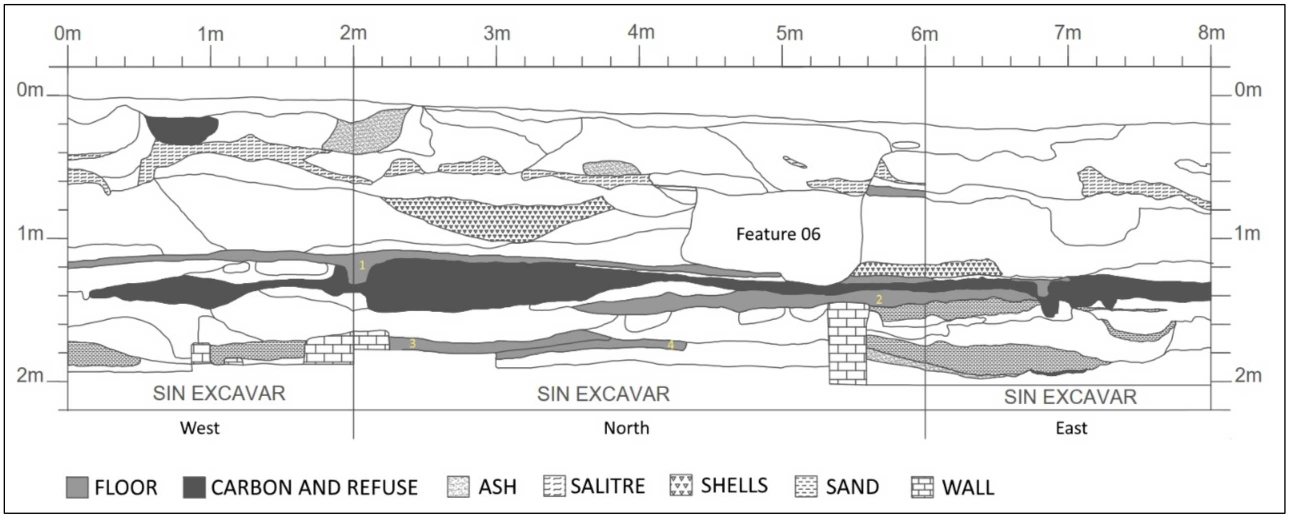

Figure 3.37 Profiles of Unit 7

Unit 7 contains Initial Period occupation, as ceramics, while not in a vast quantity, are encountered from the surface to 70 cm below the surface and in Feature 6 (which will be discussed later). A layer of thick salitre appeared at 30 cm below the surface on the west, declining toward the east to 70 cm below surface on the east side. The distribution of salitre corresponds to the current topography of the site, and its evenness implies steady water accumulation that possibly resulted from an El Niño event. Hearths and concentrations of ash are registered directly above or below the salitre suggesting continuous human activities before and after the El Niño event.

Human activity was even more intense before the salitre deposits. Midden deposits including concentrations of faunal remains, charcoal, and ash could be found in several places before reaching the first definite floor at 100 cm below surface (Figure 3.38). It is noteworthy that Unit 7 is the only unit in which a high density of shell concentrations, similar in scale to what Strong and Evans presented in their excavation, were encountered during the 2015 field season (Figure 3.37, 3.39: right).

Figure 3.38 Dense human activities in Unit 7, 75cm below the surface

Figure 3.39 Left: West profile shows sand refill and thick salitre; right: East profile shows the concentration of shells that appeared right above the floor.

In Unit 7, the first two clay floors (Floor 1 and 2) are identified at 110 and 130 cm below surface. In between them is a layer of dark soil rich in charcoal. As presented above, this pattern of the sandwiched floor and dark charcoal zones is also observed in Unit 1, 3 and 6. In addition, Unit 7 provides a rare case in Huaca Negra that shows shell consumption happened directly atop of Floor 1 (Figure 3.39: Right)

A series of wall structures were encountered below Floor 2 (see the section below) and another floor (Floor 3) is registered associated with "upper part" of the wall at the northwest corner (see Figure 3.37). Beneath Floor 3 is a fill matrix with few material remains. Based on the way these strata were deposited, it is clear that the spaces partitioned by the walls were leveled up before constructing Floor 3, and another fill process was done to prepare the space for Floor 2. The last identified floor (Floor 4) appears associated with walls on the north of the unit before the end of excavation.

One interesting human behavior discerned in the lower part of Unit 7 is that pure sand was intentionally introduced to the context (Figure 3.38: left). As can be seen on the bottom of the profile, this behavior was associated with the fill process, and no ecofacts or artifacts are found within the sand deposit. Introducing pure sand to fill the space was significantly different from the case in Unit 5, where a large space was filled with clay or fragmented adobe. While the actual reason for introducing pure sand into this context is unknown, the difference between Unit 5 and 7 might be explained by (1) different recognition/ function of space; (2) different behavior pattern between different time periods.

The excavation of Unit 7 ceased at 200 cm below surface, as the excavation area was divided into many small sections by multiple walls, which impeded the working process. Other than the uppermost wall that was removed to continue the excavation, all the wall structures remain intact so that future research can reveal the actual layout of the architecture.

Although the results of AMS dating of the site will be discussed later in this chapter, it is worth mentioning here that the cultural deposit in Unit 7 was extremely compressed. The bottom of Feature 6 (130 cm below surface) is dated as 3,160 CalBP; the dark layer between Floor 1 and 2 (also 130 cm below surface) dated back to 3,780 CalBP, and the bottom of the excavated area (200 cm below surface) is 4,550 CalBP. Thus, we are seeing an 800-year time span within 70 cm of continuous human activities and deposits at this unit, which makes the nature of occupation different from the other units.

B. Architecture

While only 4 floors were identified within the 2-meter deep unit, multiple walls and structures were encountered starting 150 cm below the surface and lower (Figure 3.40, 41). It is clear that Wall 2 is an enclosed chamber measuring 90 by 70 cm at the top and smaller at the bottom where it measured 50 by 65 cm. While the north part of Wall 2 is constituted by a layer of a singleline of adobes placed on mortar, the other part of this wall is made merely of piled, compact clay. Inside the chamber were fine sand, ash, charcoal, and burnt pebbles mixed together. Fish bones were also encountered, indicating this might be a space associated with cooking activities rather than storage or another function.

Wall 2 was removed after revealing its layout so that the relationship between Wall 1 and Wall 4 could be defined. Both Wall 1 and Wall 4 have adobes placed on mortar: the body of Wall 1 is constituted of compacted clay, with two or three lines of small, flat adobe placed on top (see the wall section on Figure 3.40). On the other hand, Wall 4 is made of a single-line of bigger adobe chunks. It is unclear whether the entire wall is made of adobe or not, because the excavation ceased before reaching the bottom of the wall, and the exterior face was covered by mortar and white plaster.

Wall 5 was the last encountered wall in Unit 7. It is another single-line adobe wall that reached both Wall 1 and Wall 4 at its east end. A burial intruded at the junction of the three walls, making it hard to decide whether Wall 4 was associated with Wall 1 or Wall 5 in the first place. However, considering the altitude and deposit process, it could be inferred that Wall 5 might be the earliest wall that delimited the south boundary of space. Meanwhile, Wall 4 defined the east boundary of the room. Wall 4 might have kept being used when Wall 1 was built to remodify the space, after the space between Wall 1 and Wall 5 was leveled with fill. Floor 3 might also shed light on the complicated partitions of the space, as it can be found within the enclosure formed by Wall 1 and Wall 4, but did not continue in the space between Wall 1 and Wall 5.

Wall 3 is a quincha wall, constructed of a reed frame with clay daub, which forms the north end of another space independent from anything discussed above. This is a space filled with black, charcoal-rich sand. A pile of pure sand was introduced to be placed atop the dark sand (profiles shown on Figure 3.40). It is also worth mentioning that Wall 3 is not a well-finished wall, as the finger marks are still visible on the daub (Figure 3..40: right).

Another point is that, for the wide walls (1, 2, and 4) in Unit 7, traces of white plaster can be discerned either on top of wall (1 and 2, Figure 3.39 left and middle) or on the side of wall (Figure 3.39 right). However, this was not carefully applied plaster. During the excavation, the distribution of lime was discerned in several occasions. This element seems so abundant in the environment that incorporating white plaster into construction might involve much less effort than in other places. Its patchy distribution and inconsistency in thickness on the side of the wall also imply a less formal or standardized process for the application of lime.

Figure 3.40 Multiple walls in Unit 7. From left to right: 170, 180 and 190 cm below surface, it can be seen that sand was used to fill the space between walls. The photo on the right also shows the daub trace and white plaster.

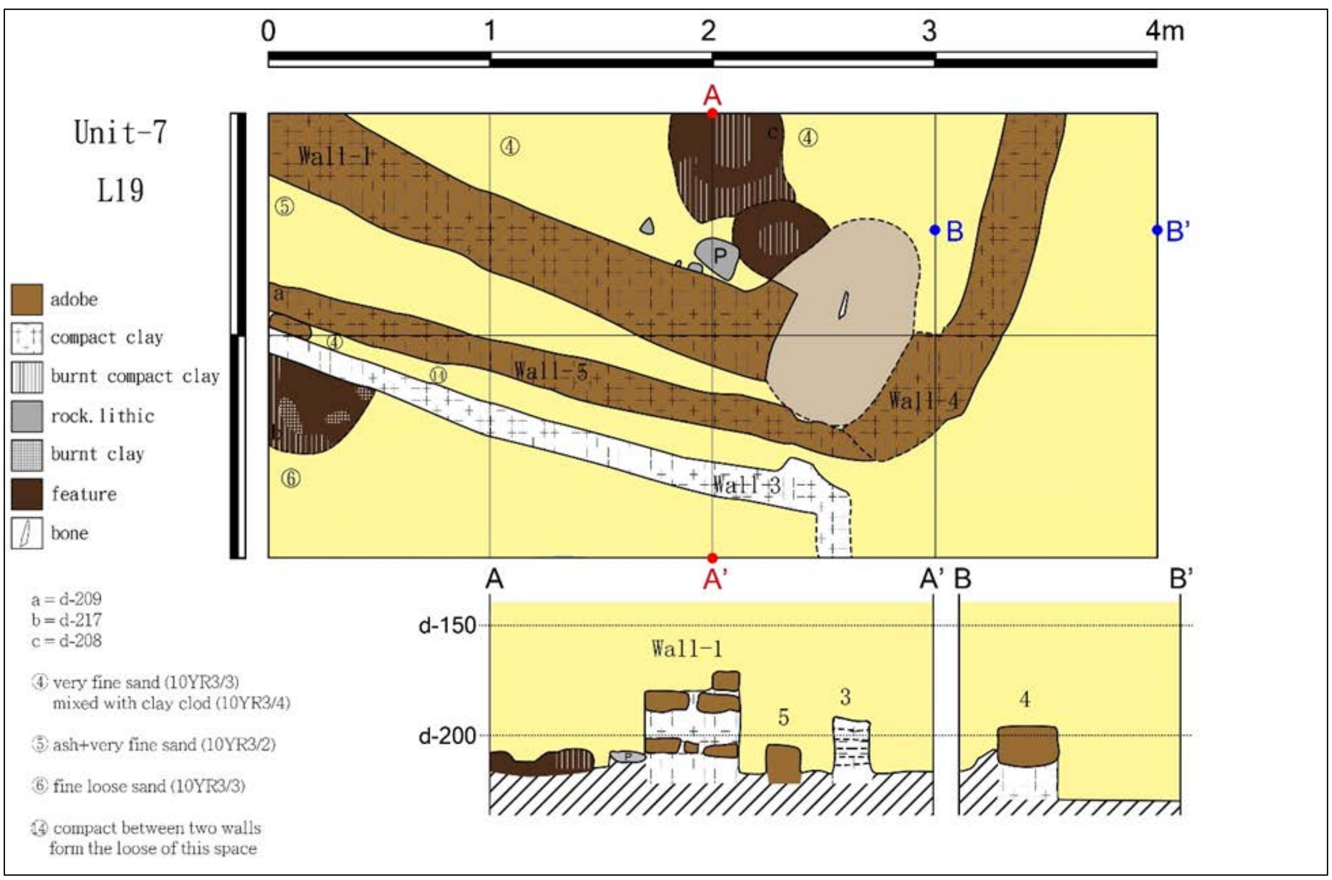

Figure 3.41 Distribution and cross section of Wall-1, 3, 4, and 5

C. Trash Pit with Human Bones

The northeast corner of Unit 7 contains an area with pure sand starting 5-10 cm below surface, showing a later episode when people introduced sand into their daily activities. The actual function of the sand is unknown as very few materials, including faunal remains, were found within this context. The situation changed after the potential El Niño rain event (represented by the presence of salitre layer): an irregular distribution of very fine sand and ash, roughly measured as 150 by 170 cm in size and 65 cm in depth, was identified as Feature 6 (Figure 3.42). Feature 6 contains a lot of artifacts and ecofacts, including charcoal, broad incised sherds, textile fragments, lithic, fauna and botanic remains. Along with these materials are disarticulated human skeletons scattered within this feature (Figure 3.42: right). While most bones are fragmented, at least three individuals are identified (MNI=3): one adult female in her early thirties (Figure 3.43: right), one subadult between 14-16 years, and another subadult between 5-7 years. The mandible of the child shows severe abrasion on dm1 and dm2 (Figure 3.43: left), which suggests the diet (such as shellfish) might contain a certain amount of sand that accelerated the degree of abrasion among relatively soft deciduous teeth.

The human remains in Feature 6 were similar to those found by Strong and Evans in that they were all found within a midden context. However, what was encountered by Strong and Evans seem to be articulated individuals, thus more likely to be burials in midden matrix. The scenario in Feature 6 is different. there is no evidence of bundled materials that might cause severe disarticulation. Thus, human bones were more likely "being dumped" into the trash pit along with many other kinds of garbage and food remains. There might be several dumping events going on as the distribution of human bones tends to concentrate at a different altitude and different corner within the feature (Figure 3.42)

Figure 3.42 Scattered artifacts and human bones in R06. Left: 80-90 cm below the surface; right: 120-130 cm below surface The base of the feature reached and slightly intruded into Floor 1

Figure 3.43 A close look at scattered child (left) and adult human (right) bones

While the midden context makes cannibalism one of the possible explanations for the distribution of these individuals, no cut marks or trauma were observed among the skeletons. The bones are in a relatively complete condition (Figure 3.43: right), which also contradicts this interpretation. However, some adult bones do reveal evidence of burning with black and gray color, which leave the nature of these features open to discussion. The late date of this feature (3,160 CalBP) separates this context from earlier architecture and the majority of site occupation. Thus, this is an independent event that happened in the last phase of human occupation of the site.

D. Other Features in Unit 7

Dense human activity has been mentioned when reviewing the excavation in Unit 7, and one example is between 75-95 cm below surface, where several events happened side by side. Figure 3.44 presents these events, which can be described in the following order.

(1) A concentration of shells within a 0.05 m^3 area: 16 different species of mussel, clam, and snail were identified with NISP=1526. One single kind of mussels ,*Aulacomya ater*, dominated this collection with NISP=1063 (70%); together with two other common mussels, *Choromytilus chorus* and *Semimytilus algosus*, 91% of the shells were mussels. In addition, only 16 fragments of fish remains are found in this context. Both the focus on a few kinds of mussel and the few fish remains indicate the consumption event targeted specific kinds of food resource.

(2) A burnt area in the clay surface: There is a series of adobes on the west side of the red (burnt) clay. These adobes did not form any specific structure, and their actual function is unknown.

(3) A 30-cm thick deposit of hearth area. This hearth is made of fire-cracked rocks forming a surface.

(4) Another pile of shells within a 0.03m^3 area. Here 17 species of mussel, clam, and snail constituted at least 430 identifiable specimens (NISP=430). No single species has dominated the population in this context. In fact, the top three abundant species are evenly distributed among snail (*Nassarius dentifer*, NISP=70), clam (*Semele corrugata*, NISP=89), and mussel (*Aulacomya ater*, NISP=132), and all of them had different habitats, implying the food was collected from various ecozones, maybe by different groups. While the scale and composition differed from context (1),

the two features have one thing in common: the scarce fish remains. Only four elements were collected from the screen.

Figure 3.44 Diverse archaeological features in Unit 7. Arrow marks an isolated sea lion humerus

Other than the features described above, another shell concentration (Feature 9) is encountered right above Floor 1. Most of the feature extended beyond the excavation area, but a NISP of 1203 shells are collected within 0.03 m^3 area, which is a very high density of shell deposits (Figure 3.45). Similar to the above-mentioned context (1), Choromytilus chorus (NISP=835) and Aulacomya ater (NISP=266) dominates the shell collection in Feature 9. Only one fish bone and one seabird bone were found in this context. Detailed analysis and discussion of these shellfish deposits and consumption events will be brought up in Chapter 4.

Figure 3.45 Shell remains after screening from one bucket (12 liters) of soil from Feature 9

3.4 STRATIGRAPHY AND OCCUPATIONAL PHASES IN HUACA NEGRA

Based on the data retrieved from these excavation units, distinct archaeological contexts are revealed from both excavated areas and profiles. The next step was to correlate these archaeological strata with absolute C14 dating results so that the sequence of occupation could be reconstructed. While the archaeological context and nature of human activities varied from one unit to another, factors such as the appearance of ceramics, the presence of massive salitres, repetitive features such as the burnt circular clay features, and the nature of the soil matrix were taken as indicators to help to define the characteristics of the occupational phases.

3.4.1 Relative Dating Results: Natural Strata

It is demonstrated that the stratigraphy of Huaca Negra is much more complicated than the picture provided by Strong and Evans, especially when considering the presence of living floors for the later occupation. Thus, it is necessary to reevaluate the cultural sequence before any further analysis for diachronic and synchronic comparison. Among the five excavated units discussed here, Unit 3 and 6 contain the complete stratigraphic sequence, and they serve as the foundation for building up the sequence of occupation phases. In these two units, four different phases can be identified. According to the presence or absence of ceramics, the first three phases correspond to the Late Preceramic Period, and the last corresponds to the Initial Period. This tentative chronology was later confirmed by the C14 dating results. The nature of each phase is summarized as followed

(1)Phase 1. The earliest human activity in the site area. This occupation is characterized by a pure sand matrix. Within it is sporadic human activities accompanied with dispersed traces of campfire or food remains such as clusters of shells. Overall, the quantity of material remains is low, and it is common that only a few crushed shells or fish bones are encountered in the stratum. Below this occupation is the sterile layer without any material remains. This stratum appears in Unit 1 and 3 by the depth of 4 to 4.5 meters, and in Unit 6 this stratum begins at about 3 meters below the surface. Based on the occasional, intermittent human activities, the use of site space at this time might be seasonal rather than a constant occupation.

(2)Phase 2. The beginning of sedentary life is evident as the nature of the soil changes into organic-rich clay matrix, and a series of sandy clay floors were repetitively built with thin intervals of midden soil. The only evident architecture associated with this phase is the sets of walls in Unit 7. This is small-scale construction (compared with the later, massive wall in Unit 5) and it may have been remodeled several times to keep using the space. Another indicative feature is the circular burnt clay features that appeared in Unit 1 and 6.

(3)Phase 3. The beginning of mound construction. In Unit 3 and 6, there are only formal floors rather than significant architecture associated with the third phase. Considering the location of Unit 3 and 6, the fine, thicker floors made of pure clay might function as public open areas that were associated with the major mound. Other evidence of larger scale construction can be identified in other units, including (a) a refilling process to level a large area for placing the lower platform around Unit 1, and (b) In Unit 5, a sequence of the large, lower wall construction, following by a refilling process with adobe debris, and then another construction event for the upper walls. Unlike the other four units, Unit 7 provides limited information about the architecture in Phase 3, but the evidence of food consumption is rich in this unit during this phase.

(4)Phase 4: The last phase with significant human activity is the Initial Period occupation. This period is present in Units 3, 5, 6 and 7, usually from the surface down to 1.2-meter depth where ceramics were part of the artifact assemblage. Current data suggest that, unlike Strong and Evans' conclusion, the Initial Period occupation is *limited* rather than being the majority of the occupation of the site that extends up to 4 meters below the surface. In addition, while there is a continuity of human activity within the site area, the Initial Period occupation is not associated with the earlier mound. New floors were constructed above the previous wall at Unit 5. A similar scenario can also be seen in Unit 3 and 6. Unit 7 is characterized by a series of small-scale midden accumulations and hearths in the Phase 4 strata.

3.4.2 Absolute Dating Results

Based on the knowledge of natural strata and the four general phases presented above, fourteen AMS dating samples were selected from different contexts and submitted to Beta Analytic Radiocarbon Dating Lab. The results are presented in Table 3.2 and Figure 3.46. Note that two dates (grayed out in Table 3.2) are excluded from further use and are not presented in Figure 3.46 (for reasons described below).

For AMS analysis, cottonseed is the preferred material because it helps to avoid the old wood problem. However, cottonseeds were rarely found *in situ* and more likely to be discovered on the screen, thus not all the appropriate contexts had cottonseed for dating. Charcoal was taken in this case, especially where samples were taken directly from the profile and the association of specific floors could be confirmed. Other cases to use charcoal sample were the features that didn't yield cottonseeds, such as the human offering in Unit 5, the hearth and earliest shell cluster in Unit 6 and the feature with scattered human skeletons in Unit 7.

As the AMS absolute date always comes with an error range, the median is taken for later discussion. The deepest part in Unit 7 has two dating results, one from charcoal and another from cotton seeds (retrieved from flotation). The two results turned out to be close to each other, so the charcoal sample was labeled as a duplicated one. Another charcoal sample (U01-0026, 30 cm below surface) in Unit 1 is excluded from further correlation as the date is inconsistent with others from the same unit. The early date in comparison with the lower level in the same unit might be a result of the old wood problem. While most dates are consistent with each other in terms of their stratigraphic correlation and the expectation based on the cultural context, one should be cautious with the results of charcoal samples because of the possible old wood problem.

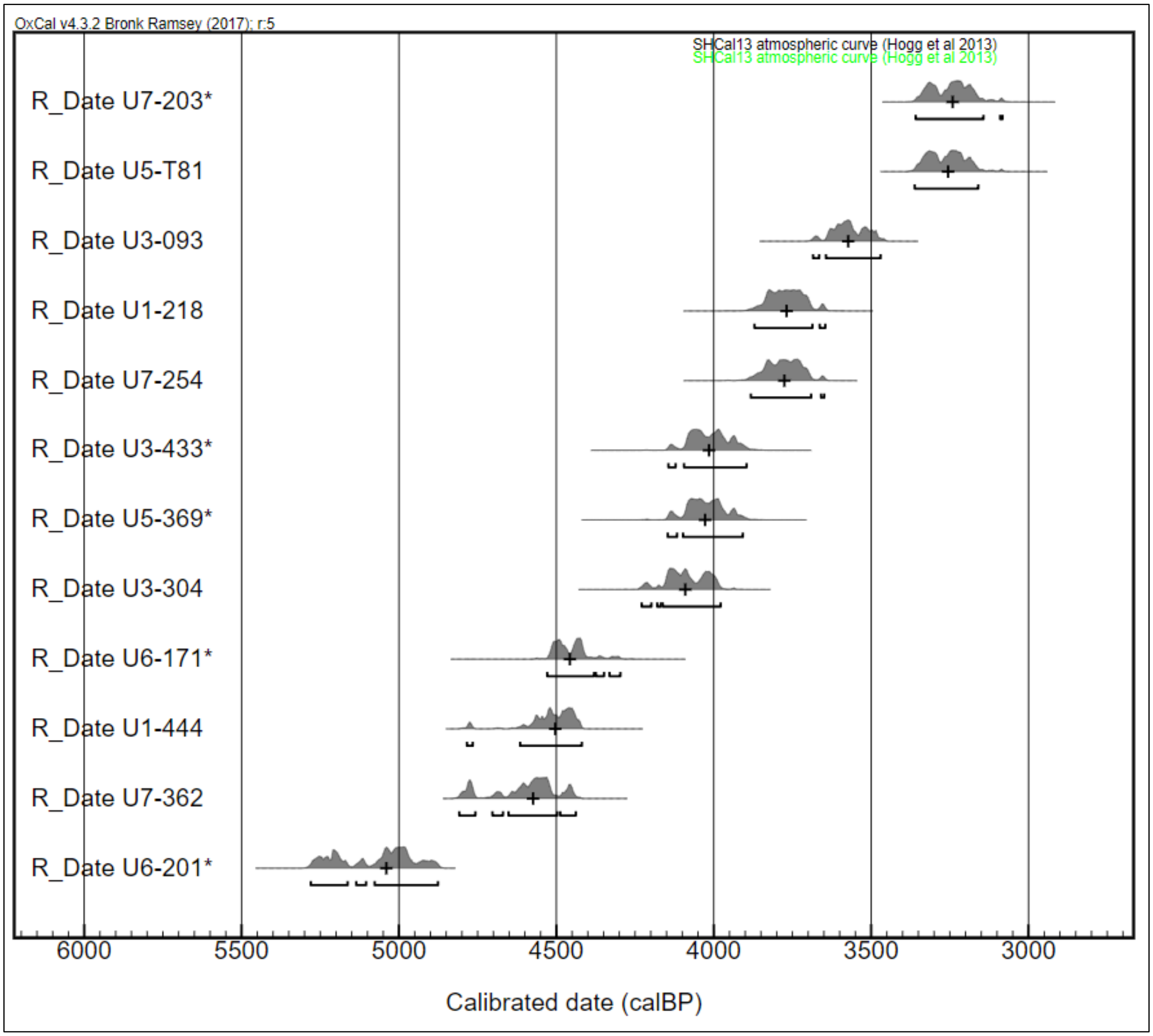

Figure 3.46 Plot of AMS dating results with median marked. Asterisks stand for the charcoal samples.

Table 3.2 AMS dating results[1]

Lab No.	Sample No.	Unit	Level	Phase	Context	Dating Material	Measured Age	Conventional Age	1-σ Calibration (CalBP)	2-σ Calibration (CalBP)	Median (CalBP)	Note
Beta-432024	U07-0203	UE07	13	4	Rasgo 06	Charcoal (wood)	3120 +/- 30	3080 +/- 30	3256-3117 (46.4%) 3330-3291 (21.8%)	3359-3143 (94.5%) 3090-3083 (0.9%)	3241	Feature with human skeleton
Beta-436006	U05-T081	UE05	7	4		Cotton Seed	3120 +/- 30	3090 +/- 30	3267-3209 (36.8%) 3336-3288 (29.7%) 3188-3185 (1.7%)	3362-3160 (95.4%)	3256	
Beta-436004	U03-0093	UE03	8	4		Cotton Seed	3330 +/- 30	3380 +/- 30	3633-3556 (53.1%) 3532-3508 (13%) 3502-3497 (2.1%)	3644-3470 (91.7%) 3685-3665 (3.7%)	3573	
Beta-447966	U01-0218	UE01	16	3	Rasgo 8	Cotton Seed	3490+/- 30	3540+/- 30	3831-3720 (68.2%)	3871-3687 (92.3%) 3664-3646 (3.1%)	3769	
Beta-447968	U07-0254	UE07	13	3	Rasgo 10	Cotton Seed	3500+/- 30	3550 +/- 30	3807-3721 (52.3%) 3836- 3810 (15.9%)	3882-3691 (94.0%) 3659-3649 (1.4%)	3776	
Beta-432019	U03-0433	UE03	17	3		Charcoal (wood)	3730 +/- 30	3720 +/- 30	4084-3970 (64.0%) 3941-3932 (4.2%)	4095-3896 (91.8%) 4144-4121 (3.6%)	4015	Profile
Beta-432020	U05-0369	UE05	31	3	T01	Charcoal (wood)	3760 +/- 30	3730 +/- 30	4086-3977 (68.2%)	4098-3908 (89.1%) 4146-4117 (6.3%)	4028	Human Offering
Beta-436005	U03-0304	UE03	29	2		Cotton Seed	3750 +/- 30	3780 +/- 30	4150-4077 (44.9%) 4038-3995 (23.3%)	4162-3978 (88.3%) 4229-4198 (5.6%) 4180-4168 (1.5%)	4091	
Beta-432021	U06-0171	UE06	30	2	Rasgo 23	Charcoal (wood)	4050 +/- 30	4020 +/- 30	4516-4470 (38.7%) 4447-4416 (29.5%)	4529-4380 (87.8%) 4331-4927 (4.4%) 4375-4349 (3.2%)	4457	Stone hearth
Beta-447967	U01-0444	UE01	42	2		Cotton Seed	4070+/- 30	4080+/- 30	4534-4437 (61.4%) 4567-4557 (5.0%) 4547-4543 (1.8%)	4615-4419 (91.9%) 4784-4766 (3.5%)	4504	
Beta-436003	U07-0362	UE07	20	2	Rasgo 16	Cotton Seed	4100 +/- 30	4120 +/- 30	4620-4518 (52.8%) 4785-4765 (9.6%) 4465-4450 (5.8%)	4652-4497 (62.0%) 4809-4757 (15.6%) 4488-4438 (12.3%) 4703-4670 (5.6)	4574	Reaffirm 354
Beta-432022	U06-0201	UE06	40	1	Rasgo 27	Charcoal (wood)	4460 +/- 30	4480 +/- 30	5064-4963 (42.5%) 5271-5184 (24.1%) 5120-5112 (1.7%)	5077-4876 (59.6%) 5280-5163 (30.6%) 5136-5105 (5.3)	5040	Shell cluster in Phase one
Beta-432018	U01-0026	UE01	4	3	Rasgo 2	Charcoal (wood)	3870 +/- 30	3840 +/- 30	4290-4152 (68.2%)	4359-4145 (84.0%) 4406-4366 (6.9%) 4121-4095 (4.5%)	4152	Inaccurate
Beta-432023	U07-0354	UE07	19	1~2	Rasgo 16	Charcoal (wood)	4200 +/- 30	4160 +/- 30	4648-4568 (36.7%) 4806-4760 (20.8%) 4698-4673 (10.7%)	4729-4525 (70.5%) 4820-4750 (24.9%)	4649	Duplicated

[1] OxCal 4.3.2 is used for calibration, with ShCal 13 atmosphere curve applied. All dates are presented as CalBP.

3.4.1 Correlation of Stratigraphy

Figure 3.46 is the dating results presented in a plot by using OxCal 4.3.2 software with SHCal 13 calibration curve. This plot shows a continuous occupation from one phase to another and corresponds to the actual sequence of the strata. The phase 2 and 3 dates overlap slightly, but this is the result of samples taken from the uppermost or the lowest portion of each phase to delimit the boundary. As the archaeological materials were mainly collected by 10-cm arbitrary levels, it was necessary to assign each level to the corresponding occupation phase. Based on the characteristics of stratigraphy and the absolute dating results, the correlation between strata and between excavated units was incorporated into a more comprehensive schema presented in Figure 3.47, which also incorporates simplified profiles from excavation units, and the actual altitude.
As can be seen in Figure 3.47, the deposition rate varied a lot between units and between phases. However, it is reasonable to assume that the rate of deposition within one occupation phase in a unit was relatively stable. Under this assumption, the unit that has a thick deposit in one phase (the most significant case will be phase 3 in Unit 1) can be divided into two sub-phases. References based on the strata shown on the profile also help to build a higher resolution dating sequence. For example, the layer of salitre in the middle of Phase 4, present in all the units with the Initial Period occupation, is taken as a marker to divide Phase 4 into early (4a) and later (4b) sub-phases, as the presence of salitre implies a significant raining event in the area.

The result of the correlation is presented in Table 3.3. Almost all the arbitrary levels can be assigned to a corresponding sub-phase. The only exceptions are level 14 and 15 of Unit 7, as the compact deposit within this relatively shallow unit blurs the boundary between phases. The multi-wall structure in Unit 7 has a very early date (4574 CalBP) that corresponds to Phase 2a, and another date from level 13 (3776 CalBP) corresponds to Phase 3b, so it is hard to assign the 20 cm deposit to either phase 2b or 3a with enough confidence. Materials from the two levels are thus removed from the further comparison between phases.

With the occupation phases constructed, the following chapters describe the materials recovered from the excavation units, using the site-wide chronology to investigate chronological change at Huaca Negra.

Table 3.3 Correlating arbitrary levels with occupation phases

Occupation Phases	Sub Phases	Date (CalBP)	Arbitrary Levels				
			U01	U03	U05	U06	U07
4	4b	3,400-3,200	Not Exist	1-4	1-8	1-4	1-7
	4a	3,600-3,400	Not Exist	5-9	9-13	5-12	8-9
3	3b	3,800-3,600	1-16	10-16	14-30	13-16	10-13
	3a	4,100-3,800	17-36	17-21	31-44	17-20	14-15
2	2b	4,350-4,100	37-40	22-29	N/A	21-25	
	2a	4,600-4,350	41-45	30-35	N/A	26-32	16-20
1	1	>5,000-4,600	46-48	35-42	N/A	33-47	N/A
sterile	0	--	49-51	43-50	N/A	48-50	N/A

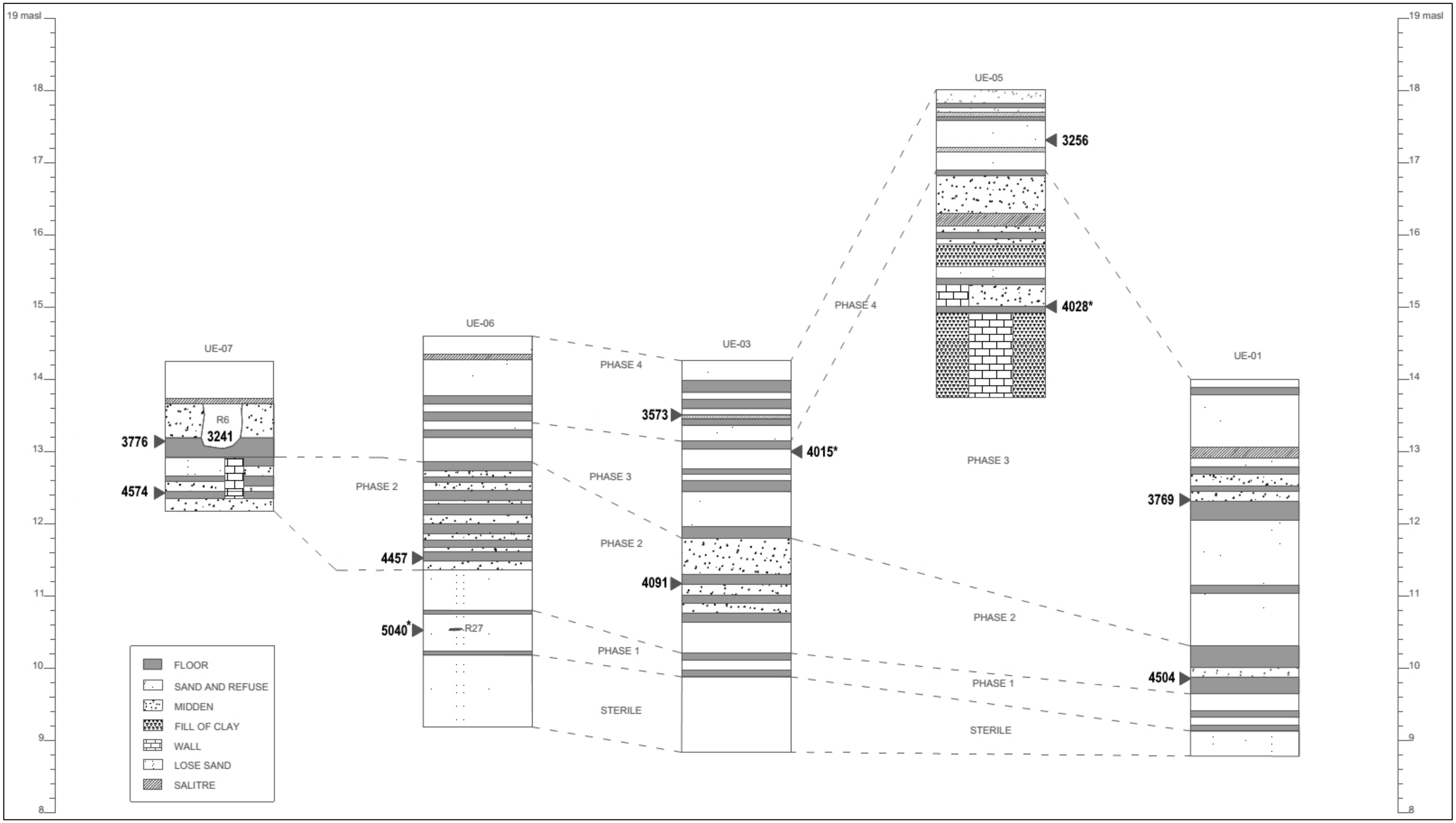

Figure 3.47 Result of stratigraphy correlation. All dates here are calibrated BP years. Charcoal samples are marked with asterisks.

4.0 DIACHRONIC CHANGE IN THE SUBSISTENCE SYSTEM AND ITS IMPLICATIONS

This chapter aims to present the analyses of unearthed ecofacts, including fish, shellfish/ sea snail, other vertebrate animals, and botanical remains. These four categories represent four different kinds of activity that relate to the subsistence system, including fishing, shellfish collection, hunting, and cultivation. Thus, this chapter reveals how the four different activities constitute the general picture of the subsistence system in Huaca Negra and its pattern of diachronic change.

Based on this idea, the comparison of the four activities between occupation phases will reveal whether there are diachronic changes of (1) targeted habitat or catchment zones (as people's focus or control of habitats might have changed from one phase to another); (2) the targeted species that represent major food resources or consumption preferences; (3) procurement strategies and related technology, especially for the possible change in coping strategy between fishing and shellfish collecting, as the two dominate the faunal remains throughout the entire occupation of the site; and (4) the changing weight of the four subsistence activities that implies how one activity might support another. By contextualizing the unearthed faunal and botanical remains, the food consumption of daily life and possible ritual context can be depicted. The current work can then constitute the foundation for further comparison with other contemporaneous sites in the north coast of Peru.

There are six sections in this chapter. In the first, a review of indices chosen for analyses and statistical approaches applied in this chapter will be described to present a general view of the methodology. In the following three sections, the analyzed fauna is divided into fish, marine invertebrate, and non-fish vertebrate animals, based on their characteristics. The general archaeological context and the inter-phase comparison within each category will be addressed. Botanical remains are presented in the fifth section in a similar format, albeit the total quantity for analysis is much less significant. The last section of this chapter provides a synthetic comparison between subsistence activities in different phases, which sheds light on the research questions mentioned in the first chapter and the diachronic changes mentioned above.

4.1 METHODOLOGY FOR COMPARISON

4.1.1 The Application of NISP for Comparison

To illustrate the picture of resource exploitation and its diachronic changes, choosing meaningful indices to represent the quantity of each species and category for analysis and comparison is the foundation for any further discussion and interpretation. The primary data of weight, Number of Identified Specimens (NISP), and the secondary data of Minimum Number of Individuals (MNI) are the most common ones applied and discussed by zooarchaeologists (O'Connor 2000; VanDerwarker and Peres 2010; Reitz and Wing 2008). All three indices are useful when estimating the relative frequency of different fauna categories mentioned above. MNI and NISP are the most widely applied indices for the assessment of quantitative change in patterns through time.

The fieldwork process regularly applied a 4mm screen to retrieve all the ecofacts, and as the current project focuses only on an intra-site comparison, both MNI and NISP can be an appropriate index to reveal the temporal changing pattern. Both MNI and NISP have limitations and requirements as an index for the number of faunal remains (e.g., Reitz and Wing 2008) as the former represents a minimum estimation in a collection and the latter reflects the maximum amount in the same context (Klein and Cruz-Uribe 1984). Reitz and Wing (2008) have pointed out possible sources of bias when applying NISP as an analytic index, including (1) difference in numbers of elements between species, (2) different survival rate of elements and species, (3) effects of taphonomic process and cultural practice, and (4) effects of recovery and laboratory procedures.

With those factors in mind, NISP is nevertheless chosen as the primary index for this research for several reasons. (1) NISP better reflects *how much food was consumed*. For example, one sea lion rib in one context and five sea lion ribs in another both count as one individual (MNI=1 in both contexts). One can, however, expect five times more meat is consumed in the second context, because each rib comes with a certain amount of meat, which would not be conveyed by the MNI. In addition, large animals, such as sharks or sea lions, might also be divided into several portions and be consumed in different locations (e.g., households), thus increasing the MNI count, and the relative importance of these animals would be overrated. The application of NISP will be more directly associated with human behavior and reasonably reduce this concern.

(2) The long-term occupation of the site, dense micro-strata, and rich archaeological contexts make the calculation of MNI a much more arbitrary process when considering whether to combine or separate collections from their original context. The 10 cm excavation levels thus seem not ideal for the research purpose. In contrast, using primary data such as NISP helps to avoid possible bias caused by the archaeologists' decision and provides a picture closer to "how things looked at the site."

(3) In the case of fish, MNI might blur the real dominant species as it is mainly counted by otolith. For example, if one species has 100 remains, including 3 otoliths and 97 vertebrae, the

MNI may be 2 or 3 depending on the otolith sides. The number can be a bit higher if we divide the other 97 vertebrae by the vertebra number of that species. Assuming the archaeologist retrieves one vertebra of another minor species from the same context, then the MNI of this fish will be calculated as one. In this case, the difference in emphasis between the two species can't be accurately represented by the MNI.

(4) The comparisons of this research are mainly made within each category, including fish, shellfish, and hunted mammal or sea bird. In Huaca Negra, marine resources dominate the faunal remains, while other mammals or seabirds seem to be occasional food supplements. By separating these categories, the possible NISP bias of different numbers of elements between important species can be avoided. The counting method for different categories can also be slightly adjusted based on the nature of particular species without missing the larger picture.

(5) Rather than directly applying the absolute number of NISP, the further comparison between the four different activities mentioned above will be focused on the change of ratio and proportion, which further minimizes the effect of a different number of elements between species.

Reitz and Wing believe that MNI is an ideal index to compare different species, and the MNI can be very close to NISP when dealing with shellfish remains (as it mainly deals with identifiable symmetrical or singular axial elements) (Reitz and Wing 2008: 208). However, fish and faunal remains can be greatly biased depending on different ways of calculation that are applied. As can be seen, MNI is not an actual number of specimens, but an "analytical product" (ibid: 206). In this project, NISP is applied for the following analysis.

4.1.2 Index of Abundance, Proportion, and Diversity

The quantitative comparison can be made in many ways to reveal behavioral patterns related to subsistence strategy. As mentioned at the beginning of this chapter, faunal remains will be categorized into three major groups: fishes, invertebrate animals, and other non-fish vertebrate animals. The abundance of species in each archaeological context will be directly represented with the NISP index mentioned above. In the first place, the abundance of species helps to identify whether there were certain species that dominated the assemblage. The comparison of abundance will also be made between different categories to examine whether there was a preference for a specific kind of food. The absolute number of NISP, however, is not appropriate for comparing the differences between various archaeological contexts. One consideration is that the excavated areas (total soil volume) changes from one context to another due to the excavation strategy or the nature of the archaeological feature. Thus, direct comparisons between contexts without considering the issue of soil volume are inappropriate.

While archaeologists tend to compare real number or proportions when dealing with the issue of abundance (e.g., Reitz et al. 2017), density is another way to compare the material abundance of contexts. The application of density is rarely seen in other zooarchaeological discussions, possibly because of the lack of the necessary data such as soil volume. Statistically speaking, Drennan has also demonstrated that density could be meaningless when dealing with assemblages from different excavation units (Drennan 2009:70–71). In Huaca Negra, however, it is necessary to take the density (in this case, NISP per cubic meter or per liter) into consideration. This is because there are huge variations of the excavated volume between occupational phases in each unit, which makes the direct comparison of NISP meaningless. The volume of each archaeological context in Huaca Negra was recorded during the excavation, which makes calculating the density of archaeological remains possible. Generally speaking, different factors such as the length of occupation, intensity of activities, and the nature of the activity area will all largely affect the density. It is true that the result of density is less convincing when dealing with a small excavation area (e.g., Unit 1) or sample size (e.g., the 2mm soil sample). However, as shall be seen in later sections, the general tendency of declining or increasing density does depict the relative importance of an activity in people's daily life.

Proportion will be taken to discern the importance of species within and between categories as it does not compare the absolute number but relative quantity between species. By evaluating the proportion of species in each of the faunal categories, the preferred catchment area can be identified. For example, sandy-bottom, rocky-bottom, near-shore, and pelagic-neritic environments accommodate different fish species, which are represented in the assemblages in different phases. Similar data can also be retrieved regarding shellfishes that live in the sandy/ rocky area or cold/warm water. Bullet graphs will be used to present the relationship between many different species. After going through the diachronic change of fish, shellfish and other vertebra animals, the proportional change between the three will also be examined. Since there are only a few categories for the latter synthetic comparison, Chi-Square tests will be used to examine further the confidence level related to the pattern discerned from the proportion of faunal remains, so that the difference or similarity between occupation phases can be better understood.

Diversity is an index that helps illuminate the strategy of subsistence activity. For example, do people fish/ hunt/ collect whatever food resources they encounter? Or, do they focus on a specific target species? The former situation will be characterized by an assemblage that contains a huge variety of species, without any dominant species greatly outnumbering others. By contrast, the latter scenario will be one in which a few targeted species dominate the collection, either without other species being present or only in insignificant quantities, perhaps a few other species living in the same environment caught as a by-product when people tried to retrieve the targeted prey. This project applies Simpson's Index of Diversity when discussing the degree of diversity. This index considers not only the number of species present in the collection, but also the sample size and proportional distribution. For Simpson's Index, a few dominant species with many minor species will still be considered as low diversity, which corresponds to the possible scenario of biomass in the natural habitat, and this is important when considering fishing activity, especially mass capture with nets. The Pisces software package "Species Diversity and Richness IV" which provides a Simpson's Index of Diversity is used for the diversity in each occupation phase in the following sections. In addition, Simpson's Index scales (D) from 0-1, with lower numbers indicating more diversity; this is counter-intuitive, so the following presentation will report 1-D (one minus D) so that a larger number refers to higher diversity.

4.1.3 Diachronic and Synchronic Comparison

The limited excavation area prevents the investigation from revealing entire archaeological contexts, so the discussion of abundance (density), proportion, and diversity are approaches that provide information that can be compared in relative terms. This approach achieves the goals of the project: to recognize the diachronic change to answer the general research questions raised in Chapter 1, and more specifically, issues related to the subsistence system mentioned at the beginning of this chapter.

Diachronic comparison is important to answer these questions. On the other hand, synchronic comparison also plays a role, as different localities within the site might serve a different function, and discerning the nature of space helps to depict activities in the domestic and community level better.

In the following sections, the material remains (ecofacts in this chapter) will be given following the order of units, through which the preliminary description of diachronic change within the unit will be made. This does *not* assume that function or activity remained the same at one spot of the site throughout the 1800-year-long occupation. Instead, each unit is a window into diachronic change through time. Thus, presenting data unit by unit helps to build up an overall scenario for our understanding of the site. It will also be easier to picture how subsistence looked in each phase after patterns are presented (sometimes repetitively) by unit. The data from different units will then be lumped together based on the occupation phase. This summary procedure avoids trivial details and illustrates a general tendency of each phase so that the changing pattern from one phase to another can be easily distinguished.

4.2 FISH CONSUMPTION IN HUACA NEGRA

This section reveals the fish remains unearthed from the 2015 excavation and the results of the analyses. The presence of fish stands for fishing activities, which indicates a complex technology system, including tools for fishing and related seagoing activities. The fish remains came from two different screens: the 4 mm screen represents general contexts, where all other fauna from the same context can be directly compared with each other. The 2 mm screen is taken as sampled contexts, applied in order to capture evidence of small fishes that play an important role in coastal Peru. In total, 1,406 liters of soil samples from different contexts were taken and processed through 2 mm dry or wet screen. Although the quantity of soil for 2 mm screen is much smaller than the general context soil for 4 mm screen, the amount of recovered fish remains is significant, and there are 10 more species identified only from the 2 mm screen.

In the following sections, the density of fish remains is presented for both 2 mm and 4 mm samples, but the unit of volume is different (liter for 2 mm and cubic meter for 4 mm) to better represent the nature of the samples. In addition, the quantity of unidentified fish elements (vertebrae) is also taken into consideration when calculating density, as vertebrae are usually present in a complete form, and the 46% unidentified elements play an important role when picturing the general quantity of fish remains in each context.

In this project, only vertebrae and otoliths are counted when calculating the NISP of fish remains. This approach is to avoid creating a large quantity of fragmented cranial bones and spines that will bias our impression of the ratio between fish and other faunal remains. The otolith is the crucial element to identify fish species. I am highly confident that consistent applyingcation of the 4 mm screen during the excavation retrieved a sufficient amount of fish otoliths that reveal the general proportions of middle-sized fish. Fish vertebra is also useful for identification and usually present in a complete form. Since the number of the vertebra of each species can be estimated, taking vertebrae into consideration will both complete the list of identified species and inform the estimation of the overall amount.

Due to the schedule of the project, the identification of fish from the 4 mm screen collection was made by Carlos Osores Mendives, and the 2 mm screen collection was done by Alí Altamirano, both licensed Peruvian zooarchaeologists. Specimens were classified into diagnostic and unidentified ones. The former are the skeletal elements that preserve well enough to make taxonomic identification; the latter are those skeletal elements without enough diagnostic characteristics for species identification.

4.2.1 Summary of Identified Fish

In total, twenty-five fish species were identified in Huaca Negra. Nine out of twenty-five came from the *Sciaenidae* family and constitute the majority of the collection. Table 4.1 lists all the identified fishes and their common name in both English and Spanish. Among several common names of each species, the ones used here are chosen based on the official catalog of the Peruvian Institute of the Sea (Chirichigno and Cornejo 2001), previous discussions of contemporaneous neighboring area (e.g., Dillhay 2017, Mauricio 2015, and Prieto 2015) and online fish databases (FishBase ver.02/2017, The IUCN Red List of Threatened Species 2010). Except for anchovy and sardine, the local name is preferred and will be applied to the following discussion.

The preliminary classification of the general habitat of identified species is also listed in Table 4.1. There are many variables that cause fish to change habitat, such as their own mobility, day-time/ night-time behavior, seasonality, movement of current, and different behaviors related to life stages. Therefore, it would be hard to constrain a species to one specific habitat. The marine system is also complicated, and there are many ways to classify the sub-environments based on the research focus. The categories applied here are mainly based on the horizontal distance from the shore, as this is directly related to the choice of fishing ground, sailing technology, and related tools and knowledge. In this research, the *littoral zone* is a synonym for the intertidal zone. Beyond the littoral zone are the *neritic and oceanic zones* divided by the continental shelf. Two terms refer to the vertical classification applied here: the benthic zone for the bottom, seabed environment and the pelagic for the area not close to the seabed. As can be seen, the majority of identified species belong to relatively nearshore environments (littoral to neritic zone), and most of them are benthos.

Table 4.1 Identified Fish Species at Huaca Negra

Order	Family	Species	Spanish Name	English Name	Environment
Atheriniformes	Atherinopsidae	Odontesthes regia	Pejerrey	Silverfish	Neritic-Oceanic (pelagic)
Batomorphii	--	--	--	--	
Carcharhiniformes	Triakidae	Mustelus sp.	Tollo	Hound shark	Littoral-Neritic (benthic)
Carcharhiniformes	--	--	Tiburon	Shark	Littoral-Neritic-Oceanic
Clupeiformes	Engraulidae	Engraulis ringes	Anchoveta	Anchovy	Neritic-Oceanic (pelagic)
Clupeiformes	Clupeidae	Ethmidium maculatum	Machete	Pacific menhaden	Neritic-Oceanic (pelagic)
Clupeiformes	Clupeidae	Sardinops sagax	Sardina	Sardine	Neritic-Oceanic (pelagic)
Condrictios	Myliobatiformes	Myliobatis sp	Raya	Peruvian ray	Littoral-Neritic (benthic)
Gadiformes	Merluccidae	Merluccis gayi peruanus	Merluza	Peruvian hake	Neritic-Oceanic
Mugiliformes	Mugiliidae	Mugil cephalus	Lisa	Flathead gray mullet	Littoral-Neritic (benthic)
Perciformes	Carangidae	Trachurus picturatus	Jurel	Inca scad	Oceanic (pelagic)
Perciformes	Centrolophidae	Seriolella violacea	Cojinoba	Palm ruff	Littoral-Neritic-Oceanic (pelagic)
Perciformes	Coryphaenidae	Coryphaena hippurus	Perico	Dolphinfish	Littoral-Neritic
Perciformes	Haemulidae	Isacia conceptionis	Cabinza	Cabinza grunt	Littoral-Neritic (benthic)
Perciformes	Haemulidae	Anisotremus scapularis	Chita	Peruvian grunt	Littoral-Neritic (benthic)
Perciformes	Labrisomidae	Labrisomus philippii	Trambollo	Chalapo clinid	Littoral-Neritic (benthic)
Perciformes	Sciaenidae	Cillus gilberti	Corvina	Corvina drum	Littoral-Neritic (benthic)
Perciformes	Sciaenidae	Cynoscion analis	Cachema (Ayanque)	Peruvian weakfish	Littoral-Neritic (benthic)
Perciformes	Sciaenidae	Menticirrhus ophicephalus	Mismis	Snakehead king croaker	Littoral-Neritic (benthic)
Perciformes	Sciaenidae	Paralonchurus peruanus	Suco (Coco)	Peruvian banded croaker	Littoral-Neritic (benthic)
Perciformes	Sciaenidae	Sciaena deliciosa	Lorna	Lorna drum	Littoral-Neritic (benthic)
Perciformes	Sciaenidae	Sciaena fasciata	Burro (Gallinaza)	Arnillo drum	Littoral-Neritic (benthic)
Perciformes	Sciaenidae	Sciaena wieneri	Robalo	Stark drum	Littoral-Neritic (benthic)
Perciformes	Sciaenidae	Stellifer minor	Mojarrilla	Minor star drum	Littoral-Neritic (benthic)
Perciformes	Sciaenidae	Umbrina xanti	Polla	Common yellowtail croaker	Littoral-Neritic (benthic)
Perciformes	Scombridae	Scomber japonicus	Caballa	Chub mackerel	Neritic-Oceanic (pelagic)
Siluriformes	Ariidae	Galeichthys peruvianus	Bagre con faja	Peruvian sea catfish	Littoral-Neritic (benthic)

Table 4.2 NISP of identified fish (from both general and sampled contexts)

Family	Species	Spanish Name	2mm		4mm	
Five Major Coastal Bony Fish						
Sciaenidae	Sciaena deliciosa	Lorna	213	8.2%	2108	43.9%
Sciaenidae	Cynoscion analis	Cachema	130	5.0%	982	20.4%
Sciaenidae	Paralonchurus peruanus	Suco	123	4.7%	769	16.0%
Sciaenidae	Stellifer minor	Mojarrilla	141	5.4%	259	5.4%
Ariidae	Galeichthys peruvianus	Bagre con faja	207	8.0%	102	2.1%
Oceanic Small Shoal Fish						
Engraulidae	Engraulis ringes	Anchoveta	884	34.0%	.	.
Clupeidae	Sardinops sagax	Sardina	642	24.7%	137	2.9%
Clupeidae	Ethmidium maculatum	Machete	65	2.5%	.	.
Atherinopsidae	Odontesthes regia	Pejerrey	46	1.8%	.	.
Shark and Ray						
Carcharhiniformes (order)		Tiburon	1	0.0%	178	3.7%
Triakidae	Mustelus sp.	Tollo	14	0.5%	47	1.0%
Myliobatiformes	Myliobatis sp	Raya	2	0.1%	94	2.0%
Other Bony Fish						
Centrolophidae	Seriolella violacea	Cojinoba	17	0.7%	84	1.7%
Sciaenidae	Cillus gilberti	Corvina	46	1.8%	.	.
Merluccidae	Merluccis gayi peruanus	Merluza	12	0.5%	11	0.2%
Sciaenidae	Sciaena wieneri	Robalo	2	0.1%	16	0.3%
Mugiliidae	Mugil cephalus	Lisa	9	0.3%	8	0.2%
Sciaenidae	Sciaena fasciata	Burro or Gallinaza	15	0.6%	.	.
Haemulidae	Isacia conceptionis	Cabinza	13	0.5%	.	.
Carangidae	Trachurus picturatus	Jurel	11	0.4%	1	0.0%
Scombridae	Scomber japonicus	Caballa	5	0.2%	.	.
Haemulidae	Anisotremus scapularis	Chita	.	.	4	0.1%
Coryphaenidae	Coryphaena hippurus	Perico	.	.	5	0.1%
Sciaenidae	Menticirrhus ophicephalus	Mismis	2	0.1%	.	.
Sciaenidae	Umbrina xanti	Polla	2	0.1%	.	.
Labrisomidae	Labrisomus philippii	Tramboyo	1	0.0%	.	.
Unidentified Fish vertebrae			2069		4125	
Total			4672		8930	

To get a better idea of the general picture of the composition of fish species, Table 4.2 represents the total NISP retrieved from Huaca Negra 2 mm and 4 mm screens, without distinguishing archaeological contexts. Together, more than 8,930 otolith and vertebrae were examined and constitute the following analysis. Other fish elements and spines are not presented in this table. As can be seen, the 2 mm collection significantly improves the recovery rate of small fish in comparison with the 4 mm collection. For both 2 mm and 4 mm collections, about half of the total collections are composed of elements that were unidentifiable down to genus or species level due to the nature of the remains.

In table 4.2, the 25 identified species and one general order (shark) are classified into four groups: (1) the five dominant species, of which four belong to the *Sciaenidae* family (Lorna, Cachema, Mojarrilla, Suco) and the other is sea catfish (Bagre con faja). The four *Sciaenidae* species can all be found in the nearshore sandy or muddy bottom environment. While Bagre con faja is less abundant in the 4 mm collection, it was incorporated into the five dominant species as its percentage rises and the quantity is similar to other major species in the 2 mm collection. This suggests a possible underestimation of this species in the 4 mm collection. As the shape of the otolith from Bagre con faja is long and narrow, it might easily pass through the 4 mm screen, causing the observed bias. Overall, the five species are relatively larger in body size, and can be captured with less sophiscated fishing technology. (2) Shoal fishes that are relatively small in body size, including anchovy, sardine, and pejerry (silverfish). These small fishes mostly appear in the oceanic area further from the littoral zone. However, anchovy and sardine also come near the surface and closer to the shore at certain seasons and times of day and require less complicated equipment to capture them. Overall, the technology required to systematically retrieve these species includes seagoing boats and nets for mass capture, although baskets are also used for nearshore catch (e.g., Marcus 1987:75). (3) Cartilaginous fishes (Chondrichthyes class): the category of shark and ray, which are relatively larger than other fishes and mostly are captured individually. As can be seen in Table 4.2, this category is underrepresented in the 2mm collection. This might be a systematic error as the workers in the field tended to pick up the large pieces of fish remains from the two-liter soil sample unconsciously. (4) Another group of minor species is the ones that count less than 100 (NISP) from both 2 mm and 4 mm collections, meaning these are not the principal target species and might have been accidentally brought into the site within the mass capture.

The species in each group are placed in the order of the total NISP quantity. While the quantity of each species changes in different units and contexts, the order in Table 4.2 will be applied in the following tables to keep the discussion consistent.

Based on the total identified sample (NISP=4805) from the 4 mm collection, *Sciaena deliciosa* (Lorna) is the most abundant species (43.9%) and dominated almost half of the sample. *Cynoscion analis* (Cachema), *Paralonchurus peruanus* (Suco) and *Stellifer minor* (Mojarrilla) are also common and abundant as the three species together constitute another 41.8% of NISP in the 4 mm collection. All four species belong to the *Sciaenidae* family. They share a similar habitat, the sandy bottom of the neritic or benthic zone, and could be captured year round. The body size varies between species but ranges from 20 to 40 cm in general.

Galeichthys peruvianus (Bagre con faja) is a demersal catfish that lives in the nearshore, sandy or muddy bottom. As mentioned above, more elements of Bagre con faja were retrieved from 2mm collection, representing another possible systematic error. However, it is noteworthy that this species is insignificant in the contemporaneous neighboring sites of Gramalote (19 out of 26177 specimens, Prieto 2015:570) and Los Moteros (5 out of 681 MNI, Mauricio 2015: 275). Thus, the unearthed quantity at Huaca Negra within relatively small excavation areas and sample sizes significantly differs from those two sites.

Carcharhiniformes is a large taxon of sharks that contains over 250 species. In this project, Carcharhiniformes constitutes the categories of Tiburon (a general local name of sharks) and Tollo (*Mustelus sp.*). This order dominates the fish remains in the Initial Period site of Gramalote in the

Moche Valley (Prieto 2015:572) while it much less significant during the Late Preceramic in Los Moteros (Mauricio 2015:275). It seems that the quantity of shark in Huaca Negra is moderate and falls in between the two sites mentioned above.

The 2 mm collection aimed to retrieve small shoal fishes, including *Sardinops sagax* (sardine), *Engraulis ringens* (anchovy), *Odonthestes regia* (pejerrey), and *Ethmidium maculatum* (machete). While sardine vertebras were occasionally collected from the 4mm screen, the 137 identified elements from the 4mm screen can only be taken as evidence of the presence of sardine fish; it is not meaningful quantitatively, as one would expect there were many more elements not captured in the screen. This point is enhanced by scrutinizing Table 4.2: there is no anchovy collected and identified from the 4 mm collection, but the anchovy is the most abundant species in the 2mm collection, four times more than Lorna. Also, sardine takes second place in the 2mm collection, and its amount is three times more than Lorna. Anchovy and sardine together (N=1526) constitute 58.62% of the identified 2mm collection (N=2603), and 32.66% of the entire 2mm fish collection (N=4672). While this does not imply that anchovy and sardine played the crucial role in the fish collection, as their body size does not provide as much animal protein as other bigger fishes, the significance of the two species is quite evident even though the pattern couldn't be discerned from the 4 mm collection. The third kind of school fish, pejerrey, is not as abundant as anchovy and sardine, thus it could be the result of occasional catch when fishermen used gill or fine nets to capture the primary target, anchovy or sardine.

In the following sections, the unearthed fish elements will firstly be presented unit by unit, and the diachronic change within each unit will also be illustrated before combining the data for further analysis and revealing the overall picture for the four occupation phases.

4.2.2 Fish Remains in Unit 1

From the 4 mm collection, there were no fish remains found in Phase 1, the earliest occupation, but the quantity of fish boosts during Phase 2 and 3 occupations (Table 4.3). There is no human activity in Phase 4 at this corner of the site. Thus, only the Preceramic occupation can be discussed here.

There are 9 species and 2 genera that have been identified from the 4 mm collection with Lorna and Cachema dominating the NISP in both Phase 2 (90.8%) and Phase 3 (61.5%), suggesting the two species were the primary resources for exploitation, while the diversity slightly increases later in Phase 3.

The total fish elements in Phase 3 is 5 times more than Phase 2, but the total excavation volume in Phase 3 is also much greater than Phase 1 and 2 due to the uneven thickness of cultural strata. As discussed in the previous section, density is taken as the proxy to compare the abundance of resources. The calculation of density reveals a picture that differs from the NISP, in that the abundance of fish elements per cubic meter actually diminished from Phase 2 (433.7/m^3) to Phase 3 (149.1/m^3). As the density of remains can also refer to the frequency and intensity of resource exploitation, the fact that the density of fish elements in Phase 2 is three times higher than Phase 3 suggests fish resources were more frequently utilized in Phase 2 than in Phase 3.

When scrutinizing the fish remains from the 2 mm collection (Table 4.4), it can be seen that there are nine fish elements retrieved from Phase 1 contexts. The four identifiable specimens belong to 4 different species, including the commonly seen Lorna, larger Tollo (*Mustelus sp.*), shoal fish (sardine) and one rarely seen species, Caballa. The density of fish element remains low (0.9 per liter), in comparison with the two latter phases.

Table 4.3 The NISP of identified fish from 4 mm collection, Unit 1

Phase	Scientific Names	Phase 1	Phase 2	Phase 3
Volume (m^3)		0.17	0.71	10.69
Five Major Coastal Bony Fish				
Lorna	Sciaena deliciosa		22	213
Cachema	Cynoscion analis		87	198
Suco	Paralonchurus peruanus		3	119
Mojarrilla	Stellifer minor		6	44
Bagre con faja	Galeichthys peruvianus		2	14
Shark and Ray				
Tiburon	Carcharhiniformes (order)			19
Tollo	Mustelus sp.			2
Raya	Myliobatis sp			6
Other Bony Fish				
Cojinoba	Seriolella violacea			39
Lisa	Mugil cephalus			3
Perico	Coryphaena hippurus			1
Unidentified		0	195	936
Total		0	315	1594
Density		0.0	443.7	149.1

In Phase 2, the fish elements from 2 mm collection do not present a tendency focusing on Lorna and Cachema as the 4 mm context does. Five more species, including anchovy and sardine, were identified. However, the small sample size (NISP=22) impedes us from getting a better idea of the proportions of fish species. The presence of sardine and anchovy suggests that people incorporated different fishing strategies and they might have gone further to the oceanic area for different resources.

Table 4.4 The NISP of identified fish from 2 mm collection, Unit 1

Phase	Scientific Names	Phase 1	Phase 2	Phase 3
Volume (liter)		10	32	166
Five Major Coastal Bony Fish				
Lorna	Sciaena deliciosa	1	2	25
Cachema	Cynoscion analis		2	19
Suco	Paralonchurus peruanus		2	25
Mojarrilla	Stellifer minor		3	25
Bagre con faja	Galeichthys peruvianus		2	75
Oceanic Small Shoal Fish				
Anchoveta	Engraulis ringes		5	**187**
Sardina	Sardinops sagax	1	3	**118**
Machete	Ethmidium maculatum			4
Pejerrey	Odontesthes regia			1
Shark and Ray				
Tollo	Mustelus sp.	1		
Corvina	Cillus gilberti			1
Merluza	Merluccis gayi peruanus		1	
Other Bony Fish				
Robalo	Sciaena wieneri		1	1
Lisa	Mugil cephalus			1
Cabinza	Isacia conceptionis			1
Jurel	Trachurus picturatus		1	2
Caballa	Scomber japonicus	1		1
Unknown		5	35	253
Total		9	57	739
density		0.9	1.8	4.5

With a larger soil sample size, 15 species were identified from the 2 mm collection in Phase 3, and the NISP is also more abundant. It is noteworthy that the amount of anchovy and sardine is significantly higher than any other 2 mm context at Huaca Negra, and the remains of small fishes are evenly distributed in every soil sample rather than being concentrated in certain levels. This pattern of distribution contradicts the possibility that some soil samples were taken from occasional anchovy/ sardine consumption events that contained a high density of specimens. Instead, the tendency suggests that the two species were regularly consumed in higher proportions throughout Phase 3 in this corner of the site. The unusually high quantity in 2 mm collection also makes the density of fish remains in Phase 3 2.5 times higher than in Phase 2, which is a unique tendency that is not seen in other units. Anchovy and sardine together dominated the 2 mm collection at 62.8% (Table 4.5), while the proportion of the five major species drops from 89.4% (in 4mm collection) down to 34.8% (2 mm collection). In the 2 mm context, shoal fish is about 2 times more abundant than the coastal fishes.

The density of fish remains in Phase 2 and 3 represent different patterns in the 2 mm and 4 mm collections. As the 4 mm collection comes from a larger volume of soil, which helps to minimize the sampling bias, it should represent a more reliable proportion of species (when excluding small shoal fish such as anchovy and sardine). On the other hand, the 2 mm collection can be considered as supplemental data that aims to retrieve information about shoal fish quantity. The 2 mm collection also adds more species that are rarely or not found from the 4 mm collection.

Several observations can be made based on the comparison between the two contexts. (1) Fishing behavior was not significant in the Phase 1 occupation. (2) Loana and Cachema dominate the fish collection in Phase 2, while other fishes are also present in the collection, considered as a by-product of net capture. (3) Shoal fish start to dominate the fish collection in Phase 3. Meanwhile, the degree of diversity also increased during this period of occupation. (4) The huge amount of shoal fish element found in the 2 mm collection, mainly from Phase 3, has a significant impact on the density calculation, which makes the two collections seem to contradict each other. Given the context and the nature of samples, the 4 mm collection is considered to reflect the overall pattern, and will be incorporated into further discussion.

Table 4.5 The proportion of identified fish species in Unit 1

	4mm screen			2mm screen		
Species /Phase	Phase 1	Phase 2	Phase 3	Phase 1	Phase 2	Phase 3
Five Major Coastal Bony Fish						
Lorna	.	18.3%	**32.4%**	25.0%	9.1%	5.1%
Cachema	.	**72.5%**	**30.1%**	.	9.1%	3.9%
Suco	.	2.5%	18.1%	.	9.1%	5.1%
Mojarrilla	.	5.0%	6.7%	.	**13.6%**	5.1%
Bagre con faja	.	1.7%	2.1%	.	9.1%	15.4%
Oceanic Small Shoal Fish						
Anchoveta	.	.	.	.	**22.7%**	**38.5%**
Sardina	.	.	.	25.0%	**13.6%**	**24.3%**
Machete	.	.	.	.	.	0.8%
Pejerrey	.	.	.	.	.	0.2%
Shark and Ray						
Tiburon	.	.	2.9%	25.0%	.	.
Tollo	.	.	0.3%	.	.	.
Raya	.	.	0.9%	.	.	
Other Bony Fish						
Cojinoba	.	.	5.9%	.	.	.
Corvina	.	.	.	.		0.2%
Merluza	.	.	.	.	4.5%	.
Robalo	.	.	.	.	4.5%	0.2%
Lisa	.	.	0.5%	.	4.5%	0.2%
Cabinza						0.2%
Jurel	.	.	.	.	.	0.4%
Caballa	.	.	.	25.0%	.	0.2%
Perico	.	.	0.2%	.	.	.

4.2.3 Fish Remains in Unit 3

Unit 3 is one of the two units where the complete sequence of stratigraphy was revealed. The definition of the occupational phases in Huaca Negra is mainly based on the dating results and human activities from this unit. Thus, the examination of faunal remains from Unit 3 serves as a baseline and helps to interpret the observed different patterns between units within the same phase.

The fish remains in Phase 1 are as low as in Unit 1. Only 8 elements from the 4 mm screen and 6 elements from the 2 mm screen are registered(Table 4.6 and 4.7). Among the 14 elements, 10 are identifiable, and they belong to 7 different species, including 4 from *Sciaenidae* family, sardine, shark (in general terms) and ray.

The quantity of fish remains increased significantly in the Phase 2 occupation, and so does the species variety. 12 species were identified from the 4 mm collection, and 9 more from the 2 mm collection. The five major species (4 *Sciaenidae* family and 1 sea catfish) together dominate at 90.3% of identified fish in the 4 mm collection, while their importance wanes to 22% when incorporating the shoal fish into consideration in the 2 mm collection. In the 2 mm collection, anchovy and sardine constitute 63.1% of total identified fish, and all the shoal fish together can be as much as 72.4%. (Table 4.8).

The five major species kept playing significant roles in Phase 3 (93.2%) and Phase 4 (96.6%) in terms of NISP in the 4 mm collection. Again, when incorporating shoal fish into the calculation, the proportion of the 5 species drops down to 24.1% as the shoal fish constitute 68.7% of the identified fish in Phase 3. This is a pattern similar to what has been observed in Phase 2. The situation in Phase 4 is slightly different, as the 5 species remain 38.8% in 2mm context and the small, shoal fishes are 54.1%.

Table 4.6 The NISP of identified fish from 4 mm collection, Unit 3

Phase	Scientific Names	Phase 1	Phase 2	Phase 3	Phase 4
Volume (m^3)		1.49	4.09	5.97	5.04
Five Major Coastal Bony Fish					
Lorna	Sciaena deliciosa		297	163	57
Cachema	Cynoscion analis	2	105	36	5
Suco	Paralonchurus peruanus	1	138	74	27
Mojarrilla	Stellifer minor		38	19	21
Bagre con faja	Galeichthys peruvianus		27	7	3
Shark and Ray					
Tollo	Mustelus sp.		31	1	0
Tiburon	Carcharhiniformes (order)	1	7	14	2
Raya	Myliobatis sp	1	14	1	0
Other Bony Fish					
Cojinoba	Seriolella violacea		9	4	0
Merluza	Merluccis gayi peruanus		1	1	0
Robalo	Sciaena wieneri		0	0	1
Lisa	Mugil cephalus		1	0	0
Jurel	Trachurus picturatus		0	1	0
Chita	Anisotremus scapularis		0	0	1
Perico	Coryphaena hippurus		2	0	0
Unknown		3	524	154	48
Total		8	1194	475	165
Density		5.4	291.9	79.6	32.7

In Unit 3, Phase 1 remains a period when fishing activity was limited, due to the less intense human occupation. When people started to settle down in this part of the site, they consistently took the five fish closer to the shore and exploited shoal fishes. The ratios between the two categories are close in Phase 2 and 3 with shoal fish significantly outnumbering the five bigger fish. On the other hand, it seems the bigger fishes that live closer to the shore became somewhat more important in Phase 4 than in previous periods as the proportion of shoal fish declines during the Phase 4 occupation in the 2 mm collection.

Another vital index to discuss is the density of fish elements. For the 4 mm collection, the density of fish elements drops from 292/m^3 (Phase 2) to 80/m^3 (Phase 3), and the number continues to go down to 33/m^3 in Phase 4. This tendency may reflect either the changing nature of the activity area in Unit 3 or the general decline of fishing activity.

Table 4.7 The NISP of identified fish from 2 mm collection, Unit 3

Phase	Scientific Names	Phase 1	Phase 2	Phase 3	Phase 4
Volume (liter)		18	44	30	26
Five Major Coastal Bony Fish					
Lorna	Sciaena deliciosa	1	17	5	9
Cachema	Cynoscion analis		17	7	7
Suco	Paralonchurus peruanus		11	2	3
Mojarrilla	Stellifer minor		10	4	8
Bagre con faja	Galeichthys peruvianus		12	2	6
Oceanic Small Shoal Fish					
Anchoveta	Engraulis ringes		111	28	20
Sardina	Sardinops sagax	3	81	20	19
Machete	Ethmidium maculatum		16	7	7
Pejerrey	Odontesthes regia		12	2	0
Other Bony Fish					
Cojinoba	Seriolella violacea		2	0	1
Corvina	Cillus gilberti	1	8	3	3
Lisa	Mugil cephalus		0	0	0
Burro	Sciaena fasciata		2	1	1
Cabinza	Isacia conceptionis		3	1	0
Jurel	Trachurus picturatus		0	1	1
Polla	Umbrina xanti		1	0	0
Tramboyo	Labrisomus philippii		1	0	0
Unknown		1	190	71	55
Total		6	494	154	140
density		0.3	11.2	5.1	5.4

Table 4.8 The proportion of identified fish species in Unit 3

Species /Phase	4mm screen				2mm screen			
	Phase 1	Phase 2	Phase 3	Phase 4	Phase 1	Phase 2	Phase 3	Phase 4
Five Major Coastal Bony Fish								
Lorna		**44.3%**	**50.8%**	**48.7%**	20.0%	5.6%	6.0%	10.6%
Cachema	40.0%	15.7%	11.2%	4.3%		5.6%	8.4%	8.2%
Suco	20.0%	20.6%	23.1%	23.1%		3.6%	2.4%	3.5%
Mojarrilla		5.7%	5.9%	17.9%		3.3%	4.8%	9.4%
Bagre con faja		4.0%	2.2%	2.6%		3.9%	2.4%	7.1%
Oceanic Small Shoal Fish								
Anchoveta						**36.5%**	**33.7%**	**23.5%**
Sardina					60.0%	**26.6%**	**24.1%**	**22.4%**
Machete						5.3%	8.4%	8.2%
Pejerrey						3.9%	2.4%	
Shark and Ray								
Tiburon	20.0%	1.0%	4.4%	1.7%				
Tollo		4.6%	0.3%					
Raya	20.0%	2.1%	0.3%					
Other Bony Fish								
Cojinoba		1.3%	1.2%			0.7%		1.2%
Corvina					20.0%	2.6%	3.6%	3.5%
Merluza		0.1%						
Robalo				0.9%				
Lisa		0.1%						
Burro						0.7%	1.2%	1.2%
Cabinza						1.0%	1.2%	
Jurel			0.3%				1.2%	1.2%
Chita			0.3%	0.9%				
Perico		0.3%						
Polla						0.3%		
Tramboyo						0.3%		

4.2.4 Fish Remains in Unit 5

Unit 5 is the only excavation unit that is located right on top of the mound, and eventually reaches the adobe wall of the mound dated to Phase 3. Only Phase 3 (the period of mound construction and usage) and Phase 4 (the post-mound Initial Period) occupation are revealed in

Unit 5, and these contexts shed light on the issues of "what did people do on the mound," and "the transition from Late Preceramic to Initial Period."

In total there are 17 species identified from the Phase 3 occupation (Table 4.9, 4.10). The five major types constitute 92.1% of total identified fish elements in 4mm collection. The proportion drops down to 29.2% in 2mm collection as the three shoal fishes together constitute 55.4% (Table 4.11). The shoal fish are about two times more abundant than the five major species from the coastal area, a similar ratio to that observed in Unit 1.

Table 4.9 The NISP of identified fish from 4 mm collection, Unit 5

Phase	Scientific Names	Phase 3	Phase 4
Soil Volume (m^3)		10.93	8.9
Five Major Coastal Bony Fish			
Lorna	Sciaena deliciosa	173	32
Cachema	Cynoscion analis	108	
Suco	Paralonchurus peruanus	60	7
Mojarrilla	Stellifer minor	16	12
Bagre con faja	Galeichthys peruvianus	15	5
Shark and Ray			
Tiburon	Carcharhiniformes (order)	14	1
Tollo	Mustelus sp.	1	
Raya	Myliobatis sp	12	1
Other Bony Fish			
Cojinoba	Seriolella violacea	3	
Merluza	Merluccis gayi peruanus	1	
Robalo	Sciaena wieneri		1
Chita	Anisotremus scapularis	1	
Unknown		166	16
Total		570	75
Density		52.2	8.4

While there were also 15 species identified in Phase 4, Unit 5, the total amount of fish remains is relatively limited. In the 4 mm collection, only 75 fish elements were found, meaning about 8 or 9 fish elements per cubic meter, which is significantly lower than Phase 3 (52.2/ m^3, Table 4.9). Unlike the 4 mm collection, the density of Phase 3 and Phase 4 fish remains are close to each other for the 2 mm collection (Table 4.10). This difference could be a result of sampling bias, or because of the body size of coastal fish was getting smaller than before (thus elements went through the 4mm screen more frequently).

Table 4.10 The NISP of identified fish from 2 mm collection, Unit 5

Phase		Phase 3	Phase 4
Soil Volume (liter)		68	118
Five Major Coastal Bony Fish			
Lorna	Sciaena deliciosa	6	26
Cachema	Cynoscion analis	8	1
Suco	Paralonchurus peruanus		6
Mojarrilla	Stellifer minor	3	16
Bagre con faja	Galeichthys peruvianus	2	2
Oceanic Small Shoal Fish			
Anchoveta	Engraulis ringes	16	4
Sardina	Sardinops sagax	16	16
Machete	Ethmidium maculatum	4	2
Shark and Ray			
Tiburon	Carcharhiniformes (order)	1	1
Raya	Myliobatis sp	1	
Other Bony Fish			
Cojinoba	Seriolella violacea	3	2
Corvina	Cillus gilberti	3	7
Burro	Sciaena fasciata	2	1
Polla	Umbrina xanti		1
Unknown		23	59
Total		88	144
density		1.3	1.2

When looking at the proportional distribution, the five major species constitute 94.9% of total identified species in 4mm context. The proportion of these major fishes remains as high as 60% even when the shoal fishes (25.9%) were taken into consideration in the 2mm collection (Table 4.11). This is one rare occasion that shoal fish categories (when considered) did not dominate the fish collection. The implication is that shoal fish consumption was not incorporated into the activities on top on the mound, at least not as much as in any other units. This tendency implies the nature of activities here might be different from the areas more marginal to the mound.

Table 4.11 The proportion of identified fish species in Unit 5

Species /Phase	4mm		2mm	
	Phase 3	Phase 4	Phase 3	Phase 4
Five Major Coastal Bony Fish				
Lorna	**42.8%**	**54.2%**	9.2%	**30.6%**
Cachema	**26.7%**		12.3%	1.2%
Suco	14.9%	11.9%		7.1%
Mojarrilla	4.0%	20.3%	4.6%	**18.8%**
Bagre con faja	3.7%	8.5%	3.1%	2.4%
Oceanic Small Shoal Fish				
Anchoveta			**24.6%**	4.7%
Sardina			**24.6%**	**18.8%**
Machete			6.2%	2.4%
Shark and Ray				
Tollo	0.2%		1.5%	
Tiburon	3.5%	1.7%		1.2%
Raya	3.0%	1.7%	1.5%	
Other Bony Fish				
Cojinoba	0.7%		4.6%	2.4%
Corvina			4.6%	8.2%
Merluza	0.2%			
Robalo		1.7%		
Lisa				
Burro			3.1%	1.2%
Chita	0.2%			
Perico				
Polla				1.2%

Like Unit 3, a decline of density from Phase 3 to Phase 4 is observed in Unit 5 based on the 4 mm collection. The difference between the 2 mm and 4 mm collections should be taken as a sampling issue, and should not impede our understanding of the trend that fishing activities are not as intense in Phase 4 as they are in Phase 3.

4.2.5 Fish Remains in Unit 6

Unit 6 is another excavation unit that contains the complete deposit of strata that recorded the occupational history of the site. The Phase 1 occupation reveals the same pattern as has been discerned in Unit 1 and 3, that fish elements are extremely limited: only 6 in the 4 mm collection and 23 from the 2 mm collection (Table 4.12 and 4.13). Interestingly, the 11 identifiable elements in the 2 mm context all belong to shoal fish: 10 anchovies and 1 sardine. The only case of shark family that is present in Phase 1 occupation at the site (N=1) is also found in Unit 6. While the number is limited, the two species are evidence for the existence of different fishing technologies and strategies in this early phase.

Table 4.12 The NISP of identified fish from 4 mm collection, Unit 6

Phase Volume (m^3)	Scientific Names	Phase 1 2.32	Phase 2 5.07	Phase 3 5.42	Phase 4 8.32
Five Major Coastal Bony Fish					
Lorna	Sciaena deliciosa		164	74	10
Cachema	Cynoscion analis	1	52	5	1
Suco	Paralonchurus peruanus		64	7	1
Mojarrilla	Stellifer minor		3	1	1
Bagre con faja	Galeichthys peruvianus		4	2	
Shark and Ray					
Tiburon	Carcharhiniformes (order)	3	32	1	8
Tollo	Mustelus sp.		1		2
Raya	Myliobatis sp		5	2	
Other Bony Fish					
Cojinoba	Seriolella violacea		1	1	2
Merluza	Merluccis gayi peruanus			1	
Lisa	Mugil cephalus		2		
Chita	Anisotremus scapularis			1	
Unknown		2	290	29	9
Total		6	618	124	34
Density		2.6	121.9	22.9	4.1

There are 14 species consumed during Phase 2 occupation (Table 4.12 and 4.13). Among the 10 identified from the 4mm collection, the five major species constitute 87.5% of total elements. The cartilaginous fishes (Tiburon, Tollo, and Raya) are another 11.6%, (Table 4.14). In the 2 mm collection, 60% of identified fish elements are anchovy and sardine; the five major species constitute another 38.4%. Thus the shoal fish are about 1.5 times more abundant than coastal fish in Unit 6 Phase 2.

Table 4.13 The NISP of identified fish from 2 mm collection, Unit 6

Phase	Scientific Names	Phase 1	Phase 2	Phase 3	Phase 4
Volume (liter)		46	120	98	172
Five Major Coastal Bony Fish					
Lorna	Sciaena deliciosa		11	15	16
Cachema	Cynoscion analis		10	7	2
Suco	Paralonchurus peruanus		17	8	3
Mojarrilla	Stellifer minor		6	9	18
Bagre con faja	Galeichthys peruvianus		10	15	16
Oceanic Small Shoal Fish					
Anchoveta	Engraulis ringes	10	47	32	89
Sardina	Sardinops sagax	1	37	25	20
Shark and Ray					
Tollo	Mustelus sp.				1
Other Bony Fish					
Corvina	Cillus gilberti		1		
Merluza	Merluccis gayi peruanus		1	1	4
Lisa	Mugil cephalus				1
Burro	Sciaena fasciata			1	
Mismis	Menticirrhus ophicephalus				1
Unknown		12	182	137	170
Total		23	322	250	341
density		0.5	2.7	2.6	2.0

In Phase 3, 13 species are identified. Based on the 4 mm collection, the importance of the major five species increases a bit and reaches 93.7% of total identified elements (Table 4.14). This tendency also can be seen when incorporating shoal fishes into the calculation: anchovy and sardine constitute 50.4% of total identified species, while the major five dominate half of the population (47.8%) leaving little room for the other two species.

Phase 4 in Unit 6 witnessed a decrease in fishing activities again, as the amount of fish remains in 4 mm collection drops significantly. Only 34 elements are recovered for the entire 8.32 m^3 excavated soil. The limited sample size prevents us from getting a precise proportional distribution between species. In this case, the most common species, Lorna (*Sciaena deliciosa*) is 40% of total identified elements, and the two shark species (*Carcharhiniformes* family) are another

40% (Table 4.14). In contrast to the 4 mm collection, sharks are relatively invisible in the 2mm collection, with only one element collected. In the 2mm context, shoal fishes regain their place and constitute 63.7% of the total collection while the five major species dominate another 32.2%.

Table 4.14 The proportion of identified fish species in Unit 6

Species /Phase	4mm				2mm			
	Phase 1	Phase 2	Phase 3	Phase 4	Phase 1	Phase 2	Phase 3	Phase 4
Five Major Coastal Bony Fish								
Lorna		**50.0%**	**77.9%**	**40.0%**		7.9%	13.3%	9.4%
Cachema	25.0%	15.9%	5.3%	4.0%		7.1%	6.2%	1.2%
Suco		19.5%	7.4%	4.0%		12.1%	7.1%	1.8%
Mojarrilla		0.9%	1.1%	4.0%		4.3%	8.0%	10.5%
Bagre con faja		1.2%	2.1%			7.1%	13.3%	9.4%
Oceanic Small Shoal Fish								
Anchoveta					**90.9%**	**33.6%**	**28.3%**	**52.0%**
Sardina					9.1%	**26.4%**	**22.1%**	11.7%
Shark and Ray								
Tiburon	75.0%	9.8%	1.1%	32.0%				
Tollo		0.3%		8.0%				0.6%
Raya		1.5%	2.1%					
Other Bony Fish								
Cojinoba		0.3%	1.1%	8.0%				
Corvina						0.7%		
Merluza			1.1%			0.7%	0.9%	2.3%
Lisa		0.6%						0.6%
Burro							0.9%	
Chita			1.1%					
Mismis								0.6%

Overall, diachronic change in Unit 6 is similar to what has been observed elsewhere. The density of fish remains in the 4 mm collection abruptly reaches the highest point in Phase 2 (121.9/ m^3) and declines significantly through time, to 22.9/m^3 for Phase 3 and 4.1/m^3 for Phase 4. However, the 2 mm collection illustrates a scenario of less dramatic decline from 2.7 to 2 per liter. The repetitive patterns discerned here and in other units suggest a general decline in the importance of fish resources from the Late Preceramic to Initial Period.

4.2.6 Fish Remains in Unit 7

Unit 7 contains a compact human occupation where the excavation reaches the early part of Phase 2 occupation (4,800 to 4,450 CalBP) at 1.8 to 2 meters below the surface. As the excavation was done following the artificial layers, the distinction between later Phase 2 (4,450 to 4,100 CalBP) and early Phase 3 (4,100 to 3,800 CalBP) is not discernable. To avoid possible error, only materials that come from secure contexts will be incorporated into the analysis.

In Phase 2 occupation, there are 18 fish species identified (Table 4.15 and 4.16). For the 4 mm collection, three of the five major species (Lorna, Cachema, and Suco) constitute 85.2% of total identified elements. The cartilaginous fishes (Shark and Ray) contribute another 10.5%. The same scenario that small shoal fishes dominate the population in the 2 mm collection is present here again. Constituting 82.6% of the total, shoal fishes outnumbered the major species (14.4%) by six times (Table 4.17), which is the most significant difference between the two categories observed in all the excavation units.

Regarding the density of the fish remains in Unit 7, the repetitive pattern again shows that Phase 2 yields a significantly higher amount than other phases: $599/m^3$ for 4 mm collection and 6.3 per liter for the 2 mm one. Only the Phase 2 data in Unit 3 yields a density as high as the one observed here. The intense fish consumption during Phase 2 occupation in Unit 7 is associated with multiple wall structures (see Chapter 3). There are two interpretations for this phenomenon: (1) these were feasts held in public architecture; (2) these structures were domestic in nature, and the consumption is related to household activities. This issue will be addressed later after other lines of evidence are presented.

Table 4.15 The NISP of identified fish from 4 mm collection, Unit 7

Phase	Scientific Names	Phase 2a	Phase 3b	Phase 4
Volume (m^3)		1.92	2.53	5.52
Five Major Coastal Bony Fish				
Lorna	Sciaena deliciosa	201	103	67
Cachema	Cynoscion analis	89	33	12
Suco	Paralonchurus peruanus	89	34	15
Mojarrilla	Stellifer minor	4	8	22
Bagre con faja	Galeichthys peruvianus	3	3	4
Shark and Ray				
Tiburon	Carcharhiniformes (order)	17	12	10
Raya	Myliobatis sp	30	2	
Other Bony Fish				
Cojinoba	Seriolella violacea	8	3	2
Merluza	Merluccis gayi peruanus	2		
Robalo	Sciaena wieneri		1	3
Lisa	Mugil cephalus		1	
Perico	Coryphaena hippurus	2		
Unknown		705	86	89
Total		1150	286	224
Density		599.0	113.0	40.6

There are also 18 species identified from the context of Phase 3 occupation. In the 4 mm collection, 90.5% of identified elements are from the five major species, while shark and ray constitute another 7%, slightly declining from the previous period. Comparing with Phase 2, the proportion of shoal fishes drops to 67.4%, similar to the proportions being revealed in Unit 1 and 3. As Bagre con faja is absent in this context, the other four major species constitute 20.2% of the identified fish elements, which is the lowest proportion of all the Phase 2 to 4 contexts that have been examined. The density of fish remains in both 4 mm (113/m^3), and 2 mm (3.3 per liter) collections also fall in between Phase 2 and Phase 4.

Table 4.16 The NISP of identified fish from 2 mm collection, Unit 7

Phase	Scientific Names	Phase 2	Phase 3	Phase 4
Volume (liter)		52	60	84
Five Major Coastal Bony Fish				
Lorna	Sciaena deliciosa	6	8	8
Cachema	Cynoscion analis	11	5	9
Suco	Paralonchurus peruanus	5	8	2
Mojarrilla	Stellifer minor	2	5	6
Oceanic Small Shoal Fish				
Anchoveta	Engraulis ringes	54	43	25
Sardina	Sardinops sagax	79	41	13
Machete	Ethmidium maculatum	1	2	5
Pejerrey	Odontesthes regia	4	1	1
Shark and Ray				
Tollo	Mustelus sp.			1
Other Bony Fish				
Cojinoba	Seriolella violacea		3	
Corvina	Cillus gilberti	2	6	2
Lisa	Mugil cephalus	1	1	
Burro	Sciaena fasciata	1	2	
Cabinza	Isacia conceptionis		2	
Jurel	Trachurus picturatus		1	
Caballa	Scomber japonicus	1	1	
Mismis	Menticirrhus ophicephalus			1
Unknown		163	70	44
Total		330	199	117
density		6.3	3.3	1.4

In the Phase 4 occupation, 15 fish species are identified in Unit 7. For the 4mm context, 88.9% of elements belong to the five major species, and shark is another 7.4%. It seems the frequency of cartilaginous fish consumption increases at this corner throughout the entire occupation history. The ratio of shoal fish and five major species is 60.3: 34.2, a ratio similar to other 2mm collections. Not surprisingly, the Phase 4 occupation contains the lowest density of fish elements, which reinforces the pattern observed before.

Table 4.17 The proportion of identified fish species in Unit 7

Species /Phase	4mm			2mm		
	Phase 2	Phase 3	Phase 4	Phase 2	Phase 3	Phase 4
Five Major Coastal Bony Fish						
Lorna	**45.2%**	**51.5%**	**49.6%**	3.6%	6.2%	11.0%
Cachema	20.0%	16.5%	8.9%	6.6%	3.9%	12.3%
Suco	20.0%	17.0%	11.1%	3.0%	6.2%	2.7%
Mojarrilla	0.9%	4.0%	16.3%	1.2%	3.9%	8.2%
Bagre con faja	0.7%	1.5%	3.0%			
Oceanic Small Shoal Fish						
Anchoveta				**32.3%**	**33.3%**	**34.2%**
Sardina				**47.3%**	**31.8%**	**17.8%**
Machete				0.6%	1.6%	6.8%
Pejerrey				2.4%	0.8%	1.4%
Shark and Ray						
Tiburon	3.8%	6.0%	7.4%			
Tollo						1.4%
Raya	6.7%	1.0%				
Other Bony Fish						
Cojinoba	1.8%	1.5%	1.5%		2.3%	
Corvina				1.2%	4.7%	2.7%
merluza	0.4%					
Robalo		0.5%	2.2%			
Lisa		0.5%		0.6%	0.8%	
Burro				0.6%	1.6%	
cabinza					1.6%	
Jurel					0.8%	
Caballa				0.6%	0.8%	
Perico	0.4%					
Mismis						1.4%

4.2.7 The Inter-phase Comparison of Fish Remains

The repetitive changing pattern of fish exploitation has been observed and described by units. To better illustrate the overall diachronic change, it is necessary to combine the samples from all the units for the purpose of inter-phase comparison, presented in the following sections.

4.2.7.1 Overview of Fish Remains by Phase

It is clear that the retrieval rate using the 2 mm screen is much higher than the 4 mm one. While the retrieval rate between the two screens is dramatically different, and the density calculation can be affected by the amount of anchovy or sardine retrieved from the 2mm screen, the overall changing pattern of frequency between phases is actually similar between the two sets of samples. Figure 4.1 is the diachronic change in the density of fish remains, with data is taken from the 4 mm collection (yield per cubic meter). For the purpose of comparison, the density for the 2 mm collection (yield per liter) is multiplied by 50 (yield per 50-liter) to reach a similar count for visualizing diachronic change. It can be observed that both samples tell a similar story. The exploitation of fish resources is very limited in Phase 1, peaks abruptly in Phase 2, soon starts to decline in Phase 3, and diminishes further in Phase 4 before the abandonment of the site.

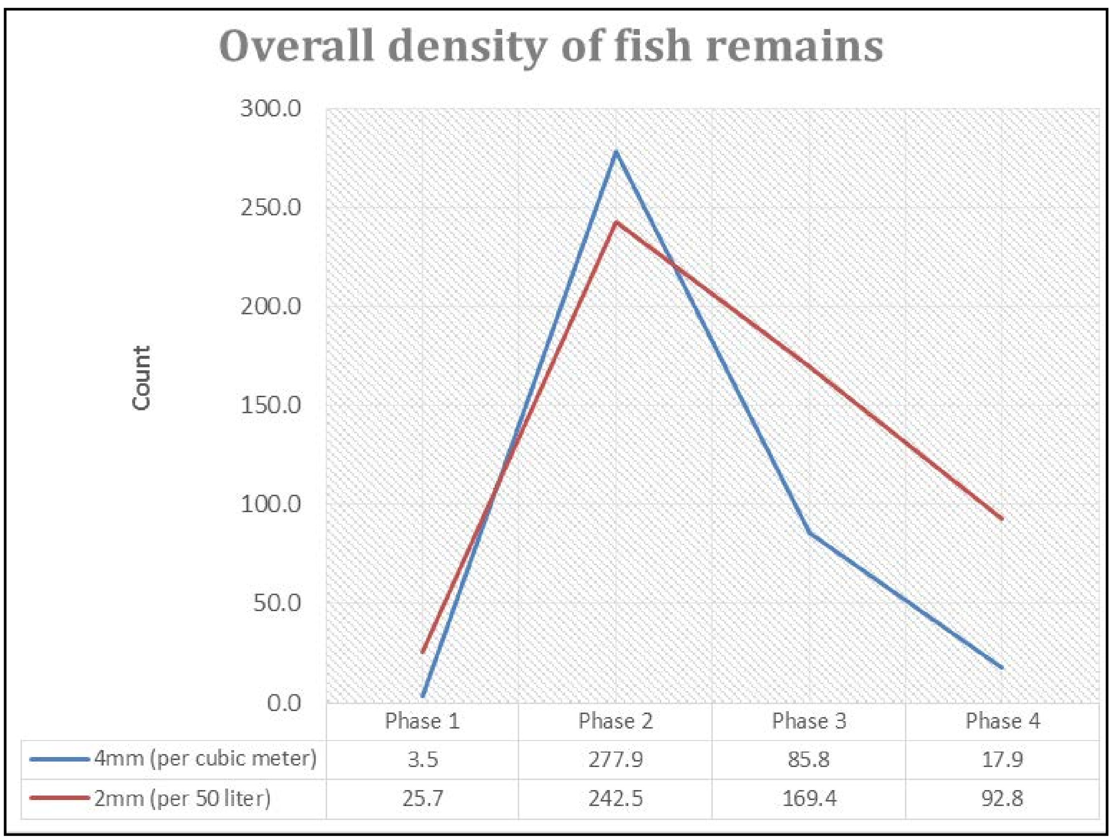

Figure 4.1 Diachronic change of fish density

As can be seen, the decline in density from the 2mm samples is not as steep as the 4mm ones during the change from Phase 2 to 4. The main difference between the two collections is the fact that the massive quantity of small shoal fish makes the decline gradual rather than abrupt.

Table 4.18 The NISP of identified fish in each phase and proportion by category

Common Name	**Environment**	**4mm (cubic meter)**				**2mm (liter)**			
		Phase 1	Phase 2	Phase 3	Phase 4	Phase 1	Phase 2	Phase 3	Phase 4
Five major		44.4%	89.4%	91.1%	89.9%	10%	24.6%	32.9%	39.6%
Lorna	Littoral-Neritic (benthic)		684	726	166	2	36	59	59
Cachema	Littoral-Neritic (benthic)	3	333	380	18		40	46	19
Suco	Littoral-Neritic (benthic)	1	294	294	50		35	43	14
Mojarrilla	Littoral-Neritic (benthic)		51	88	56		21	46	48
Bagre con faja	Littoral-Neritic (benthic)		36	41	12		24	94	24
Shoal fish						75%	71.1%	62.4%	53.4%
Anchoveta	Neritic-Oceanic (pelagic)	.	.	.	.	10	217	306	138
Sardina	Neritic-Oceanic (pelagic)	.	.	.	.	5	200	220	68
Machete	Neritic-Oceanic (pelagic)	.	.	.	.		17	17	14
Pejerrey	Neritic-Oceanic (pelagic)	.	.	.	.		16	4	1
Shark and Ray		55.6%	8.8%	5.2%	7.1%	5%		0.2%	0.7%
Tiburon	Littoral-Neritic-Oceanic	3	80	47	19			1	1
Tollo	Littoral-Neritic (benthic)	1	8	17	4	1			2
Raya	Littoral-Neritic (benthic)	1	49	23	1			1	
Other Bony Fish		0%	1.8%	3.7%	3%	10%	4.3%	4.5%	6.3%
Corvina	Littoral-Neritic (benthic)					1	11	13	12
Robalo	Littoral-Neritic (benthic)			1	5		1	1	
Lisa	Littoral-Neritic (benthic)		3	4			1	2	1
Burro	Littoral-Neritic (benthic)						3	6	2
Cabinza	Littoral-Neritic (benthic)						3	4	
Chita	Littoral-Neritic (benthic)			2	1				
Mismis	Littoral-Neritic (benthic)								2
Polla	Littoral-Neritic (benthic)						1		1
Tramboyo	Littoral-Neritic (benthic)						1		
Perico	Littoral-Neritic		4	1					
Merluza	Neritic-Oceanic (pelagic)		3	3			2	1	4
Caballa	Neritic-Oceanic (pelagic)					1	1	2	
Jurel	Oceanic (pelagic)			1			1	4	1
Cajinoba	Littoral-Neritic-Oceanic (pelagic)		18	50	4		2	6	3
Total		9	1563	1678	336	20	633	876	414

While both 2 mm and 4 mm collections reveal a similar tendency, showing that the exploitation of fishery resources is the most intense in Phase 2 and then declines over time, it is also clear that the 2 mm and 4 mm collections differ from each other in many ways and that the two cannot easily be merged by mathematical means. They provide insight into somewhat different kinds of habitat exploitation and technology.The five major species, the majority of 4 mm collection, are the species that are available in the coastal area and represent nearshore fishing activities. Another category in the 4mm collection is shark/ ray, larger species that could be caught individually in a pelagic environment, further away from the shoreline. The neritic-oceanic species that are mainly present in the open sea are rare in the 4mm collection, only a limited amount of Jurel (Inca scad, NISP=1) and merluza (Peruvian hake, NISP=6) were identified. The other two species, the cajinoba (palm ruff) and shark in general terms that might also be found in the further open sea are present in a larger quantity, but their expanded distribution area limited the possibility for further interpretation (Table 4.18).

In contrast to the 4 mm collection, the 2 mm collection mainly reflects the exploitation of small, mass captured shoal fish (anchovy and sardine), and the shark/ ray category might be underrepresented as mentioned at the beginning of the discussion. The 2 mm collection is also a lens to estimate the relative frequency between “sea-going, massive quantity of shoal fish” and “near-shore larger fish” as the five major species are also consistently present in the 2mm collection. In the following section of comparison, 2 mm and 4 mm collections will be analyzed separately as various information can be retrieved and compared within each collection.

4.2.7.2 Targeted Species and Degree of Diversity within the Collections

In this section, selected species or categories are examined to see whether there is a change related to target species. In addition, the degree of diversity of both 2 mm and 4 mm collections will be analyzed by using Species Diversity and Richness IV.

For the 4 mm collection that contains mainly near-shore fish resources, lorna is the most abundant species from Phase 2 to Phase 4 thus is chosen for illustrating its proportion and error range in bullet graph (Figure 4.2). As can be seen from the bullet graph, the proportion of exploited lorna drum remains similar during Phase 2 and 3, slightly increases from 43.3% to 49.4%. Although it can be claimed that there is a difference between Phase 4 and previous phases with a 95% confidence level, the change is not dramatic. The general pattern remains similar throughout the occupational history of Huaca Negra that lorna is well exploited, while also associated with other species encountered in the similar habitat.

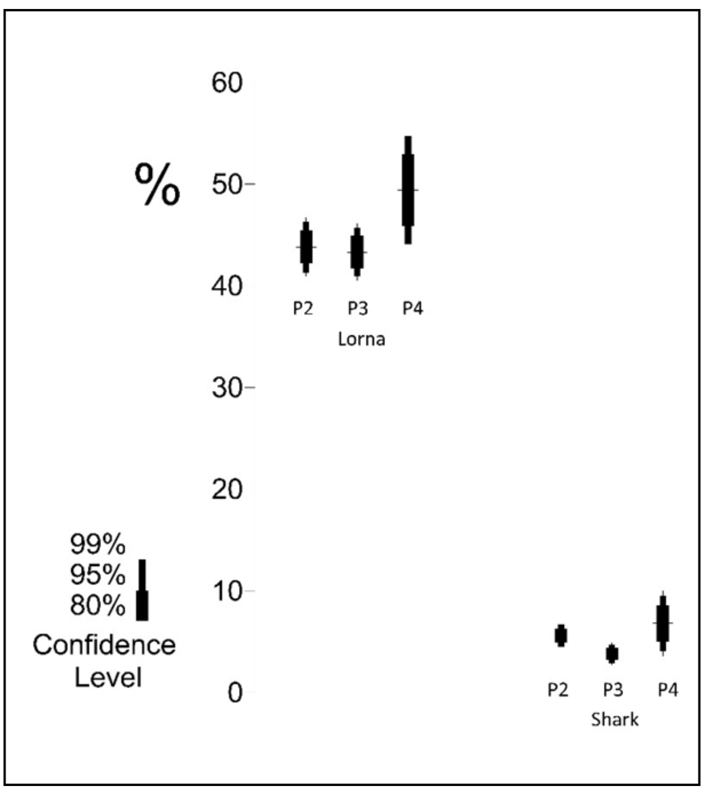

Figure 4.2 The proportion of exploited lorna drum and shark in the 4mm collection

In addition to lorna drum, the proportion of shark is also examined in order to compare with the two contemporaneous sites of Gramalote and Los Morteros. In the Moche Valley, the Initial Period occupation in Gramalote contains such a huge quantity of shark remains (*Carcharhiniformes* order) that the researcher assigns special social meaning to sharks (Prieto 2015). On the other hand, the Preceramic occupation in Chao Valley yields limited shark (Mauricio 2015). The long-term occupation in Huaca Negra thus provides the chance to discern whether the role of shark changed through time generally on the north coast.

The proportion of total shark NISP and its error range are illustrated on the right of Figure 4.2. As can be seen, the proportion of shark remains is steadily below 10%, with the lowest exploitation in Phase 3 (3.8%), slightly higher in Phase 2 (5.6%). Shark might play a more important role in Phase 4 as the proportion of NISP raised to 6.8%. The difference between phases, however, is not strong enough to demonstrate a diachronic change especially as the difference between Phase 2 and Phase 4 falls within the 95% error range. Thus, one cannot confidently claim the proportion of utilized shark is higher in Phase 4 than Phase 2.

It is also noteworthy that, while the proportion of shark is relatively higher in Phase 4, the overall abundance of fish remains was extremely limited in the 4mm collection. Taking all the facts into consideration, the pattern here should not be interpreted as a heavier exploitation of shark, but a result of the sharp decline of the main five species. In fact, the inter-phase comparison of both compared species, lorna drums and sharks, suggests a stable approach and a preference for coastal fish resources throughout the occupation. It is also clear that, unlike in Gramalote, shark was not preferred in the Initial Period occupation (Phase 4).

As the selected species, lorna drum and shark, reveal a consistent exploitation pattern throughout the occupation, examining the diversity of species by applying Simpson’s Index helps to examine the composition of consumed fish. Since there are not many oceanic species retrieved and identified from the 4mm collection, the degree of diversity of the 4 mm collection mainly reflects the fishing strategy for the coastal (littoral-neritic) environment. The 2mm collection, on the other hand, incorporates more neritic-oceanic species and indicates an overall image of the utilized fish resources. It is expected that the 2mm collection will reflect a higher degree of diversity, and the point of this inter-phase comparison within each collection is to see if there is any change related to behavior patterns. Table 4.19 is the result of diversity analysis with 95% and 99% confidence level, and Figure 4.3 is the bullet graph of the data of Table 4.19.

Table 4.19 The Diversity of fish remains and its error range in 2mm and 4mm collections

Collection	Phase	Simpson's Index of Diversity (1-D)	Lower 95%	Upper 95%	Lower 99%	Upper 99%
4mm	Phase 1	0.833	0.556	0.861	0.389	0.889
	Phase 2	0.723	0.707	0.737	0.701	0.740
	Phase 3	0.726	0.711	0.741	0.702	0.745
	Phase 4	0.700	0.656	0.735	0.639	0.754
2mm	Phase 1	0.705	0.484	0.803	0.421	0.824
	Phase 2	0.769	0.748	0.790	0.736	0.795
	Phase 3	0.791	0.771	0.807	0.766	0.811
	Phase 4	0.821	0.796	0.840	0.790	0.847

Due to the limited sample size, the Phase 1 occupation contains a huge error range, therefore, it is less meaningful for further discussion. In the 4 mm collection, there is no significant difference between Phase 2 and Phase 3 in the Simpson’s index (0.723 vs. 0.726) and confidence level (less than 95% confidence to claim difference existed between the two phases). The degree of diversity is slightly lower in Phase 4, but only slightly, impeding any interpretation of change in fishing strategy or targeted species.

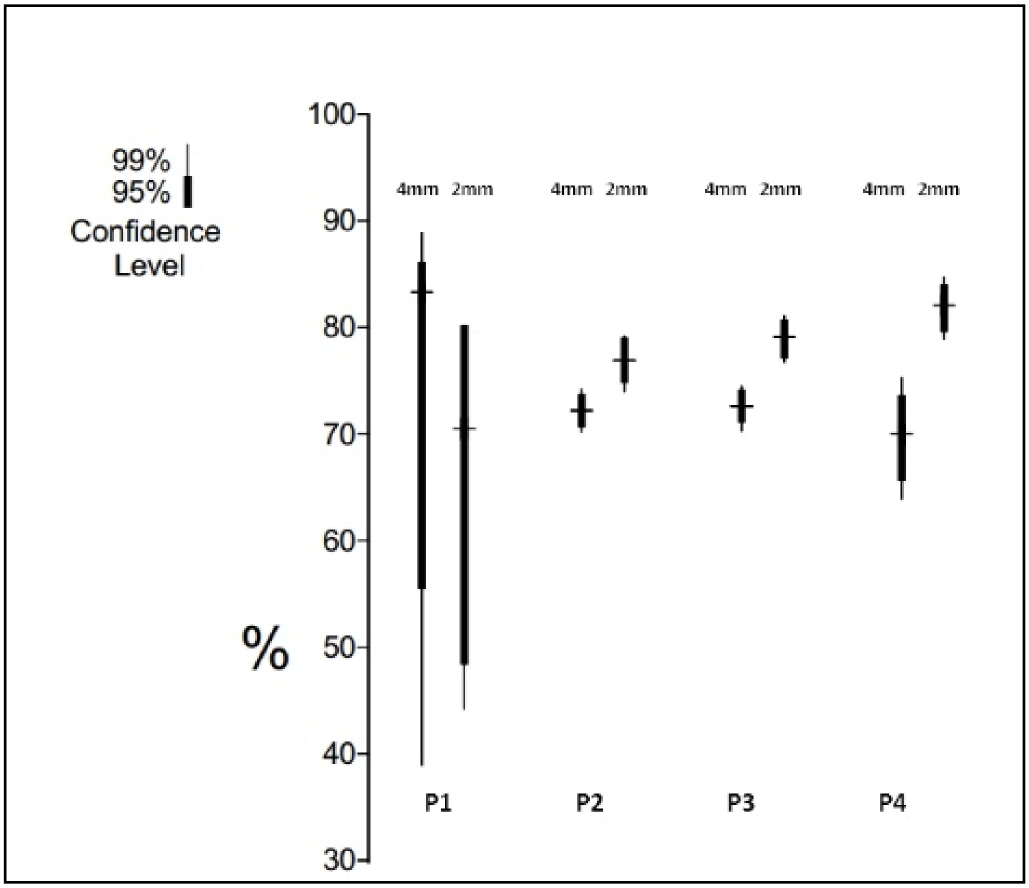

Figure 4.3 The bullet graph of Simpson's Index of Diversity

While a reverse tendency in the 2mm collection suggests that the degree of diversity increased over time, a similar inter-phase pattern can be observed. The Simpson's Index for Phase 2 and 3 are similar to each other (fall into the 99% error range), and Phase 4 tends to differ from preceding phases with higher confidence level but in a fairly minor way. These gradual changes might have nothing to do with changes of intentional fishing strategy, but instead be a consequence of the fact that fishing activity as a whole diminishes dramatically in the later occupation.

4.2.7.3 Coastal and Oceanic Fish as an Index of Sea Going Activities

While the sample size is relatively small in terms of soil volume, the 2mm collection provides a chance to examine seagoing activities in Huaca Negra as it well represents the two major categories of fish resources: the littoral-neritic species stand for near-shore, coastal fishing activities, and the neritic-oceanic species stand for more use of sea-going boats and the application of fine-net fishing. The two categories constitute more than 95% of identified fish remains in Huaca Negra in the 2mm collection, and the comparison can be made between the two catchment zones regardless of the diversity of species within each category. Table 4.20 is the proportion of two catchment zones and also the omnipresent species, cajinoba fish and general shark, from Table 4.18. Figure 4.4 is the bullet graph that presents the two categories after removing the omnipresent species; the error range in different confidence levels is also incorporated.

Table 4.20 The NISP and proportion of fish from two catchment zones (2 mm collection)

Catchment/ Phase	Phase 2		Phase 3		Phase 4	
Littoral-Neritic species	177	27.96%	314	36.18%	182	44.44%
Neritic-Oceanic species	454	71.72%	554	63.46%	226	54.59%
Omnipresent species	2	0.32%	8	0.92%	6	1.45
(NISP) Total	633		876		414	

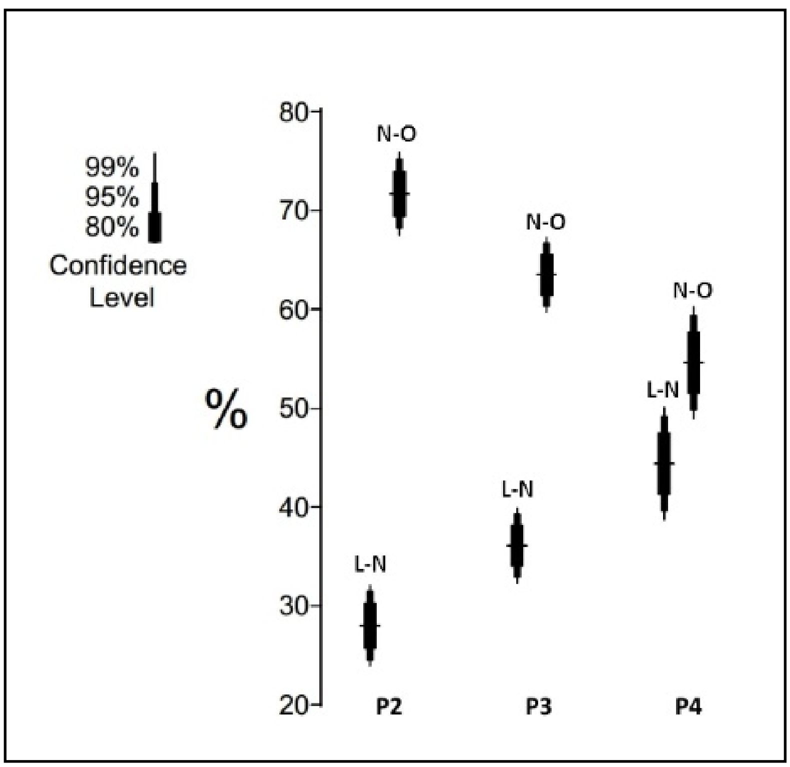

Figure 4.4 Bullet graph of the proportion of two catchment zones in three discussed phases

A compelling shift of focus on catchment zones can be discerned from Figure 4.4. As can be seen, the diachronic change is significant and can be claimed with more than 99% confidence. The neritic-oceanic fish dominate the Phase 2 fish remains by more than 70%, 2.6 times more than the littoral-neritic species. As Phase 2 also signifies the time when fish resources are most heavily exploited regarding overall density, the high proportion of resources retrieved from the open sea suggests that people not only utilized more fish resources at this time but also invested more in the associated technology to make sea-going trips and massive catch possible.

After Phase 2, the gap between the two categories gradually diminishes. While they always outnumbered the coastal species, the proportion of open sea fish declines over time from 63.46% in Phase 3 (1.8 times more than coastal fish) to 54.59% in Phase 4 (1.2 times more than coastal fish). It is also noteworthy that, as the neritic-oceanic species are mainly small shoal fish, the total amount of meat would be relatively less than the coastal species. Therefore, the actual importance of the shoal fish in terms of meat dropped more precipitously than what is observed here in terms of NISP.

4.2.8 Summary

The analysis takes density as an indicator of the intensity of fishing activity, and the proportion of different kinds of fish as an indicator for targeted fishing grounds (habitat). In examining the fish remains in Huaca Negra, important patterns emerge. One of the most important patterns is that the frequency of fish utilization continuously waned throughout the sedentary occupation from Phase 2 to Phase 4. Both 2 mm and 4 mm collections reveal the same tendency that the importance of fish resource declines over time. This pattern is presented in Figure 4.1 with the density of each phase attached.

Along with diminishing focus on fishery resources, there is a change in fishing behavior, reflecting the selection of fish habitats. As catching small shoal fish in the open sea requires skillful labor for sailing and the preparation of fine nets, people might be more willing to invest time and energy in this if the targeted resource played an important role, either in the subsistence system or terms of other social meaning. This pattern is evident as the density of fish remains, and the proportion of neritic-oceanic species, both reach an apogee in Phase 2 (Table 4.20). By contrast, while the massive capture of shoal fish could be an efficient way to retrieve food resources, people might be more reluctant to invest in such sea-going activities if the overall importance of fish is not as significant. This tendency appears in Phase 3 and is most evident in the Phase 4 occupation: the proportion of shoal fish declines over time.

While Phase 4 represents post-mound occupation, the subsistence activity does not revert to the pre-mound pattern. Instead, there is a continuous trajectory towards less emphasis on fishery resources. Overall, Figure 4.1 and the Neritic-Oceanic species in Figure 4.4 show a positive correlation, suggesting that the fish resources in general, and specifically, labor investment in seagoing fishing both diminish in the later part of human occupation at Huaca Negra. The social implications of this tendency and the replacement of subsistence resources are crucial to discuss, and will be addressed later in this dissertation.

Finally, it is interesting that the dominant species remain the same throughout the 1,800-year-long occupation. For the oceanic species retrieved from the 2 mm collection, anchovy always outnumbers any other species, while the importance of the second most common species, the sardines, seems to decline through time. For the littoral-neritic zone, lorna drum constantly outnumbers other species in the 4 mm collection. Suco (croaker) and cachema (weakfish) were also well exploited in Phase 2 and 3 while the latter yielded its place to another drum fish, the mojarrilla (drum) in Phase 4. In contrast, the less significant species, the sharks, remain a minor but stable component of the fish collection in the 4 mm collection. In terms of proportion, the role of shark didn't diminish, nor did its importance develop over time, which also advocates for a stable fishing strategy. The examination of target species and the diversity in each phase suggests continuity in fishing behavior and preferences about fish resources. The waning importance of fish and the waning investment in sea-going fishing don't affect the overall behavior pattern, except for less investment in fishing activity.

4.3 THE INVERTEBRATE REMAINS AND THE IMPORTANCE OF SHELLFISH GATHERING

This section discusses the invertebrate remains, mainly marine shellfish and snails, unearthed from the 2015 Huaca Negra excavation and the results of the analysis. This category is one of the most abundant material remains that are retrieved from the excavation, and constitutes the major component of the final comparison.

4.3.1 Summary of Identified Invertebrates in Huaca Negra

The invertebrate remains from Huaca Negra were identified by Roy Osmar Lezama García, a licensed Peruvian archaeologist from Trujillo. This is the most abundant category related to the subsistence system in terms of quantity and diversity. Tables 4.21-23 list the identified species, including bivalves, gastropods and other invertebrate species such as crab, chiton and sea urchin. The information of Spanish/ English name and the habitats/ distribution of each species are based on *Lista Sistematica de Maluscos Marinos del Peru* (Alamo and Valdivieso 1997), while the description in other recent work (e.g., Dillehay 2017, Mauricio 2015 and Prieto 2015) are also essential references. In total, there are sixteen bivalve species identified, five of whom are mussels associated with rocky habitats, and the other eleven are clams that live in the sandy or other soft substrates such as muddy environments (Table 4.21).

As for gastropods, there are thirteen[2] limpet species and twenty different kinds of snails (Table 4.22). The snails can be further classified into rocky-based, sandy-based, omnipresent, and land snails, and all the limpet species are related to the rocky environment.

Table 4.23 lists a few more species beyond the categories of bivalves and gastropods that were exploited by people in Huaca Negra, including two different crabs, chitons, sea urchin and sea cucumber. The diversity and amount of these species are relatively limited in comparison to bivalves and gastropods.

In total, 56 invertebrate species are identified, with a total population of 39,631[3] specimens incorporated into the following analysis. The shells from 2 mm and 4 mm collections are combined as all the species found on 2mm screen would also be caught by the 4 mm one. Table 4.24 categorized the 55 species into 12 groups based on a more general taxon classification (which might also better fit the classification that people had in mind in Huaca Negra) and the associated habitat. This classification also echoes the research question that aims to discern people's strategies retrieving resources from different habitats. As can be seen from Table 4.24, bivalves dominate

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[2] The number excludes the identification down to genera, but there are species identified under this genus. For example, Fisshrella sp. is not counted as one of the thirteen as there are another seven species identified. On the other hand, Crucibulum sp. is one of the thirteen because no other species under this genus was identified. The same principle was applied to the entire discussion of invertebrate.

[3] To make the comparison consistent, NISP is applied for the following discussion. While applying NISP rather than MNI might lead the skew when comparing bivalves and gastropods, it should not prevent us from getting the overall picture of invertebrate consumption.

the entire invertebrate population as ¾ identified specimens fall into this category. While less important, gastropods were also gathered and consumed, and constituted 1/5 of the total population. The exploitation of other species is limited and mainly focuses on sand crabs.

Table 4.21 Identified Bivalves in Huaca Negra

Taxon	Spanish Name	English Name	Environment	Depth
Bivalves				
			Rocky	
Aulacomya ater	Cholga	Cholga mussel	Rocky substrate	Medio-Infralittoral
Choromytilus chorus	Choro zapato	Giant mussel	Rocky substrate	Medio-Infralittoral
Lithophaga peruviana	Dátil de mar	Mussel	Rocky substrate	Infralittoral
Perumytilus purpuratus	Chorito negro	Purple mussel	Rocky substrate	Medio-Infralittoral
Semimytilus algosus	Chorito lustroso	Mussel	Rocky substrate	Mediolitoral
			Sandy (muddy, or mangrove)	
Argopecten purpuratus	Concha de abanico	Scallop	Sandy substrate	Infralittoral
Donax obesulus	Palabritas	Donax	Sandy/ mangrove	Medio-Infralittoral
Euromalea rufa	Almeja	Clam	Sandy substrate	Infralittoral
Mediodesma donacium	Almeja	Wedge clam	Sandy substrate	Medio-Infralittoral
Pholas chiloensis	Alas de ángel	Piddocks	Perforating wood	Medio-Infralittoral
Protothaca thaca	Almeja	Neck clam	Sandy/ muddy substrate	Medio-Infralittoral
Semele corrugata	Almeja	Clam	Sandy substrate	Medio-Infralittoral
Spisula adamsi	Almejita	Trough shell	Sandy substrate	Infralittoral
Tagelus dombeii	Pico de pato	Razor clam	Sandy substrate/ mangrove	Medio-Infralittoral
Tellina sp.	Telina	Tellin	Mangrove	Infralittoral
Trachycardium procerum	Piconudo	Cockles	Sandy/ muddy substrate	Medio-Infralittoral

Table 4.22 Identified Gastropods in Huaca Negra

Taxon	Spanish Name	English Name	Environment	Depth
Gastropod				
Limpets			**Rocky**	
Calyptraea sp.	Pique, Señorita	Slipper limpet	Rocky substrate	.
Calyptraea trochiformis	Picacho	Slipper limpet	Rocky substrate	Infralitrol
Collisella sp.	Patela	Limpet	Rocky substrate	Mediolittrol
collisella ceciliana				
Collisella orbignyi				
Crepipatella dilatata	Pique, Señorita	Slipper limpet	Rocky substrate	Medio-Infralittoral
Crucibulum sp.	Pique, Señorita	Slipper limpet	.	.
Fissurella sp.	Lapa	Keyhole limpet	Rocky substrate	Mediolittrol
Fissurella crasa				
Fissurella latimarginata				
Fissurella limbata				
Fissurella maxima				
Fissurella peruviana				
Fissurella picta				
Fissurella pulchra				
Scurria viridula	señorita	Limpet	Rocky substrate	Mediolittrol
Snails			**Rocky**	
Concholepas concholepas	Chanque	Barnacle rock snail	Rocky substrate	Medio-Infralittoral
Prisogaster niger	Caracolito negro	Turban snail	Rocky substrate	Medio-Infralittoral
Stramonita haemastoma	Caracol	Dye shell	Rocky substrate	Infralittoral
Tegula atra	caracol turbante	pearly top shell	Rocky substrate	Medio-Infralittoral
Tegula picta	caracol negro	pearly top shell	Rocky substrate	Mediolitoral
Xanthochorus buxea	Caracol	Dye shell	Rocky substrate	Medio-Infralittoral
Xanthochorus cassidiformis	Caracol	Dye shell	Rocky substrate	Medio-Infralittoral
			Sandy (or muddy)	
Bursa ventricosa	Caracol rosado	Frog shell	Sandy/ muddy substrate	Medio-Infralittoral
Cancellaria urceolata	.	Cross-barred shell	Sandy/ muddy substrate	Infralittoral
Crassilabrum crassilabrum	Caracol	Dye shell	Sandy substrate	Mediolitoral
Mitra sp.	.	Miter shell	Sandy substrate	Medio-Infralittoral
Mitra orientalis	.	Miter shell	Sandy/ muddy substrate	Medio-Infralittoral
Oliva sp.	Oliva	Olive shell	Sandy substrate	.
Oliva peruviana	Oliva	Olive shell	Sandy substrate	Medio-Infralittoral
Olivella columellaris	Olivita	Olive shell	Sandy/ mangrove	Mediolitoral
Polinices sp.	Caracol blanco	Moon snail	Sandy substrate	.
Polinices uber	Caracol blanco	Moon snail	Sandy	Medio-Infralittoral
Prunum curtum	Porcelanita	Rice shell	sandy/ muddy	Mediolitoral
			Omnipresent	
Bittium sp.	Caracol	High spired snail	Sandy/rocky substrate	
Bursa sp.	Caracol	Frog shell	Sandy/rocky substrate	
Nassarius dentifer	Caracolito	Dog Whelk	Sandy/rocky substrate	Medio-Infralittoral
Sinum cymba	Abalon	Moon snail	Sandy/rocky substrate	Infralittoral
Stramonita chocolata	Caracol común	Dye shell	Sandy/rocky substrate	Medio-Infralittoral
			Land	
Scutalus proteus		Land snail		-

Table 4.23 Other identified invertebrate species in Huaca Negra

Taxon	Spanish Name	English Name	Environment	Depth
Crab				
Cancer sp.	Cangrejo Jaiva	Cancer crab	Sandy/ Rocky substrate	.
Platyxanthus orbignyi	Cangrejo violaceo	Crab	Sandy substrate	.
Chiton				
Chiton sp.	Barquillo, Chitón	Chiton	Rocky substrate	.
Chiton cumingsii				.
Enoplochiton niger				.
Other				
Clase Echinoidea	Erizo de mar	Seaurchin	Sandy/ Rocky substrate	.
Clase Ascidiacea		Sea cucumber	Rocky/ algae substrate	.

In general, a sandy substrate is the preferred habitat from which people gathered the majority (at least 57.33%) of their invertebrate resources. This is not surprising, as the sandy beach today is only 1.2 km away from the site, and could have been less distant 4000 years ago. Thus, the sandy beach is more accessible than the nearest rocky habitat around 4 km away (Figure 4.5).

It is worth noting that the majority of gastropod species unearthed from Huaca Negra are the omnipresent species (*Nassarius dentifer*), which does not provide evidence about targeted habitats. A clearer tendency to focus on the sandy environment can be seen in bivalves and crabs. It is also worth exploring the collecting strategy within different environmental contexts; this issue will be addressed in the section of inter-phase comparison.

Table 4.24 The overall NISP and proportion of identified invertebrate

Type of resources	Habitat			% by Category
	Rocky	Sandy	Omni	
Bivalves	9,526	20,041	.	75.34%
Gastropod	2,928	1,565	3,904	21.40%
Crab	.	894	42	2.38%
Others	344	.	2	0.88%
% by habitats	32.61%	57.33%	10.06%	100%

Figure 4.5 Google image shows a clear distribution of sandy and rocky habitats nearby Huaca Negra

In Huaca Negra, different features were registered during the excavation. Some of the features are clearly concentrations of shell/snail remains. This is a behavior pattern that is not present in fish nor other faunal remains. As these features might be closely related to the nature of shellfish/snail consumption, representing a single event and quick deposit that will affect the calculation of density, the invertebrate remains found from these features will be separated from general contexts to facilitate further discussion.

4.3.2 Invertebrates in Unit 1

In total, 3,543 invertebrate remains are identified in Unit 1, and Tables 4.25-27 illustrate the distribution of these exploited species. As can be seen, the usage of invertebrate resources was limited in Phase 1 and 2. Only one *Nassarius dentifer* is retrieved from the entire Phase 1 deposit. Three bivalves and one limpet are identified in Phase 2. 75% of the samples come from rocky habitat, but the sample size is too small to make any further interpretation (Table 4.28). No feature was associated with shellfish/ snail consumption in Phase 1 and Phase 2.

The scenario changed significantly in Phase 3, when nine different bivalves and twenty-two gastropods (including land snails) are identified. Four other invertebrates were also incorporated into the repertoire. Six small-scale shellfish/ snail concentration areas were identified as features, and the total amount of each species from the features is summed up so that the overall density can be compared with the general context. Proportionally speaking, bivalves dominate the entire invertebrate collection in both general contexts (78.0%) and features (83.9%) (Table 4.28).

Table 4.25 NISP and density of Bivalves in Unit 1

Taxon	General Context			Feature
	Phase 1	Phase 2	Phase 3	Phase 3
Volume (m^3)	0.17	0.71	11.6	0.86
Rocky Bivalves				
Aulacomya ater		2	104	76
Choromytilus chorus			293	50
Perumytilus purpuratus			32	15
Semimytilus algosus			29	16
Sandy Bivalves				
Donax obesulus		1	366	146
Mediodesma donacium			1	
Protothaca thaca			6	3
Semele corrugata			1,256	406
Tellina sp.			8	
Total Bivalves	0	3	2,095	712
Density	0	4.2	180.6	827.9

Table 4.26 NISP and density of Gastropod in Unit 1

Taxon	General Context			Feature
	Phase 1	Phase 2	Phase 3	Phase 3
Volume (m³)	0.17	0.71	11.6	0.86
Rocky Limpets				
Collisella ceciliana			2	
Collisella orbignyi			2	
Crepipatella dilatata		1	39	1
Crucibulum sp.			3	1
Fissurella crasa			1	
Fissurella latimarginata			2	
Fissurella limbata			1	
Fissurella peruviana			1	
Fissurella picta			1	
Fissurella pulchra			1	
Rocky Snails				
Concholepas concholepas			1	
Prisogaster niger			82	26
Stramonita haemastoma			28	6
Tegula atra			15	4
Xanthochorus buxea			51	4
Xanthochorus cassidiformis			20	5
Sandy Snail				
Mitra sp.				6
Mitra orientalis			4	
Polinices uber			78	13
Omnipresent Snail				
Nassarius dentifer	1		191	60
Sinum cymba			6	
Stramonita chocolata			20	1
Land Snail				
Scutalus proteus			2	
Total Gastropod	1	1	551	127
Density	5.9	1.4	47.5	147.7

Table 4.27 NISP of other invertebrates in Unit 1

Taxon	General Context			Feature
	Phase 1	Phase 2	Phase 3	Phase 3
Crab				
Cancer sp.				1
Platyxanthus orbignyi			36	9
Chiton				
Chiton sp.			3	
Chiton cumingsii			2	
Other				
Clase Ascidiacea			2	
Total			43	10

Table 4.28 Proportional distribution of invertebrates in Unit 1

Taxon/ Context	General context			Feature
	Phase 1	Phase 2	Phase 3	Phase 3
Rocky Bivalves		50.0%	17.1%	18.5%
Sandy Bivalves		25.0%	60.9%	65.4%
Rocky Gastropod		25.0%	9.3%	5.6%
Sandy Gastrpopd			3.1%	2.2%
Omni Gastropod	100.0%		8.0%	7.2%
Crab			1.3%	1.2%
Other Invertebrate			0.3%	

A further comparison can be made between general and feature contexts in Phase 3. It can be seen from Table 4.25 that, in the general context, *Choromytilus chorus* dominates the rock mussel, and *Aulacomya ater* also plays an important role in this collection. The tendency slightly reverses in the features as the *Aulacomya ater* outnumbered *Choromytilus chorus*. *Semele corrugata* and *Donax obesulus* are the two most important species of sand clam in both general and feature contexts. Regarding density, bivalves from feature contexts are 4.6 times denser than the general contexts (827.9/m^3 versus 180.6/m^3). As for targeted habitats, the ratio of sandy to rocky bivalves in general contexts (1,637:458) and in features (555:157) is very close (3.57 for general contexts and 3.53 for the features). The patterns revealed above suggest that the nature of shellfish consumption events, while they can be distinguished from the general context, are similar to the food remains found in the general context.

The gastropods in Phase 3 are more complicated than the bivalves, as the diversity is higher and the most abundant species is the omnipresent *Nassarius dentifer*. In general, gastropods are 20.4% of total NISP in general contexts and 15.0% in the feature contexts. It can also be seen from Table 4.26 that the rock limpets are almost not consumed in those events. The density of gastropod remains in the features is 147.7/m^3, 3.1 times higher than general contexts (47.5/m^3), but the difference in density between the two contexts is less significant than for bivalves.

The utilization of crab constitutes about 1.2% in both general and feature contexts in terms of total NISP (Table 4.27). Sandy crab (*Platyxanthus orbignyi*) is the most commonly exploited species, but the quantity is insignificant enough that the calculation of density seems meaningless. As can be seen from Figure 4.6, the overall tendency of shellfish and snail consumption patterns remains similar in the general contexts and in the specific consumption events, suggesting no clear differentiation between the two: consumption events appear to be part of daily life.

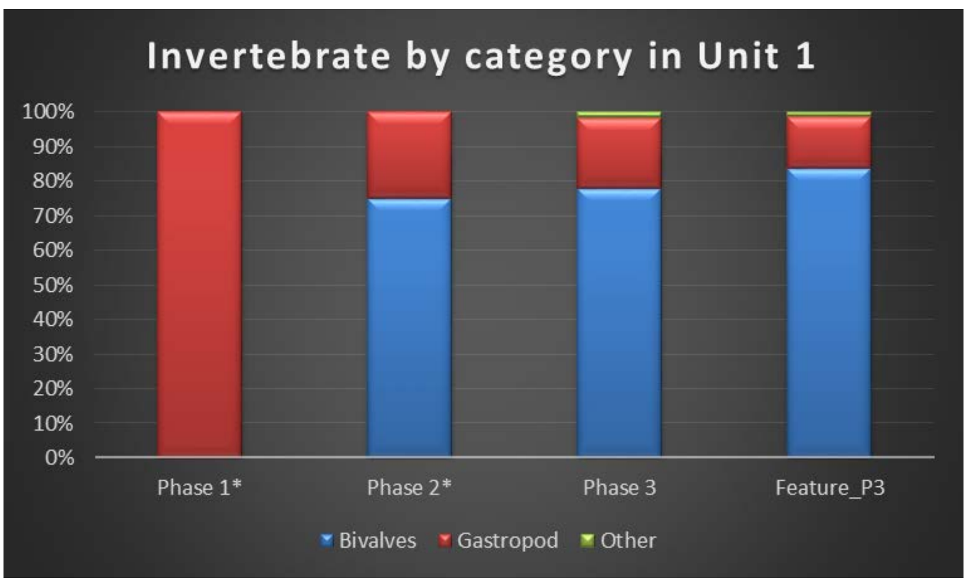

Figure 4.6 Proportion of the three major invertebrate categories in Unit 1

4.3.3 Invertebrates in Unit 3

In total, 13,634 invertebrate remains are identified in Unit 3, and Tables 4.29-31 illustrate the distribution of these exploited species. In Unit 3, Phase 1 continues to be a time when the low frequency of human activities is reflected in the consumption of invertebrates: only two *Donax obesulus* were collected from this context.

Unlike Unit 1, the Phase 2 occupation in Unit 3 already incorporates invertebrates for daily consumption. There are 1321 elements from this context analyzed, including ten different bivalves, four kinds of limpet, fourteen snails, two crabs, chitons and sea cucumber. Bivalves dominate the collection at 77.5% (Table 4.32), and the ratio between sandy and rocky habitats is 4.9 (840:173, see Table 4.29). In phase 2, the overall density of bivalve remains is 241.2/m^3, and it is 66.0/m^3 for gastropods, both much lower than the following Phase 3 and 4 occupation. No feature was associated with invertebrate consumption in Phase 2.

In Unit 3, Phase 3 witnesses an abrupt increase of invertebrate consumption in both bivalves and gastropod categories. 7,486 elements from general contexts are identified, including thirteen kinds of bivalves, six kinds of limpets, and eighteen kinds of snails. Crab, chiton and sea cucumber are also found in Phase 3. Considering only bivalves, the ratio of sandy to rocky bivalves is 3.0 in general contexts (3117:1038), similar to the contemporaneous Unit 1, which suggests people exploited resources more often from the sandy environment. Phase 3 also yields the densest invertebrate remains, so that the bivalve density reaches 669.1/m^3.

There are three independent events related to shellfish/ snail consumption identified in Phase 3. These are relatively small-scale events as each contains less than 10-cm-deep deposit and no single event's volume is larger than 0.08 m^3. While the consumption events are small in scale, the density (8260/m^3) is much higher than the Phase 3 general context. In addition, the feature contexts show a different pattern in that the sandy/rocky ratio is 0.6 (160:258), with the rocky species outnumbering the sandy ones. This tendency implies that people might have selected specific kinds of shellfish, in this case, *Aulacomya ater*, for the consumption events held in this corner of the site.

Another significant change in Phase 3 in Unit 3 is the emphasis on gastropod consumption (Table 4.32). Both general contexts (41.3%) and feature contexts (38.3%) contain relatively more gastropod than Phase 2 (20.1%) and Phase 4 (16.9%). In the general contexts, *Nassarius dentifer* dominate the gastropod collection by NISP count at 1788 (57.7% of total gastropod population). This number is even higher than the major bivalve species *Semele corrugata* (N=1558) and *Donax obesulus* (N=1527). Similar to the general contexts, *Nassarius dentifer* also dominate the gastropod collection in feature contexts by NISP count of 191 (72.2% of total gastropod). This tendency suggests that *Nassarius dentifer* is intentionally collected and incorporated into the repertoire. It might play a special role in this unique context.

In Phase 4, 4,038 elements from general contexts are identified, including ten kinds of bivalves, seven kinds of limpets, and fifteen kinds of snails. Crab, chiton and sea cucumber are also found in Phase 4. Considering only bivalves, the ratio of sandy to rocky bivalves is 3.9 (2577:653). The overall density of bivalves remains similar to that observed in Phase 3, about 641 elements are expected per cubic meter (Table 4.29). Unlike bivalves, the density of gastropods dropped dramatically from 498.9 (Phase 3) to 140.3 in Phase 4 (Table 4.30).

One feature related to invertebrate consumption was identified in Phase 4. Within its small area (0.04 m3), 85 bivalves, 15 gastropods 1 crab and 1 sea cucumber elements are identified. While the density is high due to the small area, the event is small-scale in nature and might be associated with residue from daily consumption.

One interesting tendency can be observed when comparing the three different phases (2-4) in Unit 3: the proportional distribution of bivalve, snail and other invertebrates in Phase 2 (77.5: 20.1: 2.4) is extremely similar to Phase 4 (80.6: 17.1: 2.3), while Phase 3 presents a different scenario (55.6: 41.3: 3.1) (Figure 4.7). In Unit 1, the proportional distribution of the three categories (77.6: 20.8: 1.6) in Phase 3 is also similar to Phase 2 and 4 in Unit 3. The three contexts with similar species distribution imply a general tendency in invertebrate consumption, which also makes the focus of snail consumption in Phase 3 Unit 3 a particular situation for interpretation. It is also noteworthy that, while we've observed the similar proportion between the three broad categories in Phase 2 and 4, the latter context yields 2.7 times the bivalves and 2.2 times the gastropods compared to Phase 2. The increased abundance of shellfish remains suggests increasing emphasis on invertebrate consumption in the later period.

Table 4.29 NISP and density of Bivalves in Unit 3

Taxon	General Context				Feature	
	Phase 1	Phase 2	Phase 3	Phase 4	Phase 3	Phase 4
Volume(m^3)	0.24	4.2	6.21	5.04	0.05	0.04
Rocky Bivalves						
Aulacomya ater		10	530	280	243	20
Choromytilus chorus		100	330	260	9	9
Lithophaga peruviana		4	20			
Perumytilus purpuratus		13	50	71	2	8
Semimytilus algosus		46	108	42		
Sandy Bivalves						
Donax obesulus	1	154	1,527	1,754	7	21
Euromalea rufa		3	4		1	
Mediodesma donacium			1	1		
Pholas chiloensis				2	1	1
Protothaca thaca	1	3	24	33		
Semele corrugata		679	1,559	786	149	26
Tellina sp.		1	1	1	1	
Trachycardium procerum			1			
Total Bivalves	2	1,013	4,155	3,230	413	85
Density	8.3	241.2	669.1	640.9	8260.0	2125.0

Table 4.30 NISP and density of Gastropod in Unit 3

Taxon	General Context				Feature	
	Phase 1	Phase 2	Phase 3	Phase 4	Phase 3	Phase 4
Volume	0.24	4.2	6.21	5.04	0.05	0.04
Rocky Limpets						
Collisella sp.				1		
collisella ceciliana		1	2			
Collisella orbignyi				2		
Crepipatella dilatata		12	66	44	4	3
Crucibulum sp.		1		2		
Fissurella latimarginata			1	1	1	
Fissurella limbata		2	2	3		
Fissurella maxima			1			
Fissurella peruviana				2		
Fissurella picta			1			
Rocky Snails						
Prisogaster niger		65	278	99	18	3
Stramonita haemastoma		14	160	25	7	1
Tegula atra		9	50	14	1	
Tegula picta			10			
Xanthochorus buxea		1	92	35	9	
Xanthochorus cassidiformis		10	88	50	11	1
Sandy Snail						
Bursa ventricosa		1	3	2		
Crassilabrum crassilabrum			1	1		
Mitra sp.			3			
Mitra orientalis		1	4			
Olivella columellaris				2		
Polinices sp.		1	6		2	
Polinices uber		95	453	167	12	4
Prunum curtum				1		
Omnipresent Snail						
Bittium sp.			1	1		
Bursa sp.		1	3			
Nassarius dentifer		42	1,788	207	191	
Sinum cymba		2	24	16	6	1
Stramonita chocolata		5	43	27	2	2
Land Snail						
Scutalus proteus		14	18	5		
Total Gastropod	0	277	3,098	707	264	15
Density	0.0	66.0	498.9	140.3	5280.0	375.0

Table 4.31 NISP and density of other invertebrates in Unit 3

Taxon	General Context				Feature	
	Phase 1	Phase 2	Phase 3	Phase 4	Phase 3	
Crab						
Cancer sp.		1	8	4		
Platyxanthus orbignyi		22	118	86	7	1
Chiton						
Chiton sp.				2		
Chiton cumingsii		2	3	1		
Other						
Clase Ascidiacea		6	104	8	3	1
Total		31	233	101	10	2

Table 4.32 Proportional distribution of invertebrates in Unit 3

Taxon/ Context	General context				Feature	
	Phase 1	Phase 2	Phase 3	Phase 4	Phase 3	Phase 4
Rocky Bivalves		13.2%	13.9%	16.3%	37.1%	36.3%
Sandy Bivalves	100.0%	64.3%	41.7%	64.1%	23.0%	47.1%
Rocky Gastropod		8.8%	10.1%	6.9%	7.3%	7.8%
Sandy Gastropod		7.5%	6.3%	4.3%	2.2%	3.9%
Omni Gastropod		3.8%	24.9%	6.1%	28.8%	2.9%
Crab		1.8%	1.7%	2.0%	1.2%	1.0%
Other Invertebrate		0.6%	1.4%	0.3%	0.4%	1.0%

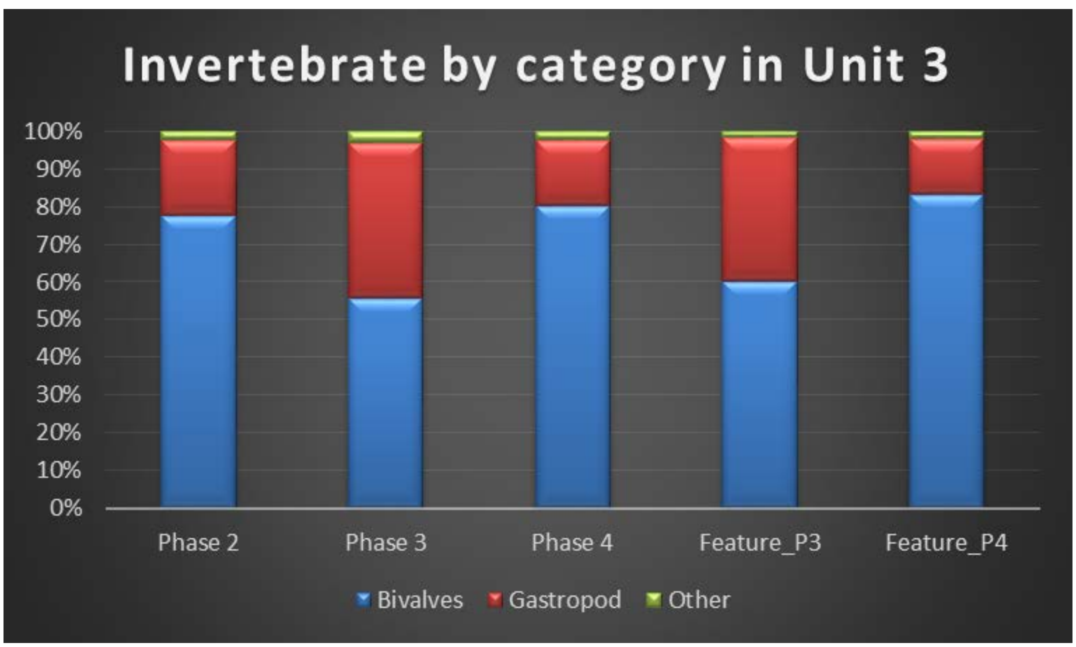

Figure 4.7 Proportion of the three major invertebrate categories in Unit 3

4.3.4 Invertebrates in Unit 5

In total, 11,376 invertebrate remains are identified in Unit 5. Tables 4.33-35 illustrate the distribution of these exploited species within the mound architecture, and after the abandonment of the mound. In Unit 5, both Phase 3 and 4 contain features that are related to consumption events.

3596 elements are from the general deposit in Phase 3, including eleven kinds of bivalves, six kinds of limpets, fifteen kinds of snails, crab, chiton and sea cucumber. At this core area of the mound, the density of invertebrates in Phase 3 (273.3/m^3) falls between contemporaneous Unit 3 (694.5/m^3) and Unit 1 (188.2/m^3). The ratio of sandy to rocky bivalves is 2.1 in general contexts (2118:1006), which suggests a higher proportion of rocky bivalves consumed at the mound.

In Phase 4, 5,369 elements from general contexts are identified, including ten kinds of bivalves, nine kinds of limpets, and eighteen kinds of snails. Crab, chiton and sea urchin were also utilized but remained insignificant. Considering only bivalves, the ratio of sandy to rocky bivalves is 8.2 (4011:488), which is much higher than any other context in Huaca Negra and implies a strong tendency in food preference. Density in general contexts of both bivalves and gastropods is higher than the preceding Phase 3 occupation, which suggests the shell remains were more abundant, and consumption might be more intense in the central part of the site. However, the commonly utilized species remain similar between the two phases (Table 4.36, Figure 4.8).

Another important aspect for understanding consumption behavior is the significant contrast between general contexts and features. There are four features identified as shellfish consumption events in Phase 3. The deposit areas are relatively small (ranging from 0.2 to 0.02 m^3) as the total volume is 0.29 m^3. The bivalve remains, however, are extremely dense, so that 1,765 elements were collected, which causes an extremely high density of more than 6,000 per cubic meter, not comparable to any other context. The implication here is that these events might have been held repetitively within the mound area. The small-scale deposits, however, should not be associated with large-scale activities related to community level such as feasting, because shellfish consumption tends to leave abundant remains while feeding a relatively small amount of people. Unlike what has been seen in contemporaneous Unit 3, consumption here focuses on sandy clam consumption (93.5%) and rocky mussels play minor roles (4.2%) in these events (Table 4.36). The extreme focus on bivalve consumption (Figure 4.8) is also distinct.

Only one event related to shellfish consumption is identified in Phase 4. While the density (80/m^3) is much lower than the events held in Phase 3, the general picture is similar: bivalves dominate the population at 95%, and sandy clam is almost 6 times more abundant than rocky mussels.

Table 4.33 NISP and density of Bivalves in Unit 5

Taxon	General Context		Feature	
	Phase 3	Phase 4	Phase 3	Phase 4
Volume(m^3)	11.43	9.25	0.29	0.3
Rocky Bivalves				
Aulacomya ater	587	315	54	60
Choromytilus chorus	324	74	16	8
Perumytilus purpuratus	33	53	5	10
Semimytilus algosus	62	46	1	6
Sandy Bivalves				
Argopecten purpuratus	1			
Donax obesulus	951	423	53	26
Euromalea rufa	1			
Mediodesma donacium		3		
Pholas chiloensis		3		1
Protothaca thaca	8	13		
Semele corrugata	1,155	3,558	1,636	453
Tagelus dombeii		1		
Tellina sp.	1			
Trachycardium procerum	1			
Total Bivalves	3,124	4,489	1,765	564
Density	273.3	485.3	6,086.2	1,880.0

Table 4.34 NISP and density of Gastropod in Unit 5

Taxon	General Context		Feature	
	Phase 3	Phase 4	Phase 3	Phase 4
Volume	11.43	9.25	0.29	0.3
Rocky Limpets				
Collisella sp.		1		1
Collisella orbignyi	1	4		
Crepipatella dilatata	53	25	2	1
Crucibulum sp.		2		
Fissurella crasa		7		
Fissurella latimarginata	3	26		1
Fissurella limbata	1			
Fissurella maxima	1	1		
Fissurella peruviana	1	4		
Fissurella pulchra		2		
Rocky Snails				
Concholepas concholepas	1			
Prisogaster niger	71	101	5	7
Stramonita haemastoma	19	40		
Tegula atra	7	20		
Tegula picta		7	1	
Xanthochorus buxea	12	52	3	2
Xanthochorus cassidiformis	13	52	2	1
Sandy Snail				
Bursa ventricosa	4	7		
Cancellaria urceolata		1		
Mitra sp.	2			
Mitra orientalis		1		
Oliva sp.	1	2		
Oliva peruviana		1		
Olivella columellaris		1		
Polinices uber	110	188	7	1
Omnipresent Snail				
Bittium sp.	1	7		
Nassarius dentifer	86	228	16	10
Sinum cymba	10	39		
Stramonita chocolata	22	18	1	
Land Snail				
Scutalus proteus	1	4		
Total Gastropod	420	841	37	24
Density	36.7	90.9	127.6	80.0

Table 4.35 NISP and density of other invertebrates in Unit 5

Taxon	General Context		Feature	
	Phase 3	Phase 4	Phase 3	Phase 4
Crab				
Cancer sp.	1			1
Platyxanthus orbignyi	40	24		3
Chiton				
Chiton sp.		1		2
Chiton cumingsii	3	10	4	
Enoplochiton niger		1		
Other				
Clase Echinoidea		1		
Clase Ascidiacea	8	2	1	

Table 4.36 Proportional distribution of invertebrates in Unit 5

Taxon/ Context	General Context		Feature	
	Phase 3	Phase 4	Phase 3	Phase 4
Rocky Bivalves	28.0%	9.1%	4.2%	14.14%
Sandy Bivalves	58.9%	74.6%	93.5%	80.81%
Rocky Gastropod	5.1%	6.4%	0.7%	2.19%
Sandy Gastropod	3.3%	3.7%	0.4%	0.17%
Omni Gastropod	3.3%	5.4%	0.9%	1.68%
Crab	1.1%	0.4%	0.0%	0.67%
Other Invertebrate	0.3%	0.3%	0.3%	0.34%

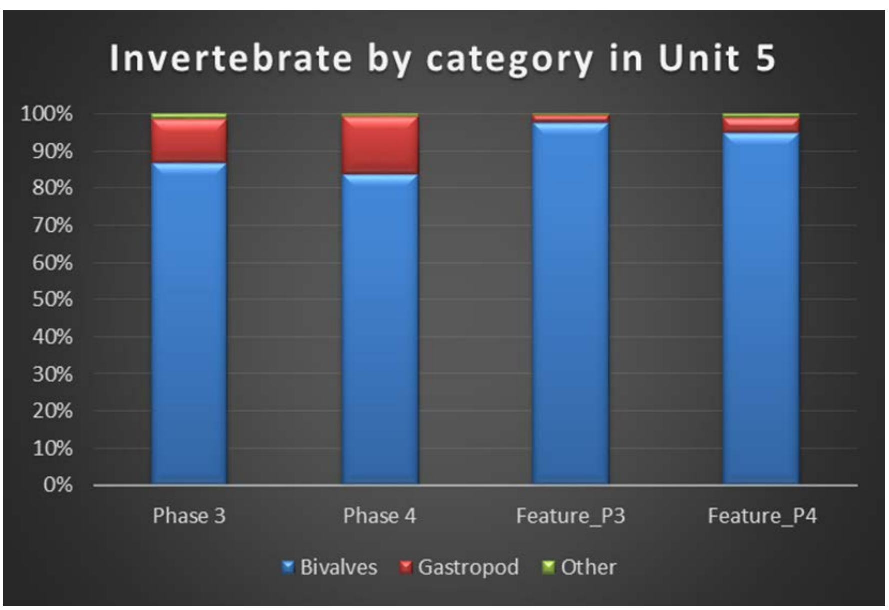

Figure 4.8 Proportion of the three major invertebrate categories in Unit 5

4.3.5 Invertebrates in Unit 6

Unit 6 remained a less utilized area throughout the entire occupation history regarding the quantity of subsistence remains. The same tendency can be observed in invertebrate remains. In total, there are 2,489 elements identified in this unit. The abundance is significantly lower than other units in terms of both total amount and density, and the distribution of invertebrate remains is summarized in Tables 4.37-39.

Unlike other units, the most significant event in Unit 6 is from the Phase 1 stratum. This is by far the clearest evidence related to human activities in the very beginning of the site occupation history. This single event was held on a relatively large scale (0.24 cubic meter), and with a very dense shellfish deposit (4,379 bivalves per cubic meter). More significantly, 97.9% of the bivalves belongs to rocky mussels, with *Perumytilus purpuratus* and *Semimytilus algosus* being the two dominant species. Seven limpets and one rock snail were also retrieved from the feature context, but the amount is insignificant, and these elements could have been brought in by accident rather than on purpose, as they share the same habitat as the targeted rocky mussels. No crab or other invertebrate species with a sandy habitat was identified from the feature, suggesting this might be a single event where people brought in mussels gathered from the rocky environment.

Compared with other Phase 1 contexts (Unit 1 and 3), the overall density ($27.3/m^3$) of bivalves is also higher in Unit 6. However, this tendency might be associated with the consumption event as the composition of species is similar (Table 4.40, but note the general context contained a higher proportion of sandy clam). Some of the shellfish elements might be scattered around the main deposit area, or be incorporated into the general context during the excavation process before the feature was registered.

Only 64 invertebrates are unearthed from the Phase 2 stratum. The degree of diversity remains high despite the small population: ten bivalve species, nine gastropod species, and sand crab were identified from this context. The proportion of gastropod remains (34.4%, Figure 4.9) is higher than other Phase 2 contexts, but the general picture of invertebrate exploitation remains the same.

Again, the usage of invertebrate resources increases in Phase 3 (while less significant than other units): 500 elements are collected, about 7 times more than the previous phase in terms of quantity and density. Ten kinds of bivalves, twelve gastropod species, sand crab, and chiton, make the diversity remain high. Sandy clam outnumbers the rocky species by 4.8 times, a similar tendency to other contexts we've seen. The utilization of other invertebrates is also presented, but the insignificant amount impedes further interpretation.

Table 4.37 NISP and density of Bivalves in Unit 6

	General Context				Feature
Taxon	Phase 1	Phase 2	Phase 3	Phase 4	Phase 1
Volume (m^3)	2.38	5.07	5.49	8.33	0.24
Rocky Bivalves					
Aulacomya ater			1	8	44
Choromytilus chorus	17	22	152	14	1
Lithophaga peruviana					
Perumytilus purpuratus	9	1	1	6	464
Semimytilus algosus	30		2	4	528
Sandy Bivalves					
Argopecten purpuratus		1			
Donax obesulus	2	3	29	210	
Euromalea rufa		1	1		
Protothaca thaca		2	2	4	
Semele corrugata	4	6	109	166	14
Spisula adamsi	3	1	13	74	
Tagelus dombeii		2	23		
Tellina sp.				1	
Trachycardium procerum		1			
Total Bivalves	65	40	333	487	1051
Density	27.3	7.9	60.7	58.5	4,379.2

Table 4.38 NISP and density of Gastropods in Unit 6

Taxon	General Context				Feature
	Phase 1	Phase 2	Phase 3	Phase 4	Phase 1
Volume (m^3)	2.38	5.07	5.49	8.33	0.24
Rocky Limpets					
Collisella orbignyi				2	7
Crepipatella dilatata		3	11	12	
Fissurella crasa				1	
Fissurella latimarginata				1	
Fissurella limbata				1	
Fissurella maxima		2	1		
Fissurella peruviana				1	
Scurria viridula				2	
Rocky Snails					
Concholepas concholepas				1	
Prisogaster niger		6	36	23	1
Stramonita haemastoma		1	4	8	
Tegula atra		1	5	8	
Tegula picta					
Xanthochorus buxea		1	4	27	
Xanthochorus cassidiformis		3	9	15	
Sandy Snail					
Crassilabrum crassilabrum				1	
Oliva sp.				1	
Olivella columellaris				2	
Polinices uber		4	39	78	
Prunum curtum				1	
Omnipresent Snail					
Bittium sp.				1	
Nassarius dentifer		1	26	84	
Sinum cymba			3	14	
Stramonita chocolata	**1**		**19**	**18**	
Land Snail					
Scutalus proteus			1	1	
Total Gastropod	1	22	158	303	8
Density	0.4	4.3	28.8	36.4	33.3

The general picture of invertebrate consumption in Phase 4 represents continuity from Phase 3 in terms of density and species composition/ proportion (Figure 4.9). The low density of human activity also is indicated by the lack of registered events during the Phase 4 occupation. Overall, the ratio between sandy and rocky bivalves is 4.1 (82:20), also echoing the scenario of Phase 3.

Table 4.39 NISP and density of other invertebrates in Unit 6

Taxon	General Context			
	Phase 1	Phase 2	Phase 3	Phase 4
Crab				
Platyxanthus orbignyi		2	7	10
Chiton				
Chiton cumingsii			2	

Table 4.40 Proportional distribution of invertebrates in Unit 6

Taxon/ Context	General context				Feature
	Phase 1	Phase 2	Phase 3	Phase 4	Phase 3
Rocky Bivalves	84.8%	35.9%	31.4%	4.0%	97.9%
Sandy Bivalves	13.6%	26.6%	35.6%	56.8%	1.3%
Rocky Gastropod		26.6%	14.1%	12.7%	0.8%
Sandy Gastropod		6.3%	7.8%	10.4%	
Omni Gastropod	1.5%	1.6%	9.7%	14.6%	
Crab		3.1%	1.4%	1.3%	
Other Invertebrate				0.2%	

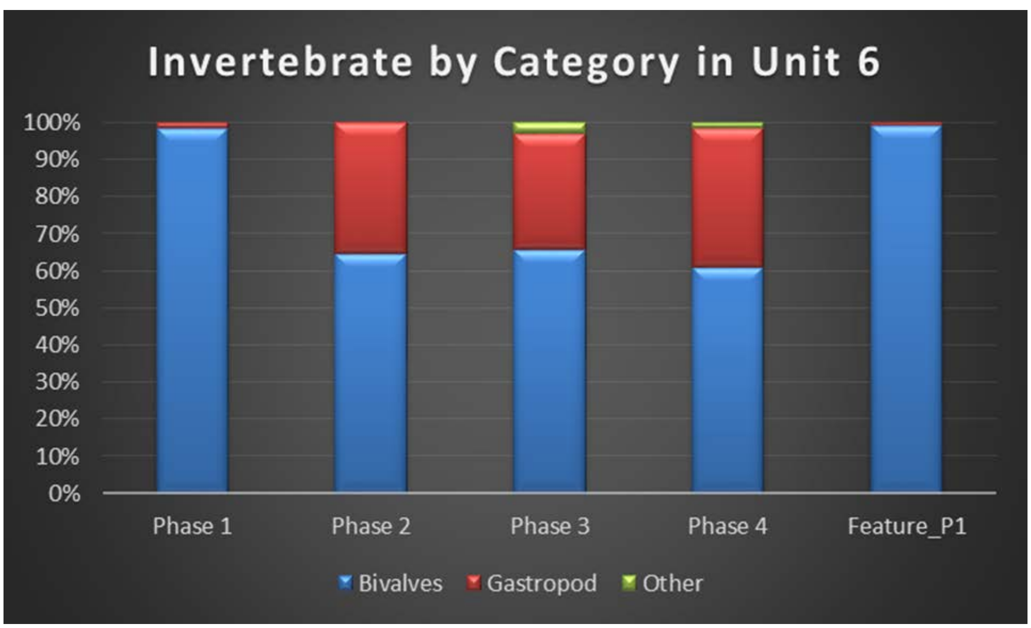

Figure 4.9 Proportion of the three major invertebrate categories in Unit 6

4.3.6 Invertebrates in Unit 7

In total, 8,589 invertebrate remains are studied in Unit 7. Tables 4.41-43 list the distribution of these species. As can be seen, invertebrate consumption is limited in Phase 2, increases steadily throughout the following phases, and reaches a peak in Phase 4. Although there is an architectural structure identified in Phase 2, there was no event related to shellfish consumption. Just like other units, consumption events are only identified in Phase 3 and Phase 4.

In Phase 2, only 59 elements are collected from Unit 7, including five different bivalves, one limpet, five kinds of snails and crabs. While the sample size is small, the count of bivalves dominates the collection at 79.7% (Table 4.44). The ratio between sandy and rocky habitats is 1.8 (30:17). In phase 2, the overall density of bivalve remains is only 19.1/m^3, and it is 2.8/m^3 for gastropods. Thus, there is no evidence of intense invertebrate consumption associated with the architecture in Phase 2 occupation.

In Unit 7, Phase 3 witnessed an abrupt increment of invertebrate consumption in both bivalves and gastropod categories. 779 elements from general contexts are identified, including nine kinds of bivalves, three kinds of limpets, and ten kinds of snails. While there was no chiton or sea cucumber found, crab is incorporated into the repertoire. The ratio of sandy to rocky bivalves is 0.4 in general contexts (170:458), suggesting people in this corner consumed more rock mussels than sand clams. This is one of few occasions in general contexts that rock mussels were exploited more than sand clam.

In the final stage of occupation in Huaca Negra, 3,704 invertebrate remains from Unit 7 general contexts were recovered, including twelve kinds of bivalves, eight kinds of limpets, and fifteen kinds of snails. Crab, chiton and sea cucumber were also collected in this context. The huge quantity of invertebrate remains makes the density much greater than the preceding phases. The ratio of sandy to rocky bivalves is 3.4 in general contexts (2004:598), as the sand clam again dominated the population. It is noteworthy that, during the Phase 4 occupation, emphasis was not only placed on shellfish collection but also on snails. The total amount of gastropods increased significantly, and about one-third of sample collection (28.7%) corresponds to this category (Table 4.44, Figure 4.10).

There are two independent events related to shellfish/ snail consumption in Phase 3. The two events yield the densest invertebrate deposit at the site (10,075/m^3) while the total volume is only 0.12 m^3. In the two features, 96.8% of elements fall in the bivalve category (Table 4.44, Figure 4.10), and the ratio between sand clam and rock mussel is 0.08 (94:1115), suggesting an extreme focus on food resources gathered from rocky habitats.

Five independent features related to shellfish consumption are identified in Phase 4 strata. One feature extends to a larger space (0.48m^3) but it is a less dense invertebrate deposit. Other events are small piles of dense invertebrate accumulation, comparable but less dense to the ones identified in Phase 3. The events in Phase 4 also emphasize rock mussels more than sand clam, as the sand-rock ratio is 0.3 (472:1776). This tendency is noteworthy as the sand clam is 3.4 times more than rock mussel remains in the general context of Phase 4. In addition, the amount of gastropods incorporated into the consumption event also increases significantly compared with Phase 3 (from 2.7% to 19.2% of the total population from the feature context, Figure 4.10). The consumption events in Phase 4 seem less focused on specific kinds of invertebrate resources, as different invertebrates were integrated into the event. This might also be a result of the increasing number of events that are registered in the later period: the variation between events can be observed within the same time period.

Table 4.41 NISP and density of Bivalves in Unit 7

Taxon	General Context			Feature	
	Phase 2	Phase 3	Phase 4	Phase 3	Phase 4
Volume	2.46	2.79	5.89	0.12	0.84
Rocky					
Aulacomya ater	2	115	328	266	1258
Choromytilus chorus	28	320	198	848	309
Perumytilus purpuratus		3	27		21
Semimytilus algosus		20	45	1	188
Sandy					
Argopecten purpuratus			1		
Donax obesulus		11	229	1	40
Euromalea rufa	1		1		
Pholas chiloensis		1	1		
Protothaca thaca	1	16	4	8	10
Semele corrugata	15	139	1764	85	422
Tellina sp.		3	3		
Trachycardium procerum			1		
Total Bivalves	47	628	2602	1209	2248
Density	19.1	225.1	441.8	10075.0	2676.2

Table 4.42 NISP and density of Gastropods in Unit 7

Taxon	General Context			Feature	
	Phase 2	Phase 3	Phase 4	Phase 3	Phase 4
Volume	2.46	2.79	5.89	0.12	0.84
Gastropod					
Rocky Limpets					
Calyptraea sp.				1	
Calyptraea trochiformis				1	
Collisella sp.		1	1		
Collisella orbignyi			1		1
Crepipatella dilatata		37	74	4	16
Crucibulum sp.			3		2
Fissurella sp.			9		
Fissurella crasa			1		
Fissurella limbata			2		
Fissurella maxima	1	1			
Fissurella pulchra			2		
Rocky Snails					
Concholepas concholepas	1		1		
Prisogaster niger	1	36	130	15	98
Stramonita haemastoma		2	67		52
Tegula atra			4		3
Tegula picta		9	3	1	5
Xanthochorus buxea	1	5	63	2	38
Xanthochorus cassidiformis		9	40	5	22
Sandy Snail					
Bursa ventricosa		1	1		
Crassilabrum crassilabrum					1
Mitra orientalis			3		2
Olivella columellaris			1		
Polinices sp.					5
Polinices uber		8	154	1	97
Omnipresent Snail					
Bittium sp.			1		
Nassarius dentifer	2	17	427	3	136
Sinum cymba		2	10		7
Stramonita chocolata	1	2	58	1	54
Land Snail					
Scutalus proteus					1
Total Gastropod	7	130	1056	34	540
Density	2.8	46.6	179.3	283.3	642.9

Table 4.43 NISP and density of other invertebrates in Unit 7

Taxon	General Context			Feature	
	Phase 2	Phase 3	Phase 4	Phase 3	Phase 4
Crab					
Cancer sp.	1	1	1	2	
Platyxanthus orbignyi	4	20	40	4	40
Chiton					
Chiton sp.			1		
Other					
Clase Ascidiacea			4		

Table 4.44 Proportional distribution of invertebrates in Unit 7

Taxon/ Context	General context			Feature	
	Phase 2	Phase 3	Phase 4	Phase 3	Phase 4
Rocky Bivalves	50.9%	58.8%	16.14%	89.3%	63.50%
Sandy Bivalves	28.8%	21.8%	54.10%	7.5%	16.88%
Rocky Gastropod	6.8%	12.8%	10.83%	2.3%	8.47%
Sandy Gastrpopd		1.2%	4.29%	0.1%	3.75%
Omni Gastropod	5.1%	2.7%	13.39%	0.3%	7.04%
Crab	8.4%	2.7%	1.11%	0.5%	0.36%
Other Invertebrate			0.13%		

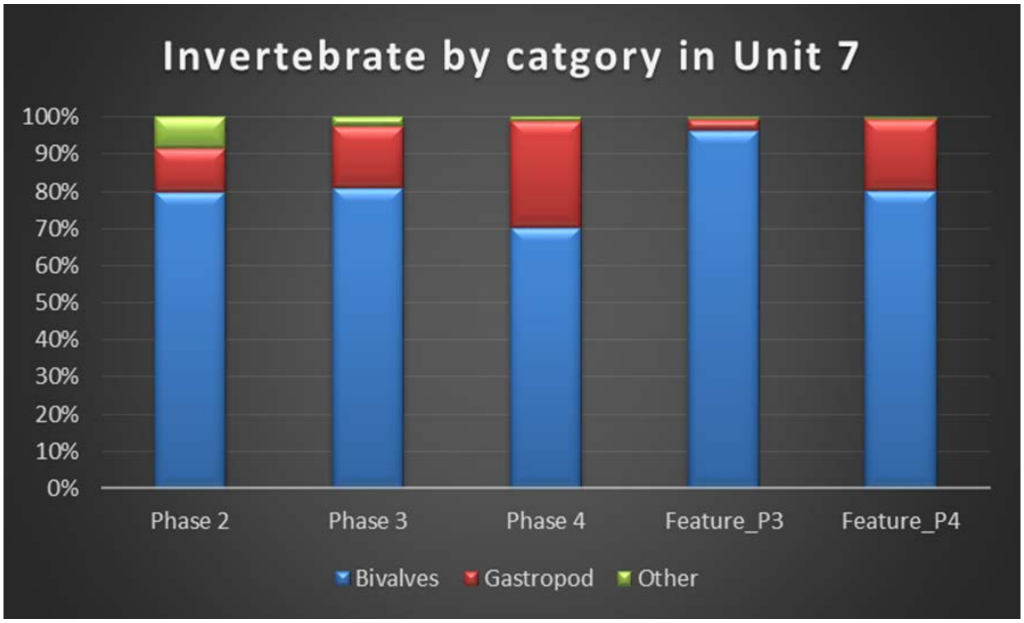

Figure 4.10 Proportion of the three major invertebrate categories in Unit 7

4.3.7 Inter-phase Comparison

4.3.7.1 Overview of Invertebrates by Phase

By combining the invertebrate remains from contemporaneous contexts, a general picture can be provided, and this helps to illustrate the changing pattern of invertebrate exploitation through time. Table 4.45 provides information from general contexts to illustrate the overall tendency. Since consumption event features tend to have their own nature and can be dramatically different from one another, it makes no sense to lump the features together to have an "overall picture," and they will be discussed separately below.

Table 4.45 Basic information of invertebrate from the general context

	Phase 1	Phase 2	Phase 3	Phase 4
Sample Size	69	1,447	14,990	13,932
Density (m^3)	24.7	116.3	399.5	488.7
N of id species	9	37	51	56
Sand clam count	11	875	7167	9047
Rock mussel count	56	228	3116	1771
% of Gastropod	2.90%	20.18%	29.0%	20.9%

Other than the only feature found in Unit 6, only 69 invertebrate remains are identified in Phase 1 within 2.79 m^3 soil volume. 67 of the elements are bivalves, and the rock mussel is 5 times more abundant than the sand clam. Phase 1 is the only time when rock mussel rather than sand clam dominates the population. However, the sample size is very small, and the distribution might be biased by the abovementioned feature. It is hard to make any conclusion about the major habitat from which people retrieved invertebrate resources in this phase. The limited quantity does correspond well to other faunal remains, supporting the idea that no intense human activity or occupation happened in the Phase 1 occupation.

The amount of invertebrate remains slightly increases in Phase 2, as 1,447 elements are incorporated in the analysis. Since Phase 2 is the time people started their sedentary life in Huaca

Negra, there is more evidence of food consumption. Along with the fact that more resources were taken, the number of identified species also rises from 9 to 37. However, the quantity of utilized invertebrates is not as significant as it is in the succeeding Phase 3 and 4. It is also less abundant than the contemporaneous fish remains.

Phase 3 is the time when the utilization of invertebrate starts to grow, with the overall density 3.4 times more than Phase 2 (Table 4.45). The diversity of exploited species is also significantly higher than before. Regarding preferred habitat, Phase 3 is also the time that the overall density of rock mussel and gastropod reach a peak, before gradually declining in Phase 4 (Figure 4.11). The tendency toward more rock species and gastropod might imply an experimental process in which people expanded their repertoire when they started to take invertebrates as their major animal protein source (as both fish and other vertebrate declined in Phase 3); later, they narrowed the targeted species again in Phase 4.

In general, the utilization of invertebrate resources witnesses a steady escalation process as the overall density (488.7/m^3) and utilized species (56) reach an apex by Phase 4. While both the proportions of gastropod and rock mussel slightly waned, the exploitation of sand clam represents a linear growth pattern through time (Figure 4.11 and 12). In Phase 4, attention was been paid to the sandy habitat (Figure 4.13). This also is reflected in the ratio between sand clam and rock mussel.

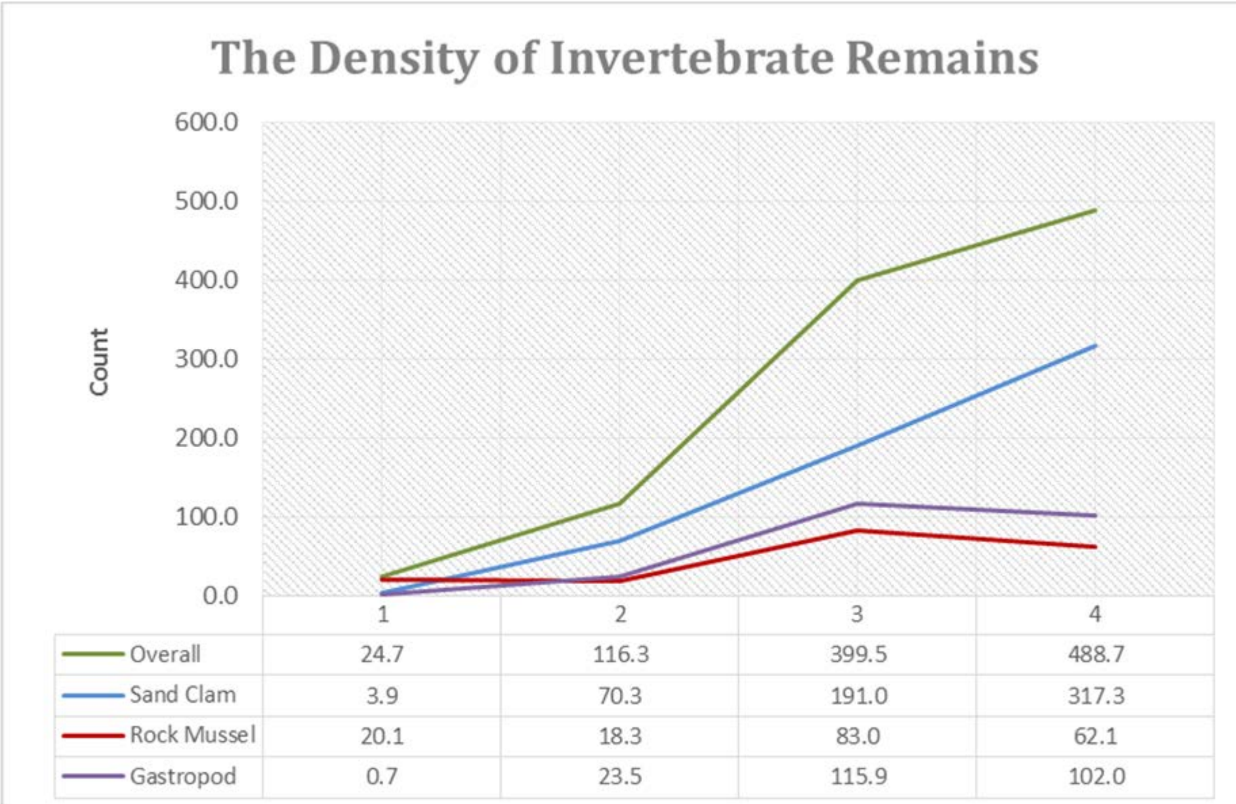

Figure 4.11 Diachronic change of the invertebrate density

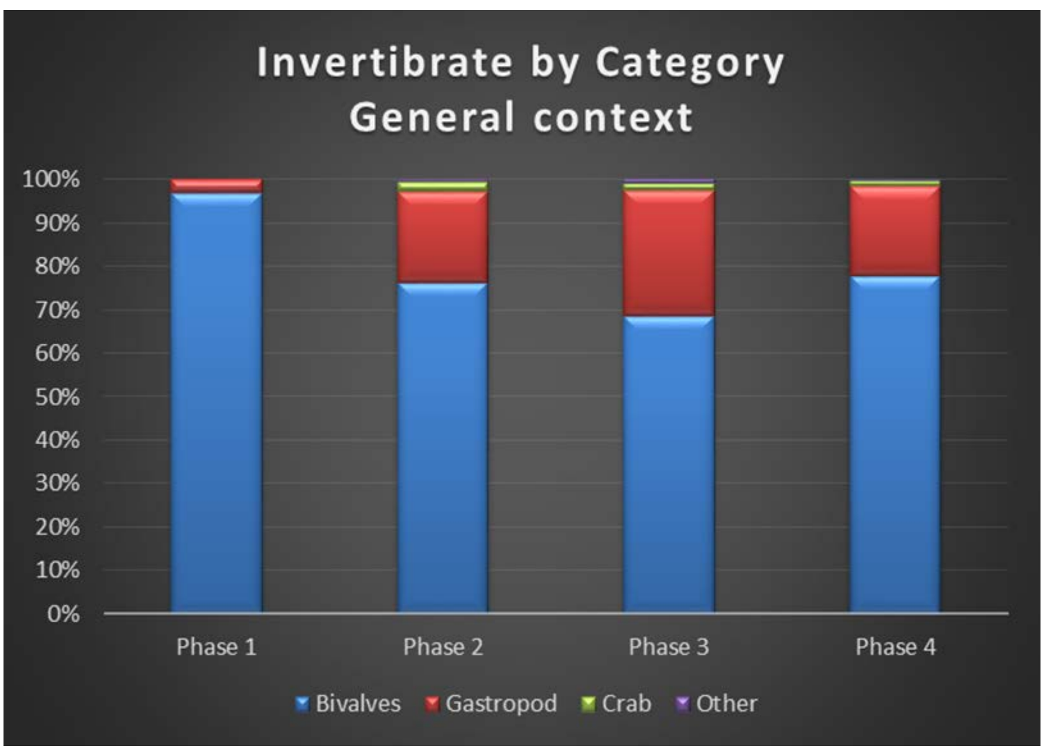

Figure 4.12 The proportion of invertebrate by category in different phases

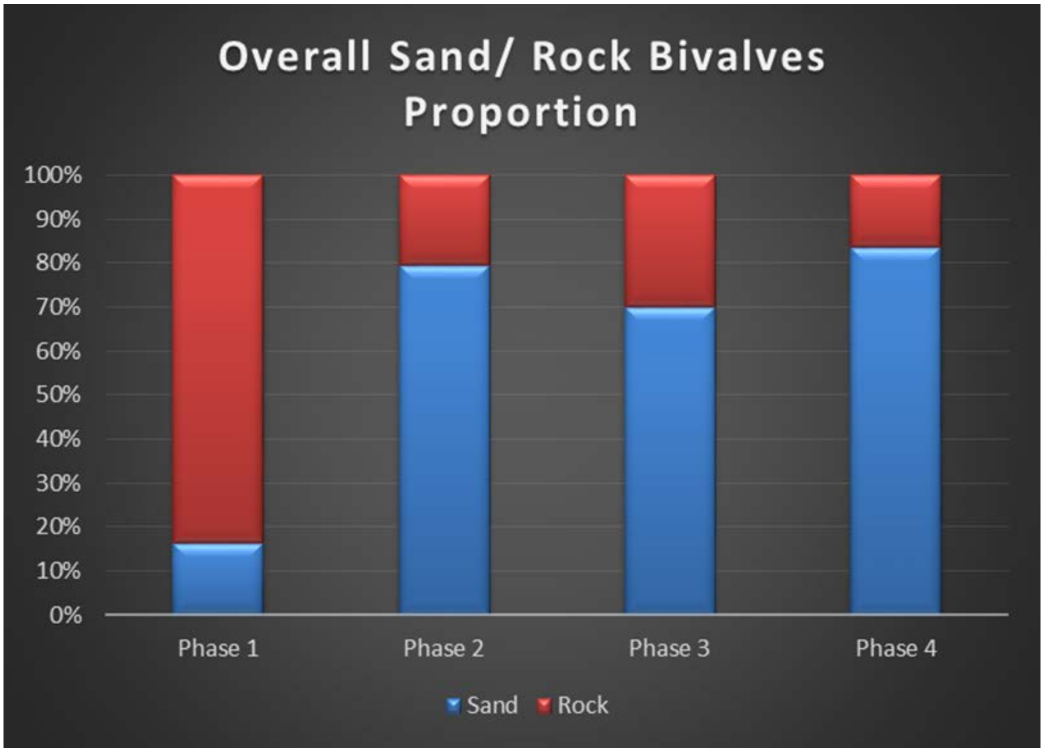

Figure 4.13 The proportion of sand/ rock bivalves in different phases

4.3.7.2 The Strategy of Collection in Different Habitats: Degree of Diversity

Considering the location of Huaca Negra and the accessible habitats (Figure 4.5), it should be no surprise that people tended to collect invertebrate resources from a sandy habitat, as it is only 1 km from the site. It is also noteworthy that other cultural factors such as a particular group controlling the right to access the sandy beach are excluded at this point, as sandy species dominate all the excavation units, and only slight variations in proportion can be observed.

As people might have different strategies for invertebrate collection in various biotopes, the following section examines the degree of diversity in each phase to discern whether people behaved differently in different environments. The fundamental logic applied here is that a low degree of diversity refers to the possibility that collectors focused on specific target(s) and ignored less preferred species encountered on their way. By contrast, a high level of diversity can relate to a situation in which people gathered whatever they encountered in a habitat rather than focusing on a few preferred species. Besides this fundamental assumption, different people might also behave differently when working on a subsistence activity.

To compare the strategies in sandy and rocky habitats, the calculation excludes the omnipresent species which can be found in both environmental settings. The land snail is also excluded from the diversity analysis. Sand crab (*Platyxanthus orbignyi*), chiton (*Chiton sp.* and *Enoplochiton niger*) and sea cucumber (Clase Ascidiacea) are incorporated as they can be associated with specific habitat. In total, there are 23 species associated with a sandy environment identified from the general context, and 24 for the rocky environment. The similar amount of species suggests people had a similar range of options in both biotopes. The analysis follows the same procedure with the same software as the one done for fish analysis. Table 4.46 lists the analysis results of Simpson's Index of Diversity for each phase within the two biotopes, which can be transformed to Figure 4.14 to present better the picture of how different the strategies might be.

Table 4.46 The diversity and its error range of invertebrate in sandy and rocky environment

Biotope	Phase	Simpson's Index of Diversity (1-D)	Lower 95%	Upper 95%	Lower 99%	Upper 99%
Sandy Habitat	1	0.782	0.545	0.818	0.455	0.818
	2	0.480	0.444	0.512	0.434	0.519
	3	0.601	0.594	0.607	0.592	0.609
	4	0.519	0.511	0.527	0.508	0.530
Rocky Habitat	1	0.606	0.496	0.659	0.445	0.672
	2	0.768	0.728	0.797	0.717	0.806
	3	0.787	0.779	0.794	0.777	0.796
	4	0.828	0.819	0.836	0.817	0.839

Due to the small sample size, the error range is huge when discussing the species diversity in Phase 1. This is the only period when the sandy population contained a higher degree of diversity than the rocky one did. The result of Phase 1 can only be taken as a reference to the degree of diversity, for the rocky population falls within the 95% error range of the sandy population. Thus there is less than 95% confidence to claim a difference between the two categories, not to mention that the sample could be skewed by the consumption event.

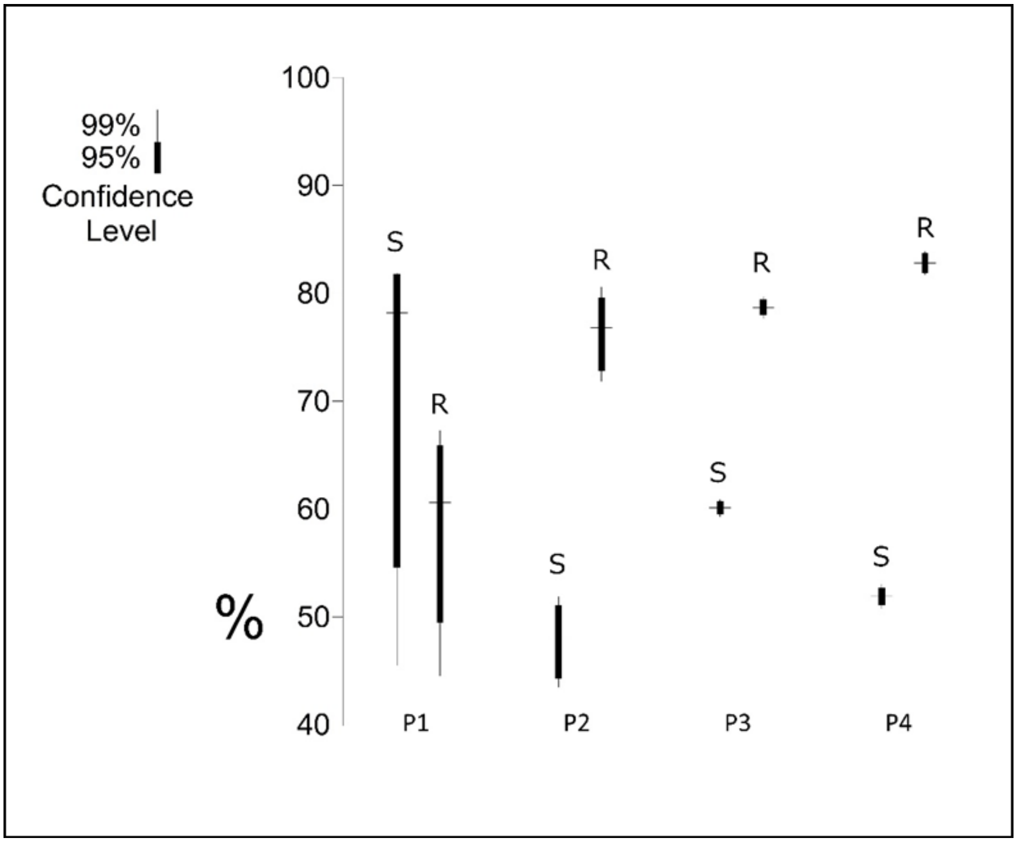

Figure 4.14 The bullet graph of Simpson's Index of Diversity (S for sandy and R for the rocky environment)

The degree of diversity in the two different biotopes is significantly different from the beginning of sedentary life in Huaca Negra. Based on the Simpson's Index of Diversity and the associated error range, it can be claimed with more than 99% confidence that the species diversity is higher in the rocky habitat than in the sandy one throughout Phase 2, 3 and 4.

Since the sandy beach was always the major place to retrieve invertebrate resources in the three phases (Figure 4.13), there might have been two reasons for people to go further away to the rocky environment to collect other invertebrates: (1) targeting specific kinds of preferred food, or (2) taking supplemental resources to remedy a temporary shortage in the sandy environment.

Following this logic, it is expected that a lower degree of diversity would result if people went to the rocky environment to collect specific kinds of invertebrates. This is also true if the travel time/ distance is considered: it would be a waste of time for people to come with a target species in mind, but allocated their energy in collecting less desired species rather than spending more time searching. However, people might focus on “efficiency” in the second scenario of shortage, as the purpose is to collect “enough” food and then go home soon enough to avoid possible spoil and waste. The latter situation would cause higher diversity as a less selective process is expected in the gathering trip.

The fact that the diversity of excavated invertebrates from the rocky environment is constantly greater than the sandy environment supports the latter scenario. In addition, the degree of diversity for the rocky environment steadily increases over time from 0.768 to 0.828. Although this is not a dramatic change, the pattern exists with a high confidence level. Combined with the fact that the sand clam was more widely utilized in the last occupation phase, and its degree of diversity is significantly lower than sand clam in Phase 3, it can be claimed that (1) people mainly targeted preferred species from the sandy beach, and intensified their exploitation of them from Phase 3 to Phase 4; (2) the resources gathered from the rocky biotope were supplemental in nature. The rocky biotope might have played a marginalized role in Phase 4 as the higher diversity (Figure 4.14), and slightly lower density of rock mussel (Figure 4.11) indicate that people paid less attention or spent less time in this area.

4.3.7.3 Targeted Species

Another way to approach the strategy the invertebrate collection is to scrutinize the targeted species by excluding the noise of minor species. As can be observed from previous sections, there are several species that were constantly exploited and dominate each category. This section discusses the possible fluctuation of these species. Crab is excluded in the following analysis as the major species (*Platyxanthus orbignyi*) dominates at 95.9% of the population (404 out of 421), which makes the comparison less meaningful. Other invertebrates are also excluded because the sample size is too small.

Table 4.47 lists the NISP of the major species by the following groups: rock mussel, sand clam, rock limpet, rock snail, sand snail, and omnipresent snail. The group distinguishes both habitat and the different characteristics of invertebrate species that can be identified by ancient people without having biological knowledge. Based on this, the proportion of the major species within its group can be calculated with the total NISP in each group as the population (Table 4.48).

Table 4.47 The major invertebrate by category and the associated NISP

Category		Phase 1	Phase 2	Phase 3	Phase 4
Rock mussel	N of Id species	3	5	5	4
	Total NISP	56	228	3086	1792
	Aulacomya ater		14	**1330**	**949**
	Choromytilus chorus	17	**150**	**1406**	**544**
	Semimytilus algosus	**30**	46	213	135
Sand clam	N of Id species	4	9	11	11
	Total NISP	11	875	7151	9047
	Donax obesulus	3	158	2868	2633
	Semele corrugata	4	**700**	**4166**	**6256**
Rock Limpet	N of Id species		5	12	12
	Total NISP		23	237	241
	Crepipatella dilatata		16	206	156
Rock Snail	N of Id species		5	7	7
	Total NISP		113	1107	885
	Prisogaster niger		72	498	353
	Xanthochorus sp.		26	300	335
Sand Snail	N of Id species		4	7	9
	Total NISP		102	714	617
	Polinices uber		99	685	588
Omnipresent Snail	N of Id species	2	4	5	5
	Total NISP	2	54	2260	1151
	Nassarius dentifer	1	45	2105	938

Table 4.48 The proportion of major species in its group

Species	Phase 1	Phase 2	Phase 3	Phase 4
Rock Mussel				
Aulacomya ater		**6.1%**	**43.1%**	**53.0%**
Choromytilus chorus	30.4%	**65.8%**	**45.6%**	**30.4%**
Semimytilus algosus	**53.6%**	20.2%	6.9%	7.5%
Rock Limpet				
Crepipatella dilatata	.	69.6%	86.9%	64.7%
Rock Snail				
Prisogaster niger	.	**54.1%**	**45.0%**	**39.9%**
Xanthochorus sp.	.	**19.5%**	**27.1%**	**37.9%**
Sand Clam				
Donax obesulus	27.3%	18.1%	40.1%	29.1%
Semele corrugata	36.4%	**80.0%**	**58.3%**	**69.1%**
Sand Snail				
Polinices uber	.	**97.1%**	**95.9%**	**95.3%**
Omnipresent Snail				
Nassarius dentifer	50.0%	83.3%	93.1%	81.5%

Two major rock mussels dominate the population throughout Phase 2 to Phase 4. *Choromytilus chorus* is commonly seen in the Late Precaramic Period and might have had some special social meaning during this period. This species is encountered in every phase of occupation. It is noteworthy that the relative proportion of *Choromytilus chorus* has a constant tendency declining from Phase 2 (65.8% of total rock mussel) to Phase 4 (30.4%). This corresponds to the general pattern that has been discerned in early coastal sites that the importance of this species is less significant in the Initial Period. *Aulacomya ater*, however, plays the counterpart of *Choromytilus chorus* as its importance within the group steadily increases in terms of proportion. The two species are regularly exploited, and together they constitute 71.9% of rock mussels in Phase 2, 88.7% in Phase 3, and 83.4% in Phase 4. *Semimytilus algosus* is the single dominant species present in the consumption event in Phase 1, and also dominates the general context. It remains relatively important in Phase 2 (20.2%) before its importance drops in Phase 3 and 4.

While there are thirteen different species identified within the limpet group (seven of them belong to *Fissurella sp.*), only one species, *Crepipatella dilatata*, invariably dominates this group at more than 60% in all the three phases. Two kinds of rock snails, *Prisogaster niger* and *Xanthochorus sp.*[4], represent a reverse tendency in that one (*Xanthochorus sp.*) increases proportionally through time while the other (*Prisogaster niger*) declines from Phase 2 to 4. As presented in Table 4.48, *Prisogaster niger* is always preferred and outnumbered the *Xanthochorus sp*., and the two species together always constitute more than 70% of the total rock snail population. While it is not clear whether the change was caused by availability due to environmental factors or human exploitation, it can be inferred that *Xanthochorus sp.* might have been a substitution when *Prisogaster niger* was less available in their natural habitat.

The scenario of the sandy biotope is less complicated, which is expected as the degree of diversity is much lower for this category. The group of sand clam is the most abundant type in Huaca Negra (NISP=7,167 for Phase 3 and 9,047 for Phase 4). Two sand clams, *Donax obesulus*, and *Semele corrugata* dominate this group together with the proportion as high as 98% throughout Phase 2 to Phase 4. Note that there are nine to eleven different clams that were brought into the site, but the two dominant species actually leave no room for the other nine species to play significant roles in the repertoire. When scrutinizing the two most abundant species, it is also evident that *Semele corrugata* was always more preferred than *Donax obesulus* in all the phases discussed here. *Donax*, however, seems always to have provided a sufficient supplement when the Semele corrugata waned (i.e., Phase 3). Based on the quantity and constant proportion, *Semele corrugata* and *Donax obesulus* were the two principal sources of invertebrate, and the former was more important than the latter.

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[4] Two species, Xanthochorus buxea and Xanthochorus cassidiformis, are combined here, as the two is very similar to each other and the biological differences might not be recognized by ancient people.

While *Nassarius dentifer* tends to be found in the sandy environment and is taken as the sand snail in some archaeological works (e.g., Dillahey 2017, Mauricio 2015), it can also be found in the rocky environment (Alamo and Valdivieso 1997). Thus, this species cannot be securely classified as a sandy species. The exploitation of *Nassarius dentifer* is noteworthy as its utilization rose in Phase 3 and 4 (Table 4.47), and it becomes the third most abundant species so that only the two major sand clams surpass it. As *Nassarius dentifer* never played a vital role in the two contemporaneous sites nearby (Mauricio 2015, Prieto 2015), its high frequency of utilization in Huaca Negra might reflect local taste and preference.

Based on the discussion above, it still appears that people in Huaca Negra targeted specific species when collecting invertebrates in the rocky biotope, as 6 out of 24 species played a major role in each group. These species, however, left about 35-10% space for other species within the same group (except the rock mussel in Phase 3 and 4) to be used. In contrast, 3 out of 23 species dominate the group of sand clams and sand snails at more than 95%, not to mention that crab was almost always gathered from the sandy biotope. Thus, two different behavior patterns relating to shellfish gathering can still be discerned in the two natural environments.

The analysis of diversity and the comparison of target species suggest that there is a continuity of food preference, targeted habitat, and collection strategy within different habitats. This is exceptionally clear in Phase 3 and 4, periods when invertebrate resources were heavily exploited. In addition, the contrast between the two different strategies, "to focus on targeted species in the sandy beach" and "to collect most of the encountered resources efficiently in the rocky environment" is enhanced in Phase 4 (Figure 4.14). As will be discussed in the later chapters, Phase 4 is a time when people focused more on activities like craft production and obtaining exotic goods, so reallocation of limited labor could be one of the explanations for this changing pattern of food collection and consumption.

4.3.8 Consumption Events in Phase 3 and 4

Along with the increasing importance of invertebrate resources, several consumption events are identified in Phase 3 and Phase 4. Most of these events are small piles of shellfish/ snail remains that don't occupy a large area, and the density of shells is much higher than in the general contexts. This section firstly compares the contemporaneous features from different units. This helps to discern whether there is a variety of features in terms of composition, targeted species, and degree of diversity.

The comparison then contrasts the events and general contexts in each phase. Assuming the general context is the one reflecting an average of daily consumption, to investigate how the consumption events differ from the general context then sheds light on the issue of "how special these events are." The more an event deviates from the general context, the more unique the event is in nature. On the contrary, if an event matches the general picture of the phase, then it is highly possible it just represents a different way that people dumped their waste, rather than an event with special social meaning (e.g., feasting).

4.3.8.1 The Invertebrate Consumption Events in Phase 3

There are fifteen features registered from all the Phase 3 contexts. The feature size (0.02 to 0.3 m^3), abundance of remains (30 to 1233 in NISP), and density (300 to 44100/m^3) all vary a lot from one to another[5]. This is because the in-field identification of features is based on the contrast with the background (general context) rather than applying a cross-unit standard. Table 4.49 lists the fifteen featurs and their contents, and Figure 4.15 and 4.16 illustrate the proportional composition of invertebrate remains; one is based on the type of the invertebrate, and another represents the habitat distribution.

In the Phase 3 occupation, in the general context sand species constitute 63.9%[6] and rock species are 36.1% (when ignoring the omnipresent species) (Figure 4.13). In the fifteen different consumption contexts, four cases contain a similar ratio within the 95% confidence level (Figure 4.15). Under the same confidence level, there are seven cases that emphasize sand species more than the general context. These include three extreme occasions in Unit 5 (R05, R06, R10, Figure 4.16) that consumed more than 90% sand species. On the other hand, there are four cases where sand species are significantly lower than expected while rock species dominate the population by 60 to 90%. Applying the proportion of each event with Chi-square analysis, the p-value is smaller than 0.001, and the Cramer's V=0.804, suggesting that there exists significant variation between features regarding the associated habitat.

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[5] The * marked on the following tables and figures indicate small scale events where the recovered remains has a population lower than 100.

[6] The population of total NISP is large enough to ignore the issue of error range. Thus the number is directly applied as comparison baseline.

Table 4.49 Shellfish consumption events in Phase 3

Context	U1_R01	U1_R03	U1_R05	U1_R06	U1_R08	U1_R10	U3_R07	U3_R08	U3_R11
volume	0.2	0.3	0.1	0.05	0.15	0.06	0.02	0.08	0.08
Total	239	92*	30*	50*	218	223	44*	525	120
Density	1195.0	306.7	300.0	1000.0	1453.3	3716.7	2200.0	6562.5	1500.0
Rock mussel									
Aulacomya ater	**61**	4	0	6	3	2	10	**233**	0
Choromytilus chorus	11	5	4	2	15	13	1	4	4
Perumytilus purpuratus	6	3	1	0	5	0		1	2
Semimytilus algosus	11	1	0	3	0	1			
Sand clam									
Donax obesulus	**74**	15	**11**	**16**	22	8		4	3
Euromalea rufa								1	
Pholas chiloensis									1
Protothaca thaca	1	1	0	0	1	0			
Semele corrugata	**62**	**43**	**5**	**13**	**115**	**168**	8	56	**85**
Tellina sp.									1
Limpets									
Calyptraea sp.									
Crepipatella dilatata					1		1	2	1
Crucibulum sp.						1			
Fissurella latimarginata									1
Rock Snails									
Prisogaster niger	1	5	5	1	10	4	1	10	7
Stramonita haemastoma	1	1	1	1	1	1		5	2
Tegula atra		3			3	1		1	
Tegula picta									
Xanthochorus buxea	2	0	1	0	0	1	3	5	1
Xanthochorus cassidiformis				2	2	1	1	10	1
Sand snail									
Mitra sp.					6				
Polinices uber	3	4			3	3	2	9	3
omnipresent snail									
Nassarius dentifer	3	5	1	5	28	18	15	**171**	5
Sinum cymba					1			5	1
Stramonita chocolata								2	
Crab									
Cancer sp.	2	2	1	1	1	1			
Platyxanthus orbignyi					1		1	5	1
Chiton									
Chiton sp.	1								
Other									
Clase Ascidiacea							1	1	1

Table 4.49 Fifteen features in Phase 3 (continued)

Context	U5_R05	U5_R06	U5_R08	U5_R10	U7_R09	U7_R10
volume	0.03	0.04	0.02	0.2	0.03	0.09
Total	1323	101	33*	350	1209	40*
Density	44100.0	2525.0	1650.0	1750.0	40300.0	444.4
Rock mussel						
Aulacomya ater	13	1	29	11	**266**	0
Choromytilus chorus	3	1	1	11	**835**	13
Perumytilus purpuratus				5		
Semimytilus algosus				1	1	
Sand clam						
Donax obesulus	50	2		1		1
Euromalea rufa						
Pholas chiloensis						
Protothaca thaca					8	
Semele corrugata	**1232**	92	1	**311**	70	15
Tellina sp.						
Limpets						
Calyptraea sp.					1	1
Crepipatella dilatata	1		1		3	1
Crucibulum sp.						
Fissurella latimarginata						
Rock Snails						
Prisogaster niger	4	1			13	2
Stramonita haemastoma						
Tegula atra						
Tegula picta	1					1
Xanthochorus buxea	2			1	2	
Xanthochorus cassidiformis	1	1			3	2
Sand snail						
Mitra sp.						
Polinices uber	3		1	3	1	
omnipresent snail						
Nassarius dentifer	11	2		3	3	
Sinum cymba				1		
Stramonita chocolata						1
Crab						
Cancer sp.					2	
Platyxanthus orbignyi	2	1		1	1	3
Chiton						
Chiton sp.						
Other						
Clase Ascidiacea				1		

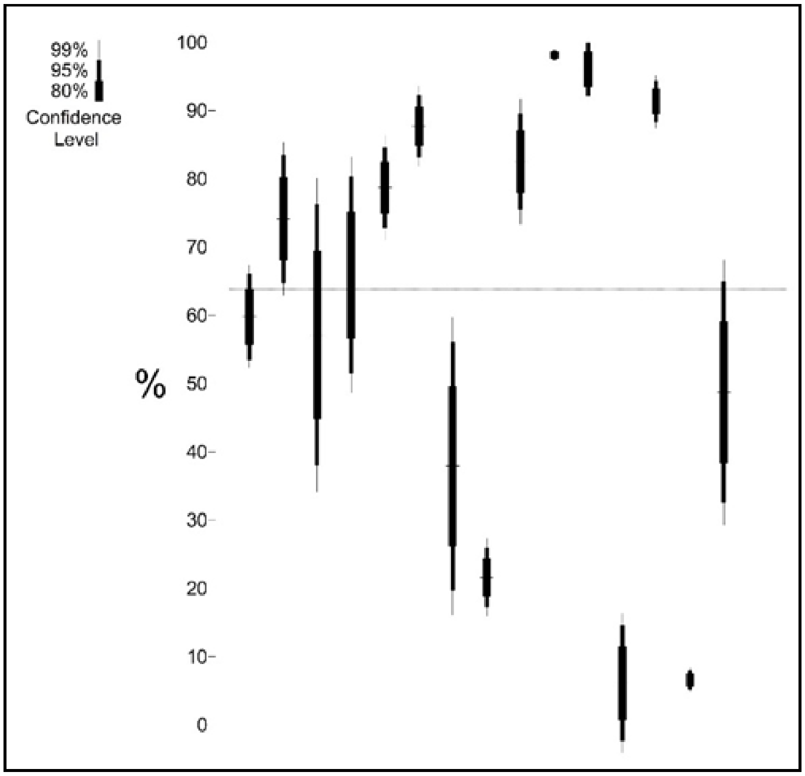

Figure 4.15 The proportion of sand species in each feature in Phase 3.
Straight line indicates 63.9%, the proportion in general context; note this the same order as in the following figure

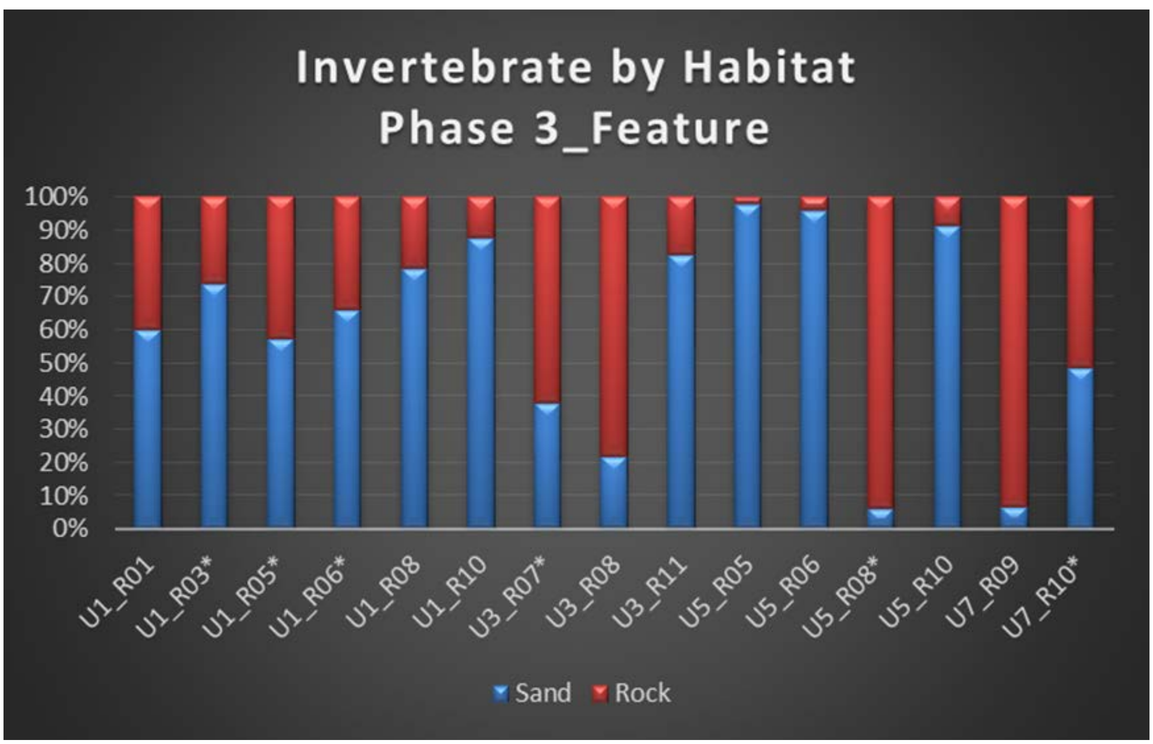

Figure 4.16 Phase 3 inter-feature comparison of habitat composition

Regarding the type of food, 68.5% of identified invertebrate remains are bivalves in the general context of Phase 3, gastropod constitutes another 29.1%, and other species such as crab, chiton and sea cucumber accunt for the remaining 2.4%. Regarding the features, the scenarios represent a similar tendency but with more variety among cases. Figure 4.17 illustrates that, with 95% confidence, there are four occasions falling within the expectation with a similar proportion of bivalves. The utilization of bivalves is more intense in another eight events (53.3% of total features) than the general context. Interestingly, there are also two events (U3_R07 and U3_R08) in Unit 3 that contain more than 40% gastropod species (Figure 4.18). Incorporating a large quantity of gastropod into the consumption event is not a typical scenario, but people in Huaca Negra did sometimes eat differently in this kind of event. The Chi-square test also indicates strong confidence for the difference between groups (P<0.001), but the degree of the difference between the events is not as significant as the contrast between habitats (Cramer's V=0.338).

An examination of species diversity between features was done with the same protocol. In the case of features, all unearthed species and its count are considered so that an overall diversity can be present. Figure 4.19 illustrates the Simpson's Index of Diversity of each feature with error range attached. Three groups can be identified as high (>65%), medium (40-50%) and low (<30%) diversity, and this pattern also suggests the heterogeneous nature of these events.

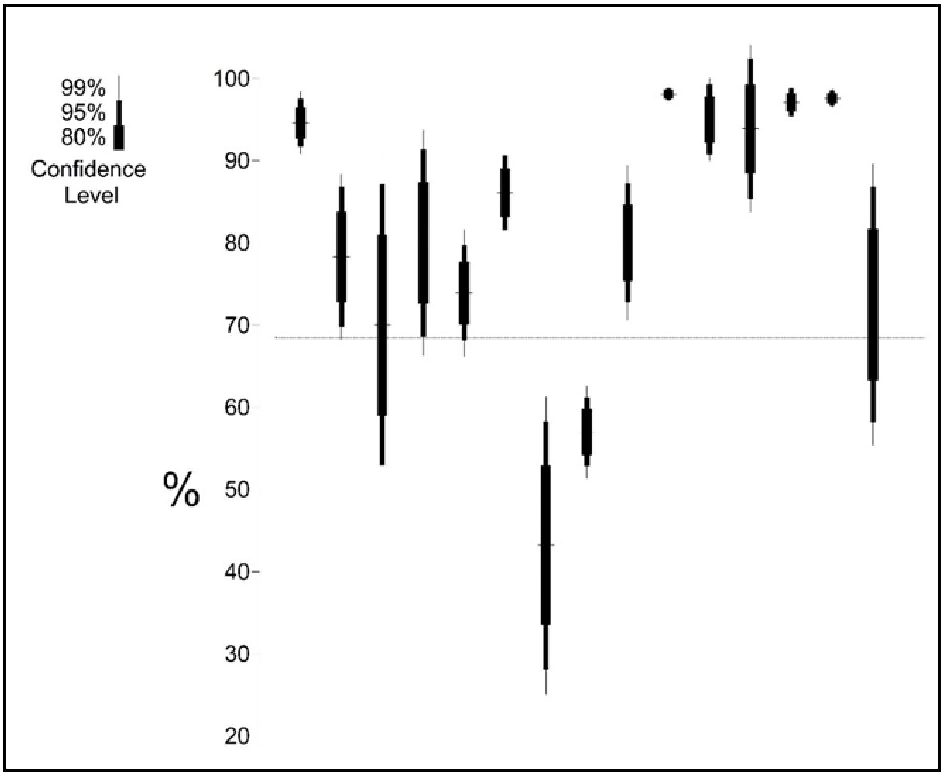

Figure 4.17 The proportion of bivalve in each feature, Phase 3. The straight line indicates 68.5%, the proportion in general context

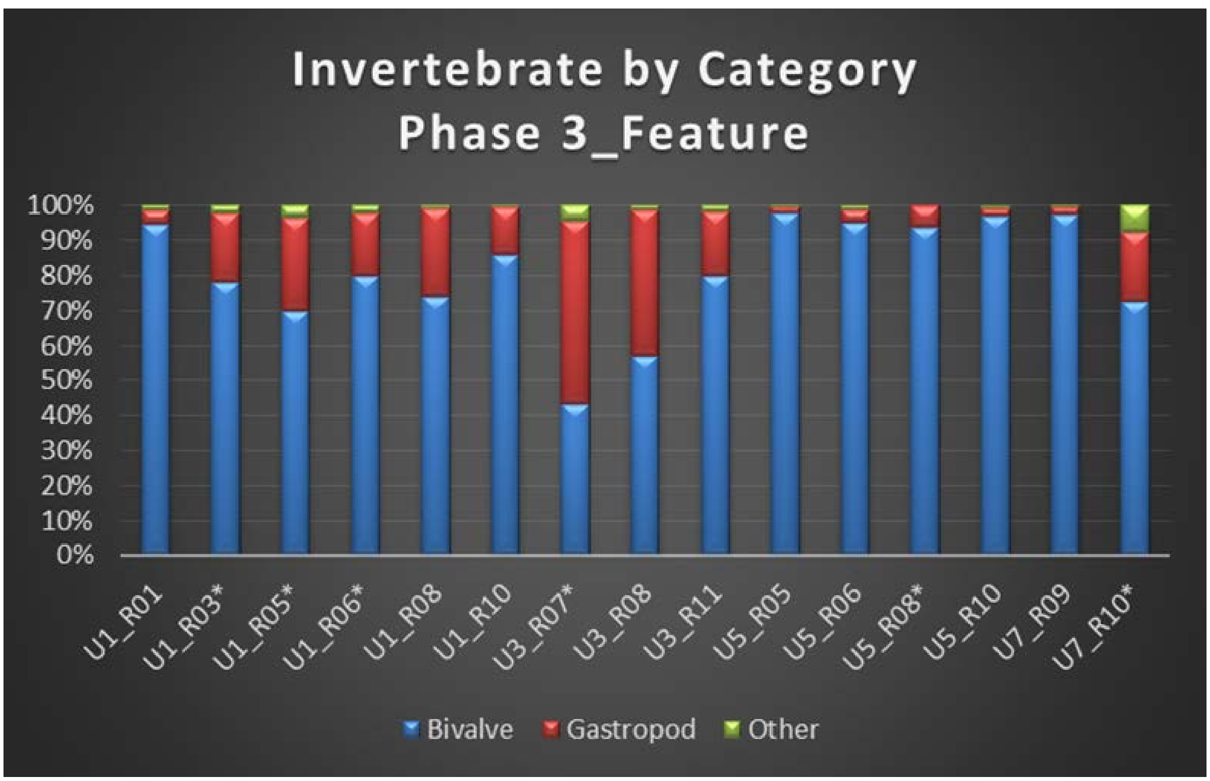

Figure 4.18 Phase 3 inter-feature comparison of invertebrate category

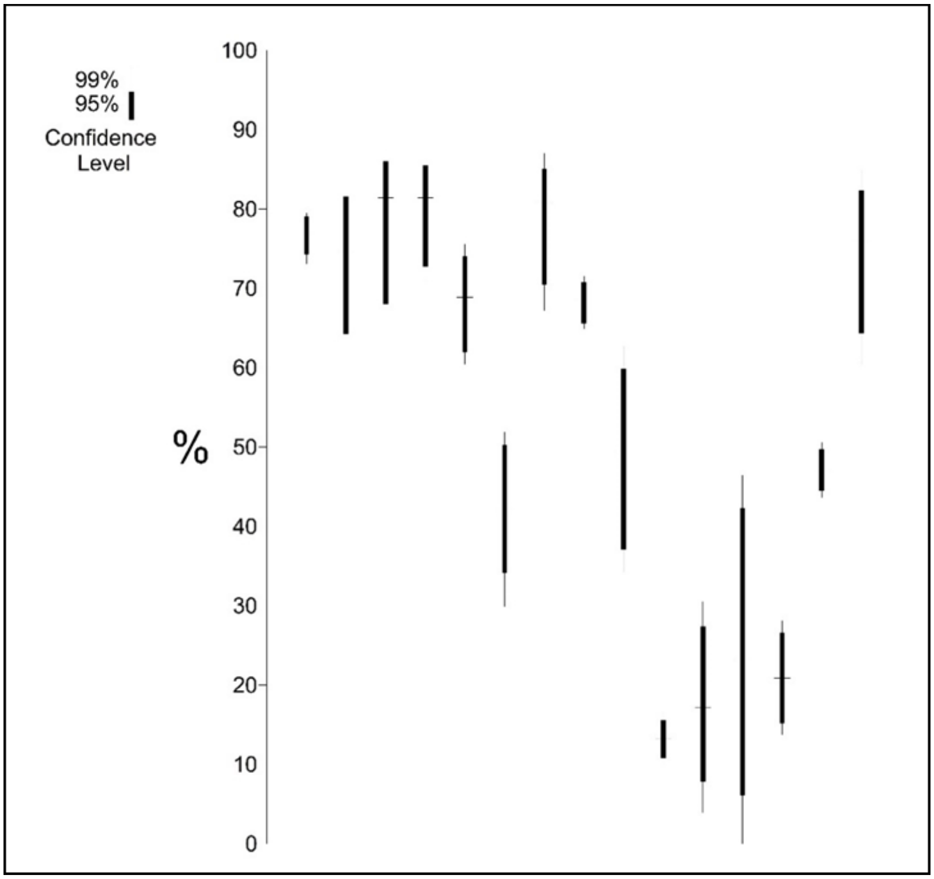

Figure 4.19 The degree of species diversity in Phase 3 features

The diverse places for invertebrate procurement, different focus on types of food, and the various degree of food/ species diversity suggest that there were diverse ways to hold shellfish consumption events. If the general context is taken as a baseline of daily consumption, the result of comparison between procurement places and different categories of food reveals an interesting pattern: about 1/3 of total events have a similar nature that echoes behaviors represented in the general context. Meanwhile, other events contain different focus or preference, and significantly differ from what people usually did, either by enhancing the already existing general pattern or going towards the opposite way. The variety of the nature of the consumption events implies different kinds of activities were held within the site area. Although these events seem to be similar at first glance, they have different implications about human behavior and social meanings.

4.3.8.2 The Invertebrate Consumption Events in Phase 4

There are seven features registered in Phase 4. The feature size (0.04 to 0.3 cubic meter), abundance (NISP from 61 to 594), and density (802 to 11600/m^3) are less diverse than what has been seen in Phase 3. Table 4.66 lists the basic data of these features.

In the Phase 4 general context, the proportion of sand and rock species is 76.9% and 23.1% respectively when ignoring the omnipresent species (Figure 4.13). However, out of seven cases of Phase 4 features, only one instance echoes the general tendency with 95% confidence (Figure 4.20). Instead, resources from the rocky habitat seem to play a more significant role in the consumption events, as there are five occasions with the proportion of sand species significantly under the baseline of general context. The rock species weigh more than 40% of the total population in these features. In fact, there are three occasions in which rock and sand species have equal weight (around 50%), and one extreme case (U7_R08) where the rock species dominate the consumed population at 77% (Figure 4.21).

While I argue above that the rocky environment provided supplemental resources for daily consumption based on the data from the general context, the situation was not the same when people were preparing an event in Phase 4: more energy was allocated for gathering resources from a place that was further away, which reflects a different behavior pattern or strategy from the previous period.

As discussed above, bivalves are all-time favorite resources within the invertebrate categories, and the tendency is intensified in Phase 4: 77.8% of identified invertebrate remains belong to bivalve category, while 20.8% is gastropod and other species such as crab, chiton and sea cucumber is 1.4% (Figure 4.11).

Table 4.50 Shellfish consumption events in Phase 4

Context	U3_R01	U5_R01	U7_R04	U7_R05	U7_R06	U7_R07	U7_R08
Volume (m³)	0.04	0.3	0.03	0.23	0.48	0.06	0.04
Total	102	594	300	329	385	61*	464
Density	2550.0	1980.0	10000.0	1430.4	802.1	1016.7	11600.0
Rock mussel							
Aulacomya ater	**20**	60	1	2	**131**	10	**165**
Choromytilus chorus	9	8					
Perumytilus purpuratus	8	10	15	2	1		3
Semimytilus algosus		6	10	1	7		**170**
Sand clam							
Donax obesulus	**21**	26	6	10	15	6	3
Pholas chiloensis	1	1					
Protothaca thaca				1	4	1	4
Semele corrugata	**26**	**453**	**89**	**64**	**143**	**29**	**97**
Limpets							
Collisella sp.		1					
Collisella orbignyi							1
Crepipatella dilatata	3	1		4	4	1	7
Crucibulum sp.				1			1
Fissurella latimarginata		1					
Rock Snails							
Prisogaster niger	3	7	43	31	15	1	8
Stramonita haemastoma	1		13	33	5	0	1
Tegula atra				2	1		
Tegula picta			4		1		
Xanthochorus buxea		2	18	14	4	1	1
Xanthochorus cassidiformis	1	1	4	11	5	1	1
Sand Snail							
Crassilabrum crassilabrum				1			
Mitra orientalis			1	1			
Polinices uber	4	1	16	**74**	10	2	
Omnipresent snail							
Nassarius dentifer		10	**70**	30	28	7	1
Sinum cymba	1			5	2		
Stramonita chocolata	2		8	40	5	1	
Crab							
Cancer sp.		1					
Platyxanthus orbignyi	1	3	2	2	4	1	1
Other							
Chiton sp.		2					
Clase Ascidiacea	1						

This tendency remained similar in the context of consumption events: three events echo the expected proportion of bivalves at the 95% confidence level (Figure 4.22), while another two extreme cases, U5_R01 and U7_R08, consumed almost only bivalves (both contain 95% bivalves) (Figure 4.22). The two events, however, differ from each other, as U5_R01 contained a similar weight of both clam and mussel, while U7_R08 focused a lot more on mussels (Table 4.50). Departing from the mainstream tendency for bivalve consumption, two cases in Unit 7 (R04 and R05) revealed another kind of event where the focus was placed on gastropod. As can be seen from Table 4.50, while limpet played no role in the collection, various kinds of snails from different habitats were incorporated into the events. The two Unit 7 cases demonstrate a diverse focus on consumed food, as they differ from both consumption events elsewhere and the general context.

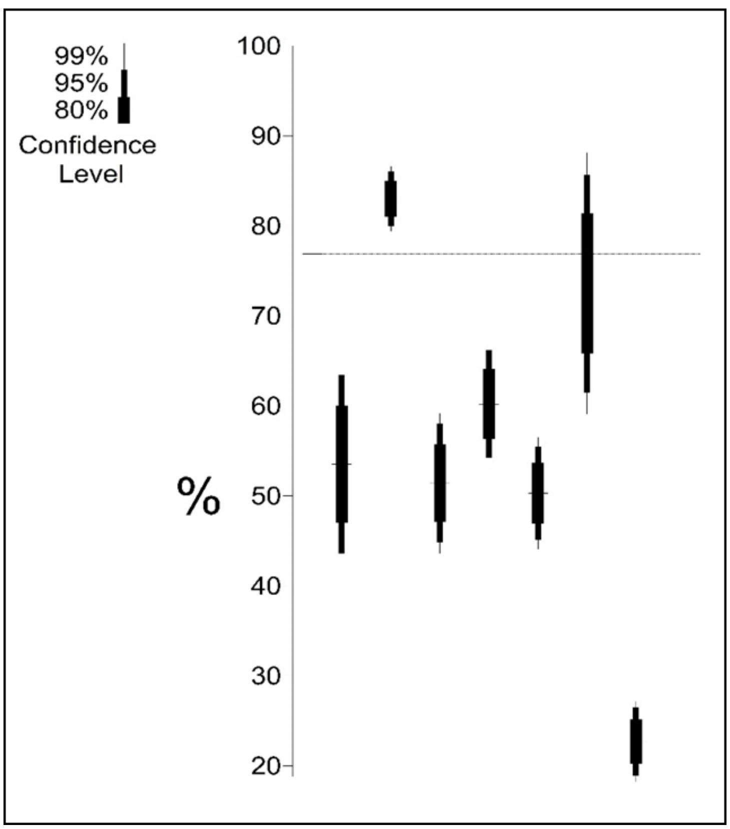

Figure 4.20 The proportion of sand species in each feature, Phase 4. The straight line indicates 76.9%, the proportion in general context

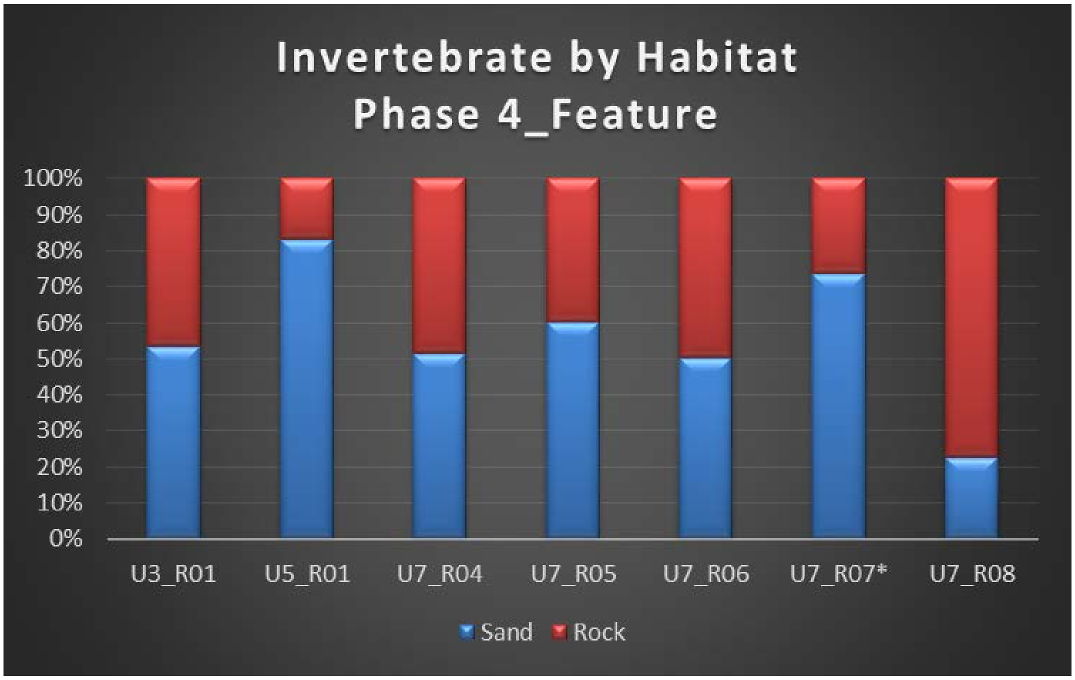

Figure 4.21 Phase 3 inter-feature comparison of habitat composition

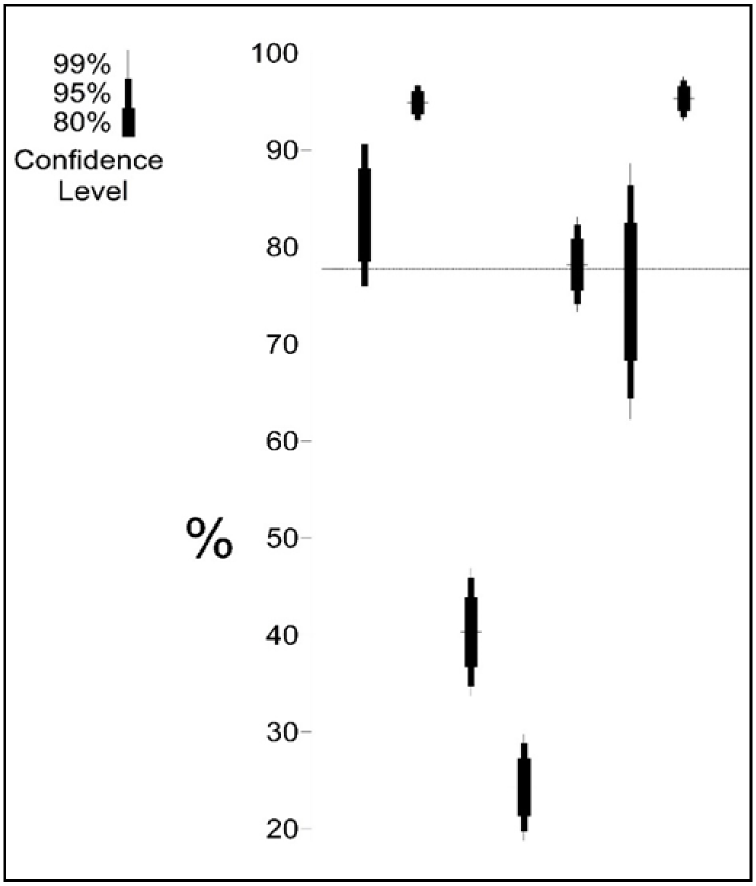

Figure 4.22 The proportion of bivalves in each feature, Phase 4.
The straight line indicates 77.8%, the proportion in general context

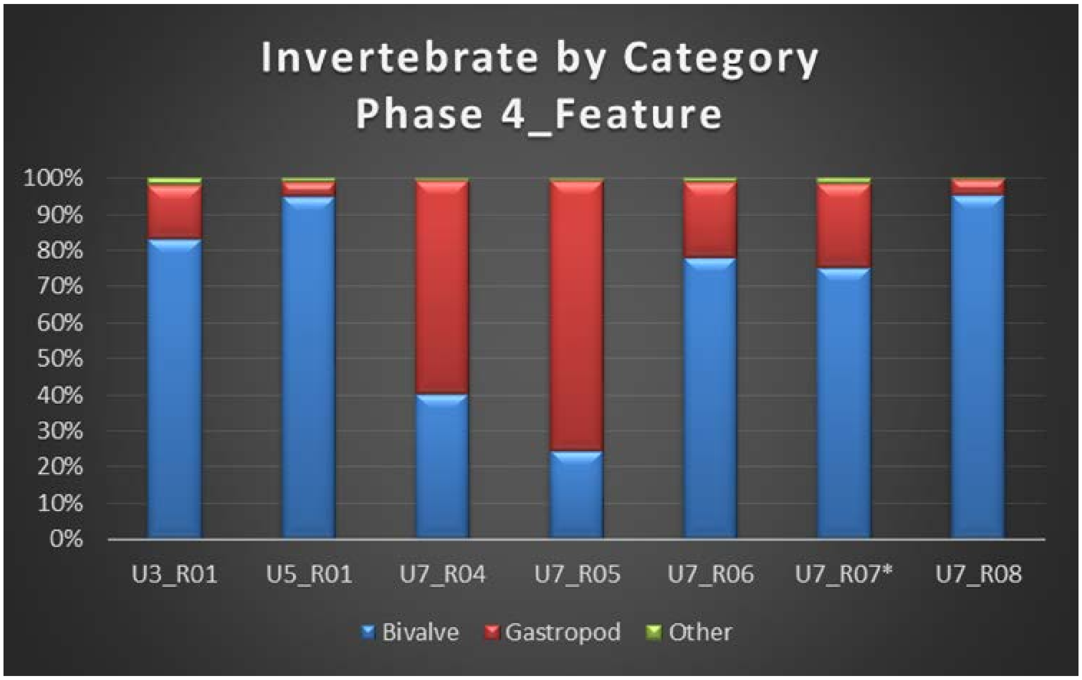

Figure 4.23 Phase 4 inter-feature comparison of invertebrate category

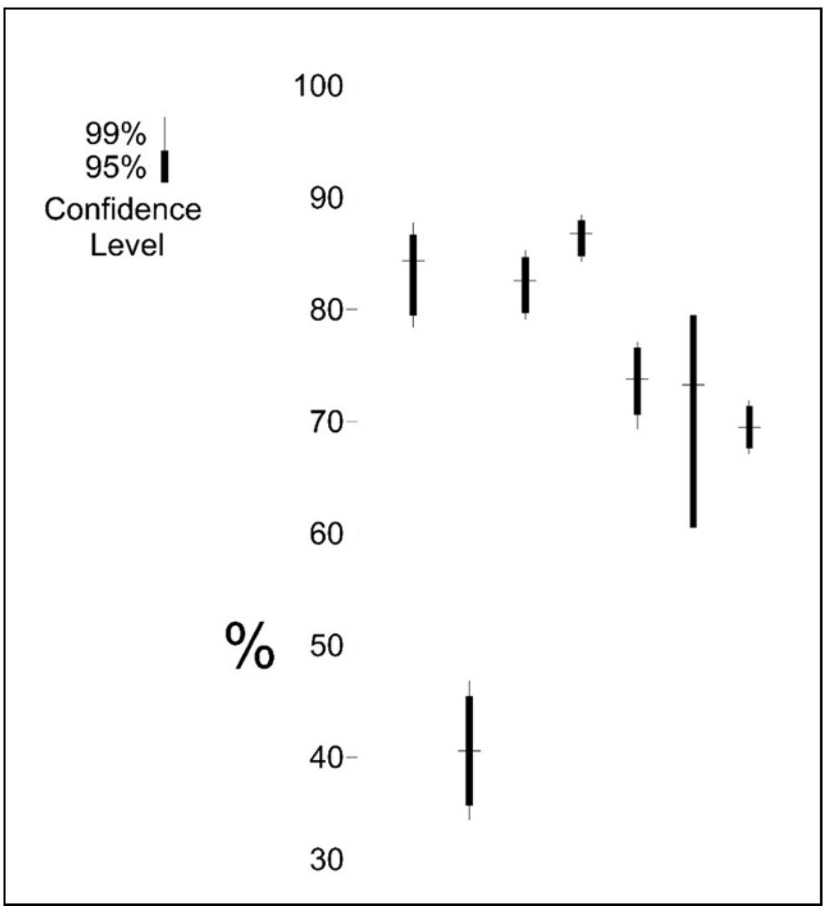

Figure 4.24 The degree of species diversity in Phase 4 features

Among the seven registered cases, one single event (U5_R01) concentrates on only sand clam (*Semele corrugata*) consumption, thus causing a Simpson's Index of Diversity significantly lower than other events (Figure 4.24). The other six cases can also be divided into two groups with 95% confidence: three cases have the highest diversity (>80%) while the other three fall within 70% and 80%. While the confidence level is high, the degree of difference between the two groups is not as dramatic as observed in Phase 3. For the consumption events discussed here, U5_R01 focuses on the consumption of the most common species of sand clam, while other events incorporate more rock species. This corresponds to the tendency in the general context of Phase 4 that the diversity is low in sand species while extremely high among rock species.

4.3.9 Summary

Invertebrate consumption was one of the most crucial subsistence activities at Huaca Negra. While underexploited in Phase 1 and 2 occupations, this category dominates the faunal remains in Phase 3 and Phase 4 regarding overall quantity and increasing density over time. By comparing the two different habitats, the composition of species, the degree of diversity, and the contrast between general contexts and special events, the nature of marine invertebrate exploitation is discussed. This section also illustrates various strategies and behaviors people took in different contexts.

A clear continuity of preferred catchment zone and targeted species can be discerned throughout the discussion, from both the review of the individual units and the more synthetic inter-phase comparison. In addition, the strategy of "targeting specific species in the sand biotope, and incorporating more diversity in the rock environment" was enhanced over time. This can be taken as a developmental trajectory of shellfish exploitation. In Phase 3, when people started to exploit invertebrate heavily, they were willing to try out more different species. As people became more familiar with the environment, available species, and their own preference, suitable strategies are then intensified in the later period of Phase 4, especially in the closer sandy area. There is no clear evidence of resource shortage or overexploitation. However, there were some fluctuations of major species abundance, and it is also evident that substitutional species were incorporated to fulfill demand in response to those fluctuations.

Aside from the general context, the nature of shellfish (and snails), and associated disposal behavior help the identification of specific consumption events. By scrutinizing the contents, it is proposed that these events had different natures: some corresponded to the general pattern and might be the result of daily consumption; others either took the current strategy to the extreme in only taking a preferred kind of food from one location, or they incorporated very different food from diverse loci. These different features are snapshots of how different the shellfish collecting strategies could be for an event. In addition, the fact that people could have various options/ strategies to retrieve resources from surrounding area makes the consistent pattern in the general context observed here more meaningful, as it illustrates a baseline for understanding the background environment and the continuity in resource preference.

It is also worth mentioning that, while there are shell beads found in Huaca Negra, no worked traces are found on either bivalves or gastropods among the 39,631 examined specimens. There is no direct evidence of shell being used as a container (e.g., for pigment, Prieto 2015) either. The invertebrate remains thus reflect the pure *result of human consumption*.

4.4 THE ROLE OF OTHER VERTEBRATE ANIMALS IN HUACA NEGRA

The term "other vertebrate animal" here mainly refers to faunal remains from hunting behavior. Compared with fish remains, other vertebrate animals such as mammals, birds, and reptiles played less significant roles in Huaca Negra in two ways. First, the NISP for the entire 4 mm collection is 854, with 50 extra samples from the 2 mm collection. These 904 specimens include elements that lack diagnostic features thus can only be identified down to class. Second, the diversity of species is very limited as the sample size is small, and fragmented elements impede further identification.

The category of "other vertebrate" presented here includes three sub-categories: (1) hunted mammals including large and middle size game that were incorporated into the site context through human agency. In Huaca Negra, these mammals are mainly marine, such as sea lion and porpoise. Only one terrestrial animal, a dog, was identified throughout the entire collection. (2) Sea bird: sea bird is one of the significant resources widely used in coastal sites due to its accessibility. The hunting strategy for birds differs from other mammals. While they are not abundant, the diversity of bird species is higher than mammal in Huaca Negra, which corresponds to its species composition in the coastal habitat. (3) Small animals: rodent is the most abundant species based on NISP value. However, a concentration of rodent bones usually refers to one individual in archaeological contexts. The relatively complete bones suggest that rodents might have co-existed with people in the site rather than being introduced and consumed by people in Huaca Negra. The occasional reptile would also fit this case. When considering "hunting behavior," rodent and reptile are rarely taken as targeted game because the expected return is low compared with energy invested for hunting. Thus, while rodent and reptile could be consumed, the discussion of hunting will mainly focus on the categories of mammal and bird.

Due to the limited NISP and sporadic distribution of the three categories mentioned above, it will be less meaningful to present faunal remains in the way applied above to fish and shellfish. The density is expected to be low in almost all contexts. In addition, the meaning of the presence of mammal or bird may not be well represented by calculating numbers. The following strategies are taken to better illustrate the scenario of faunal utilization: (1) Incorporating 2 mm data into the general context. As all mammal and bird bones retrieved in 2 mm screen would also have been recovered from the 4mm screens, and the proportions of different species from these two collections are very similar, separating the two context does not tell any new story. The two contexts are thus combined to get a greater sample size. (2) The comparison is be made between categories: as the identified species mainly belong to either bird or marine mammal, the two categories represent different strategies for hunting or technologies to approach targeted game. The comparison between categories will better reveal human behavior from a broader perspective. (3) Following the same logic, this analysis also takes unidentifiable faunal remains into consideration: while the majority of vertebrate faunal remains is not identifiable down to order or family level, the fragmented specimens can be firstly categorized as mammal or bird, which can then be classified into three categories based on body size observed directly from the bones. In this case, large mammal refers to a body size similar to adult sea lion; medium mammal corresponds to body size falling between young sea lion and dogs; small mammal encompasses reptiles or rodents. As for birds, large bird means body size similar to the pelican; medium bird to cormorant, seagulls or Peruvian booby; and small bird corresponds to body size close to Western Peruvian Dove or Peruvian diving petrel. (4) Both NISP and MNI are present as the former makes the number comparable, and the calculation of MNI provides a more vivid picture of faunal utilization.

The identified species mentioned in this section are listed in Table 4.51. In the following sections, the three categories will be presented together following the order of the units. A general comparison between phases will be made afterward, and a preliminary conclusion will be drawn by the end of this section.

Table 4.51 Identified fauna in Huaca Negra

Class	Order	Family	Species	Spanish Name	English Name
Mamíferos	Carnivora	Otariidae	Otaria flavescens	Lobo marino sudamericano	South American sea lion
	Carnivora	Canidae	Canis lupus familiaris	Perro	Dog
	Cetacea	Delphinidae	-	Delfín	Porpoise
	Rodentia	Muridae	Rattus sp.	Rata	Rodent
Aves	Charadiiformes	Laridae	Larus sp.	Gaviota	Seagull
	Columbiformes	Columbidae	Zenaida meloda	Paloma	West Peruvian dove
	Pelicaniformes	Pelecanidae	Pelecanus thagus	Pelicano	Peruvian pelican
	Procelariformes	Pelecanoididae	Pelecanoides garnotii	Potoyunco peruano	Peruvian diving petrel
	Psittaciformes	Psittacidae	-	Perico	Parrots
	Suliformes	Phalacrocoracidae	Leucocarbo bougainvillii	Cormorán guanay	Guanay cormorant
	Suliformes	Sulidae	Sula sp.	Piquero	Peruvian booby
Reptiles	-	-	-	-	Reptiles

4.4.1 Other Faunal Remains in Unit 1

The distribution of unearthed faunal remains is listed in Table 4.52. In Unit 1, a limited amount of animal remains are found during Phase 1 and Phase 2 occupation, and this would have something to do with limited excavation area: 0.17 m^3 for Phase 1 and 0.71 m^3 for Phase 2. The NISP increases in Phase 3 as the volume of excavated area expanded to 10.69 m^3, 15 times more than Phase 2. There are ten mammal remains with three of them being identified as South American sea lion (Otaria flavescens falanges from 50, and from 170-180 cm below the surface). Considering the fast deposit rate in Huaca Negra, the MNI of sea lion should be counted as 2. The absence of bones associated with the meaty part suggests sea lion might be less significant for consumption purposes in this context. Two other individuals are from distinct contexts, and both are unidentifiable fragments.

There are 98 bird elements retrieved from Phase 3. There are two Peruvian Pelican (*Pelecanus thagus*) elements, one fragment from 90 cm below the surface and another cervical bone from 200cm below the surface, making the MNI counted as 2. In addition, one femur and one tibiotarsus of Guanay cormorant (*Leucocarbo bougainvillii*) are found from the same context; thus the MNI is 1. Other than large birds, small birds played a relatively important role in Phase 3 even though only one element can be identified, as Peruvian diving petrel (*Pelecanoides garnotii*). Other 84 small bird elements refer to at least ten individuals (MNI=10) based on the identified/ sided bones and their unearthed contexts. The MNI for medium size bird was counted as three under the same principle.

It can be seen that the importance of hunted animals increases abruptly in Phase 3 in both quantity and diversity. While the considerable variation of soil volume might affect the reliability of the calculation of density, the overall density on Table 4.53 suggests that Phase 3 witnesses increasing fauna usage. Compared with the bird, mammal played a less significant role as the former constitutes 90.7% of total identified game. The implication here is that hunting behavior focused more on bird-catching.

Table 4.52 The NISP of other faunas in Unit 1[7][8]

Phase/ Fauna	Mammal				Bird						Small animals		Total	Density
	Sea lion	LM	MM	M	Pelican	Cormorant	Petrel	LA	MA	SA	Rodent	SM		
Phase 1											1		1	5.9
Phase 2										3			3	4.2
Phase 3	3	1	1	5	2	2	1		11	82	10		118	11.0

Table 4.53 The proportion of identified hunted games in Unit 1

Phase/Fauna	Mammal				Bird				
	Sealion	LM	MM	M	Pelicano	Cormorant	Petrel	MA	SA
Phase 1				100.0%					
Phase 2									100.0%
Phase 3	2.8%	0.9%	0.9%	4.6%	1.9%	1.9%	0.9%	10.2%	75.9%

4.4.2 Other Faunal Remains in Unit 3

The distribution of unearthed faunal remains in Unit 3 is listed in Table 4.54 and 4.55. In Unit 3, hunting activities were limited in Phase 1 as only 7 bird bones were retrieved from excavation, which can be associated with two birds (MNI=2). Unlike the limited hunting scenario presented in Unit 1, Phase 2 in Unit 3 already witnessed increasing hunting activities as the NISP of both mammals and birds grows. Sea lion starts to be present during this time, with one right humerus and one thoracic vertebra from nearby contexts making MNI count as 1. Only one gull (Larus sp.) is identified with two falange elements. In total 77.6% of NISP belong to the category of bird and only 22.4% for a mammal in Phase 2, Unit 3.

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[7] In this and following tables, LM: Large Mammal; MM: Medium Mammal; SM: Small Mammal; M: Mammal that the body size could not be identified; LA: Large bird; MA: Medium bird; SA: Small bird; A: birds that the body size could not be identified.

[8] For the complete animal names, check Table 4.51

While Phase 3 yields a similar amount of faunal remains as Phase 2, both the larger volume of excavated soil and a more significant amount of rodent remains (N=25) undermine the importance of hunted game consumption at this corner of the site. One burnt sea lion lumbar vertebrae represents a limited portion of one individual in Phase 3 context; the porpoise vertebra represents another large mammal individual here. While the total proportion of mammal NISP remains low (10.8%), all elements are related to species that are large in body size. By contrast, bird bones dominate the collection by NISP count (89.2%) while they might contribute a similar amount of meat in total to the large mammals in this context.

Game exploitation drops in Phase 4. This tendency is significant from the perspective of the number of bird remains, while the quantity of mammal remains the same. The sample size is too small to make the proportional comparison meaningful.

Table 4.54 The NISP of other faunas in Unit 3

Phase/ Fauna	Mammal					Bird			Small animal		Total	Density
	Sea lion	Porpoise	LM	MM	M	Seagull	MA	SA	Rodent	Reptile		
Phase 1							1	6			7	4.7
Phase 2	2		1	10	4	2	8	31	8	1	67	16.4
Phase 3	1	1	2				10	23	25		62	10.4
Phase 4	4		2		3			3	2		14	2.8

Table 4.55 The proportion of identified hunted games in Unit 3

Phase/Fauna	Mammal					Bird			
	Sealion	Porpoise	LM	MM	M	Seagull	MA	SA	A
Phase 1							14.3%	85.7%	
Phase 2	3.4%		1.7%	17.2%		3.4%	13.8%	53.4%	6.9%
Phase 3	2.7%	2.7%	5.4%				27.0%	62.2%	
Phase 4	33.3%		16.7%		25.0%			25.0%	

4.4.3 Other Faunal Remains in Unit 5

The distribution of unearthed faunal remains is listed in Table 4.56 and 4.57. Unit 5 contains only Phase 3 and 4 occupation, the former is directly associated with mound itself, and the latter refers to post-mound activities as it is located right on top of the mound. In Unit 5, the tendency is repetitive that birds outnumber mammals regarding with a proportion of 60% (Phase 3) and 66.7% (Phase 4) of NISP.

In Phase 3, a sea lion is represented by one complete falange and a porpoise by one vertebra. As for the bird, Peruvian Booby (NISP=8, MNI=2 based on right ulna) and Western Peruvian Dove (NISP=4, MNI=1) are identified. Two small size birds and one medium size bird are also identified with the right ulna and left femur.

The only case of dog (two molars) appears at 40 cm below the surface within the Phase 4 context. The meatless dental remains should not be associated with consumption. Two falanges of sea lion are also unearthed from the same context (30-50 cm below surface). One seagull femur and two elements from Peruvian booby refer to two different individuals of bird. The general tendency of the ratio between mammal and bird remains similar to other contexts that have been discussed. One thing that makes Phase 4 remains in Unit 5 different is that the medium size bird outnumbered the small size bird, while small size birds tend to dominate the bird population in Unit 1, 3, and most contexts in the following two units.

Table 4.56 The NISP of other Faunas in Unit 5

Phase/ Fauna	Mammal						Bird						Small animal		Total	Density
	Sea lion	Porpoise	Dog	MM	SM	M	Seagull	Booby	Dove	A	MA	SA	Rodent	Reptile		
Phase 3	1	1		7	1	14		7	4		7	18	3	1	64	5.9
Phase 4	2		2	3		3	1	2		2	14	1	2	1	33	3.7

Table 4.57 The proportion of identified hunted games in Unit 5

Phase/Fauna	Mammal						Bird					
	Sealion	Porpoise	Dog	MM	SM	M	Seagull	Booby	Dove	A	MA	SA
Phase 3	1.7%	1.7%		11.7%	1.7%	23.3%		11.7%	6.7%		11.7%	30.0%
Phase 4	6.7%		6.7%	10.0%		10.0%	3.3%	6.7%		6.7%	46.7%	3.3%

4.4.4 Other Faunal Remains in Unit 6

Table 4.58 and 59 list the basic data of faunal remains from Unit 6. Phase 1 in Unit 6 is similar to Unit 3 in that only bird remains are encountered, and the small size bird outnumbered the medium size one.

Not many new species were introduced in Phase 2. There are three porpoise vertebrae from the same context thus MNI=1. Based on the context and siding result, at least two individuals of small birds (NISP=22, MNI=2) and one medium size bird (NISP=5, MNI=1) can be identified. Rodents are also present at this time. In total, 90.9% of identified elements belong to the category of bird, while porpoise alone is another 9.9%.

The excavated volume is close between Phase 2 (5.07m^3) and Phase 3 (5.31m^3), and it seems the latter phase witnesses a slight decline of mammal and bird utilization while the amount of rodent increased (NISP=13, MNI=2). The unique finding in this context is a fragment of whale vertebra. It is expected that people scavenged whale along the beach rather than hunting the whale by themselves. Sea lion is also present in this context with one complete femur with unfused epiphysis and a cranial bone (MNI=1). Another unique tendency here is that the amount of mammal remains dominated the collection in terms of NISP (52.6%) as only 9 bird elements (47.4%) are identified, which represent at least two individuals, one booby, and one small size bird.

While the NISP count reaches a peak in Phase 4 occupation in Unit 6, this would have something to do with the large excavated volume (8.32 m^3). The abundance of faunal remains does increase slightly from Phase 3. Again the bird remains dominate the collection at 78% of NISP. Among these fragments, there are at least two individuals of medium size bird based on two right humeri and one small bird. The MNI of sea lion is 2 as two right femora are unearthed from the same context; this is also a rare case where more than one sea lion was present in one context.

Table 4.58 The NISP of other faunas in Unit 6

Phase/Fauna	Mammal						Bird				Small animals		Total	Density
	Sea lion	Porpoise	Whale	LM	MM	M	Booby	A	MA	SA	Rodent	Reptile		
Phase 1									3	7			10	4.3
Phase 2		3						3	5	22	7		40	7.9
Phase 3	2		1	1	4	2	1			8	13		32	5.9
Phase 4	6			2		1			16	16	2	1	44	5.3

Table 4.59 The proportion of identified hunted game in Unit 6

Phase/Fauna	Mammal						Bird			
	Sea lion	Porpoise	Whale	LM	MM	M	Booby	A	MA	SA
Phase 1									30.0%	70.0%
Phase 2		9.1%						9.1%	15.2%	66.7%
Phase 3	10.5%		5.3%	5.3%	21.1%	10.5%	5.3%			42.1%
Phase 4	14.6%			4.9%		2.4%			39.0%	39.0%

4.4.5 Other Faunal Remains in Unit 7

As can be observed in Table 4.60 and 61, what is unique in Unit 7 is the high amount of rodent present in both Phase 2 and Phase 3. These elements belong to a limited number of individuals as the relatively complete skeleton causes the high NISP. In Phase 3, the MNI of rodent is 3 counting by three right tibias. In Phase 2, the MNI of rodent is 8, retrieved from two distinct contexts, one with 3 complete left pelves and another with 5 complete right femorae. Among these 272 identified elements, 253 of them remain complete (93%). As rodent bones are small and fragile and would not likely stay intact after being consumed, it is suggested that the presence of rodents is not the result of being brought into archaeological context (as food) by human agency. Instead, they might coexist with human occupation. The amount of rodent might have a positive correlation with the intensity of consumption activities, as more food leftovers could support a higher rodent population in one particular area.

Aside from the rodents, the mammal and bird remains remain similar in amount to other units. In Phase 2, the total NISP is 84. Among the identified elements, only three belong to the category of mammal, the sea lion ulna and vertebra, and another one is from a large mammal, possibly sea lion as well. Birds again dominated with 95.2% of identified elements, and the diversity here is slightly higher than in other contexts, as well-preserved bone elements facilitated the identification. Other than the 4 recognized species (each with MNI=1), at least five more individuals of birds (1 for large body size, possibly pelican, 2 for medium and 2 for small size bird) can be claimed in this context.

The amount of mammal remained low in Phase 3: only 2 sea lion bones (one humerus and one falange) fall into this category. The other twelve bird elements constituted three possible individuals. However, the small sample size (NISP=14) prevents us from further discussion of the proportion between the two categories.

In Phase 4, the amount of rodent drops down to a similar standard that has been seen in other units. The sample size remains small for both mammal and bird remains (NISP=21). Sea lion is still present here with humerus bones. Booby and at least one more individual of small body size bird contribute 55% of identified NISP.

Table 4.60 The NISP of Other Faunas in Unit 7

Phase/ Fauna	Mammal				Ave							Small animals			Total	Density
	Sea lion	LM	MM	M	Booby	Seagull	Petrel	Parrot	LA	MA	SA	Rodent	SM	Reptile		
Phase 2	2	1			3	4	1	1	3	30	39	185	3		272	141.7
Phase 3	2				2					5	5	87			101	39.9
Phase 4	2	2	1	4	2						9	14		2	36	6.2

Table 4.61 The proportion of identified hunted games in Unit 7

Phase/ Fauna	Mammal				Ave						
	Sea lion	LM	MM	M	Booby	Seagull	Petrel	Parrot	LA	MA	SA
Phase 2	2.4%	1.2%			3.6%	4.8%	1.2%	1.2%	3.6%	34.5%	47.6%
Phase 3	14.3%				14.3%					35.7%	35.7%
Phase 4	10.0%	10.0%	5.0%	20.0%	10.0%						45.0%

4.4.6 Inter-Phase Comparison

4.4.6.1 Mammal and Bird in Phase 1

Phase 1 occupation is present in Units 1, 3 and 6, with total excavated volume 3.98 m^3. In total there were 17 fauna elements identified, and all belong to the categories of bird. The density is 4.3/m^3, signifying a very low density of animal remains (Table 4.62). The limited sample size corresponds to the general impression of low activity intensity that is also indicated by fish and shellfish remains as mentioned in the previous sections. As the stratigraphy in these contexts shows intermittent human activity sandwiched by pure sand without evidence of human occupation or usage, it is not surprising that only scarce faunal remains are unearthed from Phase 1 contexts.

While these data are limited, the fact that 100% of fauna are bird remains suggests that people tended to put effort into catching birds than other terrestrial or marine animals. In addition, small-size bird (NISP=13) seems more common than medium size ones (NISP=4).

Table 4.62 NISP and density of Phase 1 faunal remains

	Volume	Mammal	Ave	Overall density
Unit 1	0.17	-	-	4.3
Unit 3	1.49	-	7	
Unit 6	2.32	-	10	
Total	3.98	-	17	

4.4.6.2 Mammal and Bird in Phase 2

In Huaca Negra, Phase 2 witnessed the beginning of settled village life. Evidence of architecture construction is found in Unit 7, and living floors are also present in all the excavation units. The nature of village life also is reflected in the increasing degree of consumption activities: intense fish remains are found in this time period (see the previous section). While less significant, mammal and birds were also consumed more in Phase 2 than other phases. This statement is supported by the overall density of NISP (Table 4.63) as it is 15.9/m^3 which is higher than any other phase.

It should be kept in mind that there are variations between units: Unit 1 contains the most limited NISP, which might be related to the constrained excavation area. In contrast, Unit 7 has the densest deposit of mammal and bird remains. The high frequency of food remains probably has something to do with the architecture and the nature of activities held there. The unusual amount of rodent remains (NISP=185) in Unit 7 is associated with many other food remains, implying this area mainly served for larger scale group consumption. The presence of rodent can also be taken as an indicator of sedentary lifestyle.

During this time, birds were frequently caught, while mammal also started to be incorporated into the repertoire. Sea lion is present in Unit 3 and 7; both contexts contain one limb bone and one vertebra. In Huaca Negra, sea lion bones never were found in huge quantity or a concentrated area, but a few pieces would be scattered in the space. This pattern suggests sea lion was never consumed as a whole but divided into portions, maybe in the hunting spot or processing camp. The limited amount/ frequency of sea lion remains argues against the idea that sea lion hunting was one of the major activities held in Huaca Negra (Strong and Evans 1952:41) albeit one of its primary habitats, the Isla Guañape, is fairly close to Huaca Negra. Porpoise also appears in one context of Phase 2. Ideally, porpoise should be associated with fishing activities; the reason to place porpoise here is not only based on its biological classification, but it requires a different technique to catch alive compared with other highly utilized fish species. It is also possible that the limited amount of porpoises was the result of individuals stranded on the beach and scavenged.

In total, the NISP of bird is 8.4 times more than mammals. Among the 159 bird elements, 3 belong to large size species (1.9%), 52 to medium size (32.7%), 97 to small size (61%) and 7 remain undetermined. Small size bird stays the most widely utilized species, and the medium size ones also play a role in Phase 2. As shall be seen, large size bird is infrequently used throughout the occupation.

Table 4.63 NISP and density of Phase 2 faunal remains

Phase 2	Volume	Mammal	Ave	Overall density
Unit 1	0.71	-	3	15.9
Unit 3	4.09	13	45	
Unit 6	5.07	3	30	
Unit 7	1.32	3	81	
Total	11.19	19	159	

4.4.6.3 Mammal and Bird in Phase 3

Phase 3 contains the most massive excavation volume among the four occupation phases, and the NISP is highest (N=239, 44.5% of the total identified mammal and bird). The overall density, however, doesn't support a picture of intense utilization of either mammal or birds, as the density declines from 15.9 in Phase 2 to 6.7/m^3 (Table 4.64). This tendency also echoes the scenario observed for fish remains, that consumption seems to decline at Phase 3.

Two kinds of mammal were present in all five excavation units: sea lion and rodents. As argued before, rodent is taken as a result of coexistence with human occupation, as the long-term human occupation would produce garbage or food left over to support the ubiquitous rodent population.

Unlike rodent, sea lion was apparently brought in to the site by human agency. Although appearing in all the units, the quantity remains small as only nine sea lion bones are collected from the five units. Not only does the very low frequency cause doubt whether sea lion was a significant food resource, but the composition of elements also reveals an interesting fact. Among the nine identified sea lion elements, five are falanges, which is associated with very little meat. In Unit 1, all the sea lion remains are falanges, two of them in a complete form. While the sample size is small, the brought-in falange might serve function or meanings other than food. Two porpoise vertebrae are also present in two of the five units, also suggesting very insignificant or limited usage.

Birds remain to the more significantly utilized category in comparison to mammals. The difference between birds and mammal is not as great as it was in Phase 2, but the tendency continues as the NISP count of bird category is 3.8 times more than mammal. Two pelican elements from Unit 1 are the only evidence for the usage of a large bird. On the other hand, the presence of cormorant, seagull, and booby in this phase increases the species diversity of medium size bird. Among the identified medium size bird, Peruvian booby is present in three different contexts and becomes the most ubiquitous bird species by this period. Small birds such as dove (NISP=4) and petrel (NISP=1) are also registered in Phase 3 occupation.

Among the 188 bird elements, 2 belong to large size species (1.1%), 45 to medium size (23.9%), and 141 to small size species (75%). The proportion of small bird increases from the previous occupation phase and continues to dominate the bird population.

Table 4.64 NISP and density of Phase 3 faunal remains

Phase 3	Volume	Mammal	Ave	Overall density
Unit 1	10.69	10	98	6.7
Unit 3	5.97	4	33	
Unit 5	10.93	24	36	
Unit 6	5.32	10	9	
Unit 7	2.53	2	12	
Total	35.44	50	188	

4.4.6.4 Mammal and Bird in Phase 4

The densities of mammal and bird are surprisingly low in Phase 4 (Table 4.65): the 3.7/m^3 yield is even lower than Phase 1. A similar pattern of Phase 4 decline is notable in the fish remains, but the overall density is still higher than Phase 1, as the nature of occupation is different between the two phases. Thus, the extremely low density of game in Phase 4 requires attention and explanation.

Although the frequency of mammal/ bird usage kept declining through time, one thing remains the same: as in Phase 3, sea lion and rodent is present in all four contexts of Phase 4 occupation, making 100% ubiquity[9]. The waning of rodent in both quantity (138 to 20) and density (3.9/m^3 to 0.7/m^3) might suggest less dense human occupation in the post-mound, Initial Period, or change in the nature of activities held on the site; this might echo the overall decrease in density of remains in this period.

[9] In this case, the ubiquity is counted base on four contexts (Unit 3, 5, 6, and 7) rather than all the arbitrary levels as the sample size (amount of remains) is very small.

While the amount is always limited, the usage of sea lion slightly increased in Phase 4 (NISP from 9 to 14, overall density from 0.3/m^3 to 0.5/m^3). Unlike Phase 3, when falanges were the majority of sea lion remains, only three falanges (two complete) were found in Unit 5 and 6. Bones associated with meaty parts such as femur (N=3), humerus (N=1), scapula (N=1), radius (N=1), and ulna (N=1) constitute 50% of total sea lion NISP, which makes the scenario that sea lion served as a meat source more plausible than it is in Phase 3.

Proportionally speaking, the difference between the quantity of mammal and bird reaches its minimum in Phase 4 as the NISP of bird is only 1.8 times more than mammals. It is difficult to claim that people exploited “more” mammals than before, as the sample size remains small,; the decline mainly happens to the category of bird. The overall density of mammal stayed in similar from Phase 3 (1.4/m^3) to Phase 4 (1.3/m^3). In contrast, the density of the bird remains drops from 5.3/m^3 to 2.4/m^3 and causes the general tendency of waning.

Another different pattern revealed in Phase 4 is that, among the 66 bird elements, 35 are categorized as medium size (53%), 29 are small size species (43.9%), and two other undetermined. No large bird was present in Phase 4, and this is the only period where the medium size bird outnumbered the small ones. While the data might be insufficient to draw a clear conclusion or convincing interpretation, the difference could be due to different food preference, or change in the availability for targeted birds.

Table 4.65 NISP and density of Phase 4 faunal remains

Phase 4	Volume	Mammal	Ave	Overall density
Unit 3	5.04	9	3	3.7
Unit 5	8.9	10	20	
Unit 6	8.32	9	32	
Unit 7	5.52	9	11	
Total	27.78	37	66	

4.4.6.5 Diachronic Changing Patterns in the Utilization of Mammal and Bird Resources

While the sample size is limited in many contexts discussed above, lumping the data from the same occupation phase is a way to even out the various functions at different corners of the site. The following discussion provides overall patterns of the utilization of mammal and bird remains.

A. <u>Overall density</u>

Figure 4.25 illustrates the density of mammal and bird remains in each phase. As bird always outnumbers mammal by a significant amount, the overall density corresponds closely to the bird density that peaks in Phase 2, starts to decline in Phase 3 and reaches the lowest density in Phase 4. By contrast, the utilization of mammals remained to similarly low regarding density, as limited pieces are unearthed in all four contexts discussed here.

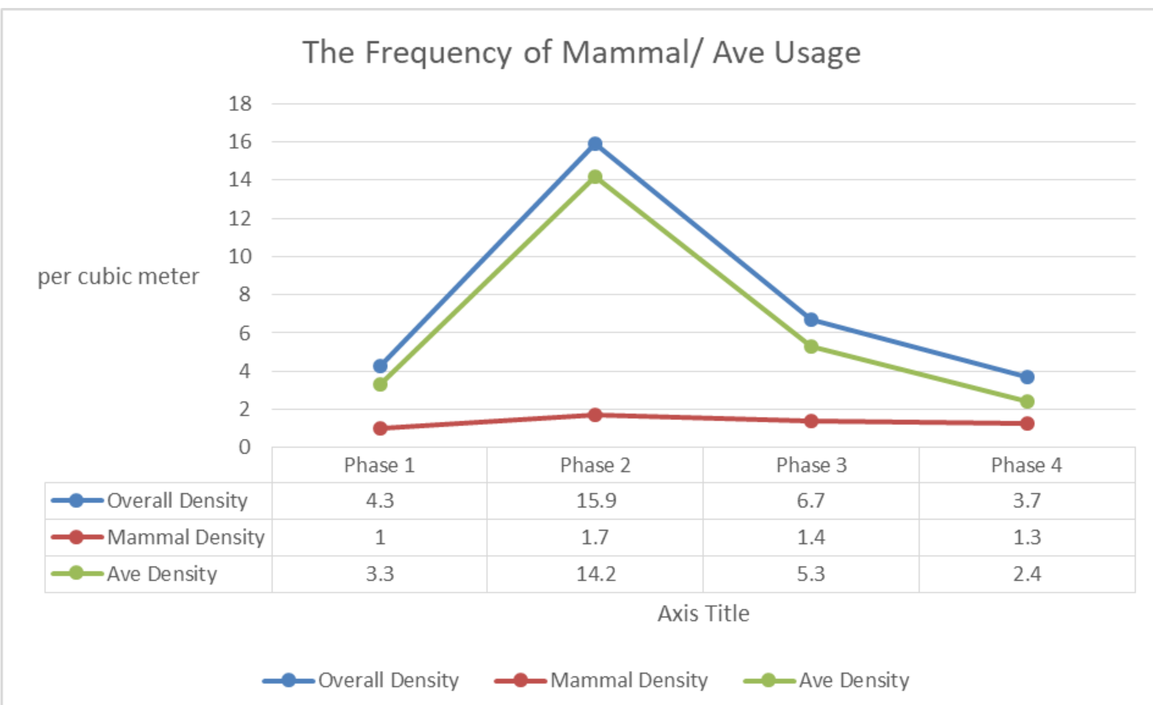

Figure 4.25 Diachronic change of mammal/ bird density

B. Proportional comparison

As mentioned at the beginning of this chapter, the proportional comparison should shed light on the emphasis on certain kinds of food resources, and a possible shift from one to another, or how the utilization of food resources remained stable throughout the history of occupation. When comparing the remains between mammal and bird (Figure 4.26), the overall scenario remains the same while a slight fluctuation can be observed between phases. The fluctuation has more to do with the general trend that the usage of bird declines through time, rather than the usage of mammals increasing.

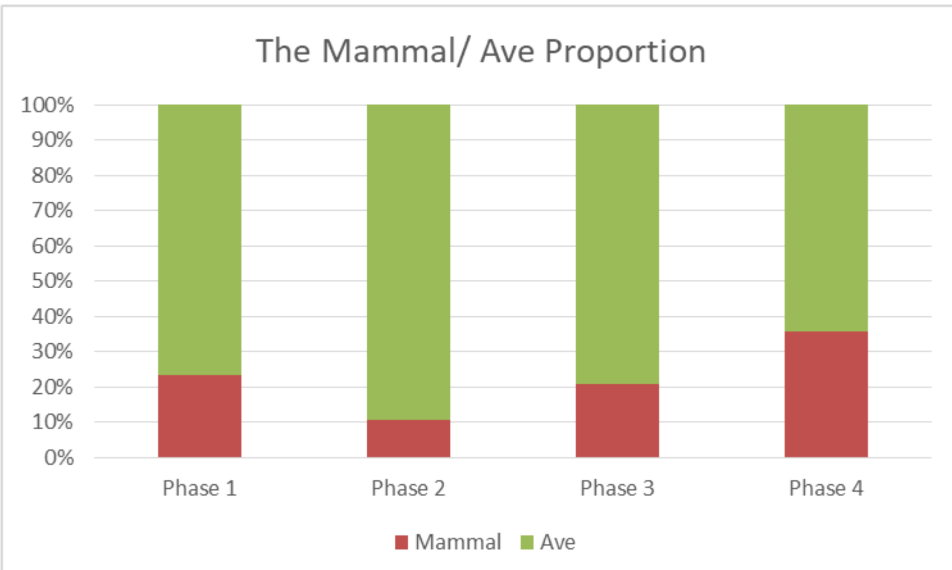

Figure 4.26 Ratio between mammal and bird

A comparison can be made between different categories of bird, based on their body size. The large bird such as pelican never actually play a role in bird catching activities. On the other hand, small size birds are the primary targeted games until the end of Phase 3. Phase 4 is the only period that people focus more on larger, medium size bird (Figure 4.27).

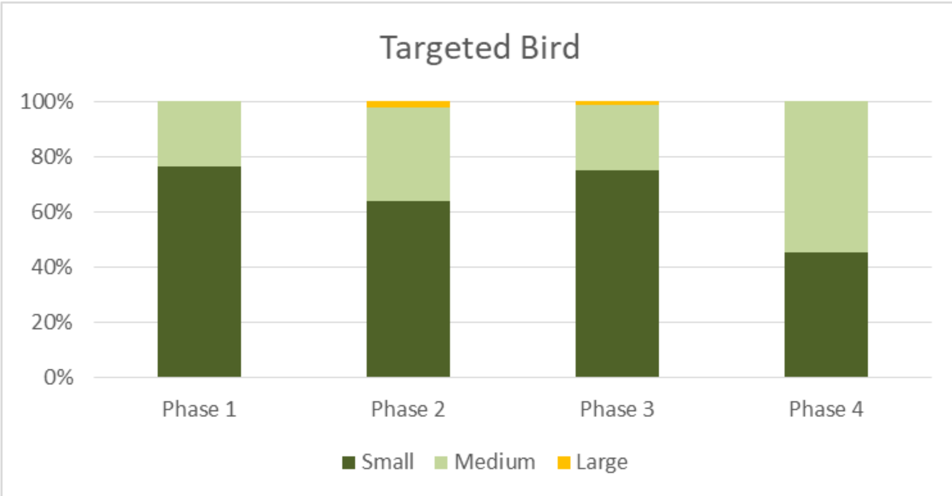

Figure 4.27 The proportion of targeted bird

The limited sample size of identified species makes it difficult to discuss the diversity of species for mammal and bird remains, but information about habitat can be addressed. Among all identified birds, only one dove (MNI=1) and one parrot (MNI=1) is associated with the inland environment. All the other species (pelican, cormorant, booby, seagull, and petrel) are marine birds and tend to be associated with rocky nesting substrates, which is also the rookery for sea lion. Current data suggests that people in Huaca Negra *rarely went inland* for hunting. Instead, birds were caught from the surrounding environment, as small birds are available from the site area to the beach 1.2 kilometers away. Bird catching could have been an *opportunistic* event on the way fishing or back home from the beach, as no evidence supports frequent intake or utilization.

While previous excavation suggested sea lion bones were common at Huaca Negra in Guañape Period (Initial Period, Phase 4 in this project) (Strong and Evans 1952:40), that is not the case regarding the number of remains in this project. Sea lion is present in all the Phase 3 and Phase 4 contexts discussed here (ubiquity= 100%), but sea lion hunting never played a significant role in the life of Huaca Negra, nor did other mammal hunting activities.

4.5 THE BOTANICAL REMAINS IN HUACA NEGRA

In the context of the Andean Coast, plants can be associated with the subsistence system in two different ways, as direct sources of food (e.g., maize), or as industrial cultigens for making tools related to subsistence activities (e.g., cotton for fishnets and gourd for net floaters). While cotton relates to textile production (i.e., craft production), the discussion of botanical remains is made under the category of the subsistence system. On the one hand, this facilitates the discussion of botanics by taking it as a single type of material remains. On the other hand, the importance of shoal fish resources that would have been caught by net is already demonstrated. Thus, it is appropriate to associate fishing activities with cotton remains as the quantity of textile is relatively limited in Huaca Negra.

In contrast to the fauna, botanical remains are limited in Huaca Negra. While organic materials tend to preserve well in the Peruvian North Coast, this is not the case in Huaca Negra. Huaca Negra is surrounded by dry land, orchards, and pasture nowadays, and sunken fields. In addition, the area south of the site used to be a swampy water body at the time Willey conducted the survey and Strong and Evans excavated the site (Strong and Evans 1952, Willey 1953). These are factors introducing water to the nearby environment. The fact that the human occupation rests on a sand base also causes preservation issues as the organic material would have been affected by changes of the underground water table (Bird et al. 1985: 19). While Strong and Evans did find cotton and gourd from the Preceramic context, no botanical remains were retrieved from the Initial Period context in their Strata Cut 1 (Strong and Evans 1952: 41). In fact, it was the low density of artifact remains (especially the perishable material) that impeded Junius Bird's attempt to excavate Huaca Negra, causing him to shift his interest to Huaca Prieta in the Chicama Valley (Bird et al. 1985: 19).

In the 2015 excavation, botanical remains were retrieved from both 2 mm and 4 mm collections. The macro-botanical identification was made by Giancarlo Ubillus, a biologist from the Universidad Nacional Mayor de San Marcos. The total amount of botanical remains is limited. Thus, it makes less sense to present the data by excavation unit. Instead, the botanical data will be addressed by occupational phases, so that a general idea of the utilization of plants in each phase can be illustrated.

There are only six species identified from the entire collection of macro-botanical remains, while there are also remains that can be broadly categorized into *Poacae*, *Fabaceae* and *Cyperaceae* families. The identified botanical species and their associated function are listed in Table 4.66.

Table 4.66 Identified botanical species in Huaca Negra

Class	Family	Species	Common Name	Usage
Dicotiledonea	Cucurbitaceae	*Lagenaria siceraria*	Gourd	Industrial
Dicotiledonea	Cucurbitaceae	*Cucurbita sp.*	Squash	Food
Dicotiledonea	Fabaceae	.	Legume	Food
Dicotiledonea	Malpighiaceae	*Bunchosia armeniaca*	Peanut butter fruit	Food
Dicotiledonea	Malvaceae	*Gossypium barbadense*	Cotton	Industrial
Dicotiledonea	Myrtaceae	*Psidium guajava*	Guava	Food
Monocotiledonea	Cyperaceae	.	Reed	Industrial
Monocotiledonea	Poaceae	*Zea mays*	Maiz	Food
Monocotiledonea	Poaceae	.	.	.

4.5.1 Botanical Remains in the Phase 1 Occupation

In general, the Phase 1 occupation in Huaca Negra yields the most limited material remains due to the nature of the lifestyle, and this tendency also applies to botanical remains. Out of the total of 4 m^3 excavated soil that was screened by the 4 mm mesh, only 57 carbonized cottonseeds are collected, from 0.07 m^3 of soil associated with a feature in Unit 3. This feature was a lens of ash that was amorphous and deposited at the uppermost part of Phase 1 strata, suggesting the botanical remains could be associated with an open-fire event held near the end of Phase 1.

Other than the 4 mm screen, there are 21 2-liter soil samples that belong to Phase 1 strata. Among the 21 samples, only the soil sample from the abovementioned feature, the fire area in Unit 3, produces botanical remains, including four cotton seeds and another thirteen fragmented, unidentifiable seeds.

While the quantity and density of cotton seeds are high at the feature of Unit 3, this feature is the only Phase 1 context where botanical remains are found. The utilization of plants appears limited, although the issue of preservation should not be excluded. As can be seen, cottonseed form the majority of botanical remains, but its relationship with fishing activities can only be speculated. Furthermore, no evidence of string or fishnet is found in this Phase 1 context. As discussed at the beginning of this chapter, fish remains are also limited in this period. Thus, rather than serving for industrial production such as string for fishnets, the possibility that plants were taken as fuel cannot be excluded. This is also valid as the unearthed context, the firing event specifically and Phase 1 in general, are not associated with a significant amount of fish remains.

4.5.2 Botanical Remains and the Phase 2 Occupation, the Pre-mound Village Life

Phase 2 is the time that abundant botanical remains began to be incorporated into people's daily life. Table 4.67 summarizes the botanical remains retrieved from the 4 mm screen and Table 4.68 from the 2 mm screen. As the epicarp, stem, and root are fragmental, only seeds that were more than 50% preserved are taken for number counting. The others are shown as present in the following tables.

As can be seen, Unit 3 is the location that yields most abundant botanical remains during Phase 2 in both 4 mm and 2 mm collections. In the 4 mm context, cotton dominates the botanical population, and one piece of gourd was also retrieved. Food resources such as legume (*Fabaceae* family) and guava are also present in Unit 3, but the quantity is insignificant.

The scenario changed significantly in the 2 mm collection, where the total amount of food resources, mainly guava and legume seeds, outnumbers the cotton seeds by 3.4 times. This makes sense as guava seed and other fragmented legumes are small in size and would be caught by the finer screen, causing the difference between the two sets of data. It is important to note that the 2 mm botanical collection provides direct evidence of the utilization of plants as food resources. However, the comparison of counts should be taken with caution, as guava is a fruit with very high seed production rates, so that one single guava yields hundreds of seeds. During Phase 3, guava seeds are concentrated in Unit 3, another sample is from Unit 7, and they are absent in Unit 1 and Unit 6. The uneven distribution implies the possibility that guava was occasionally consumed only in certain contexts in this time.

This spatial distribution of botanical remains suggests Unit 3 might be an area where more consumption activities took place. The fact that the 2 mm collection in Unit 3 also yields the densest fish remains also supports this idea. In addition, cotton seeds were also concentrated in this area, implying a space with multiple functions, likely to be a household context.

Table 4.67 Quantity of botanical remains from 4 mm collection, Phase 2 strata

Species	Common Name	Unit 1	Unit 3	Unit 6	Unit 7	Total	Note
Gossypium barbadense	Cotton	41	364	4	91	500	seeds
Cyperaceae (family)	Reed		present				2 roots
Psidium guajava	Guava		present				1 epicarp
Lagenaria siceraria	Gourd		present				1 epicarp
Fabaceae (family)	Legume		1		2	3	seeds

Table 4.68 Quantity of botanical remains from 2 mm collection, Phase 2 strata

Species	Common Name	Unit 1	Unit 3	Unit 6	Unit 7	Total	Note
Gossypium barbadense	Cotton	3	35	1	8	47	seeds
Psidium guajava	Guava		75		1	76	seeds
Fabaceae (family)	Legume	6	73	7	9	95	seeds

4.5.3 Botanical Remains and the Phase 3 Occupation, the Mound Construction and Usage

Botanical remains retrieved from Phase 3 strata are listed in Table 4.69 (4 mm collection) and Table 4.70 (2 mm collection). Again, cottonseed is the most abundant type in the 4 mm collection, which is mainly concentrated in Unit 3. The amount of unearthed cottonseeds also increases in Unit 1. Other than that, there are also five gourd fragments found in Unit 1, and this is the only occasion where gourd is found in the Phase 3 occupation. Among the limited samples, squash (*Cucurbita sp.)* is newly incorporated into the inventory, as it can be found in both 4 mm and 2 mm collections during this time.

It is also clear from the 2 mm collection that during the Phase 3 occupation, Unit 1 and Unit 3 are the loci yielding the most abundant botanical remains. By contrast, the core area of the mound (Unit 5) seems to contain the least botanical remains. This tendency corresponds to the expectation that the space on the mound served a public purpose, thus it contains fewer materials. While the number is limited, squash seeds were retrieved from both 4 mm and 2 mm collections, and from three out of five units, which implies the introduction of more edible plants into daily life during Phase 3 occupation.

Table 4.69 Quantity of botanical remains from 4 mm collection, Phase 3 strata

Species	Common Name	Unit 1	Unit 3	Unit 5	Unit 6	Unit 7	Total	Note
Lagenaria siceraria	Gourd	present						5 Epicarp, 1 is perforated
Cucurbita sp	Squash	12					12	seeds
Gossypium barbadense	Cotton	204	328	24		90	646	3 stems, seeds
Poaceae (family)	.	present						stems
Dicotiledonea (class)	.	present						stems

Table 4.70 Quantity of botanical remains from 2 mm collection, Phase 3 strata

Species	Common Name	Unit 1	Unit 3	Unit 5	Unit 6	Unit 7	Total
Cucurbita sp	Squash	4	1		2		7
Fabaceae (family)	Legume	21	35	1	24	4	84
Gossypium barbadense	Cotton	25	36	1	12	7	81
Psidium guajava	Guava	36	13		2	1	52

4.5.4 Botanical Remains and the Phase 4 Occupation, the Post-mound, Initial Period

Botanical remains retrieved from Phase 4 strata are listed in Tables 4.71 and 72. In the Phase 4 occupation, two more species, *Bunchosia armeniaca* (peanut butter fruit, locally known as cansaboca) and *Zea mays* (maize), were incorporated into the repertoire. While no more examples of squash were found from this period of time, the presence of two new food plants and the fact that legume remained relatively abundant in the 2 mm collection both suggest that people focused slightly more on cultigens for food. Maize and peanut butter fruit, while present, are only found in one of the four excavation units, and none of them is from the 2 mm collection, implying a rather low frequency of utilization. As the two species are also low in quantity in the contemporaneous coastal site of Gramalote in Moche Valley (Prierto 2015), this pattern might reflect a general life style in the early North Coast.

Similar to the preceding periods, what was gathered from the 2 mm collection are legume, cottonseed, and guava seeds. It is clear that legume and cottonseed remain similar in quantity, but guava seed drops down to a very insignificant amount, especially when considering the quantity of seed each individual fruit can yield.

Table 4.71 Quantity of botanical remains from 4 mm collection, Phase 4 strata

Species	Common Name	Unit 3	Unit 5	Unit 6	Unit 7	Total	Note
Fabaceae (family)	Legume				1	1	seeds
Bunchosia armeniaca	Peanut butter fruit	2				2	seeds
Gossypium barbadense	Cotton	15	12		189	216	seeds
Zea mays	Maize		1			1	cod

Table 4.72 Quantity of botanical remains from 2 mm collection, Phase 4 strata

Species	Common Name	Unit 3	Unit 5	Unit 6	Unit 7	Total
Cucurbita sp	Squash		1			1
.	Legume	16	41	17	15	89
Gossypium barbadense	Cotton	25	22	4	25	76
Psidium guajava	Guava	2	1	3		6
Dicotiledonea (class)	.		2			2

4.5.5 Inter-phase Comparison of Botanical Remains

According to the diachronic comparison and the comparison between 2 mm and 4 mm collections, it seems clear that there is a systematic bias in the 4mm collection made in the field: cottonseed seems to preserve better and is more identifiable therefore it always outnumbers other species in this dataset. The 2 mm collection, on the other hand, effectively reduces this bias as soil samples were bagged in the field, screened in a controlled environment, and remains were picked through with appropriate tweezers. Thus, albeit the amount of identified species and collected botanical remains are limited, information on the subsistence system can be captured in two ways: (1) the diachronic change in cottonseed density from the 4 mm collection, and (2) the ratio between this industrial plant and species related to food resources from 2 mm collection.

Figure 4.28 illustrates the density (per m^3) of cottonseed from the 4 mm collection, and it shows a dramatic declining tendency over time, which *corresponds well with the observed pattern in density of fish remains* (see Figure 4.1). When applying linear regression analysis, there is a significant and positive correlation between the density of cottonseed and fish remains from 4 mm collections ($R=0.999$, and $p=0.013$, Figure 4.29). This correlation between fish and cottonseed supports the original idea that cotton is strongly associated with fishing activities.

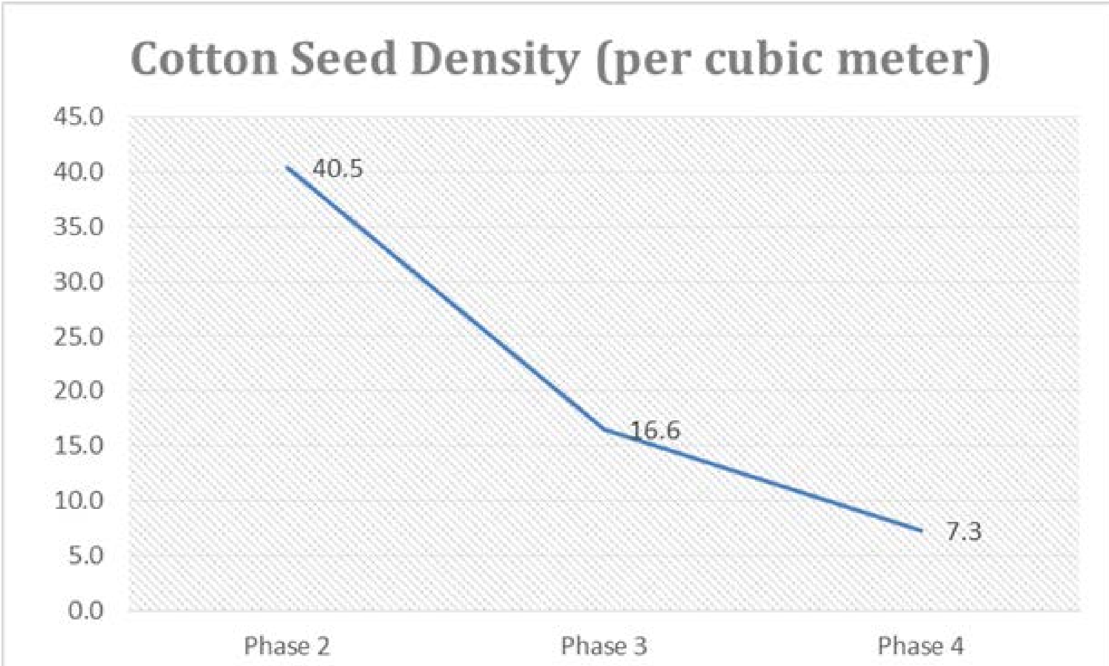

Figure 4.28 Diachronic change in cotton density

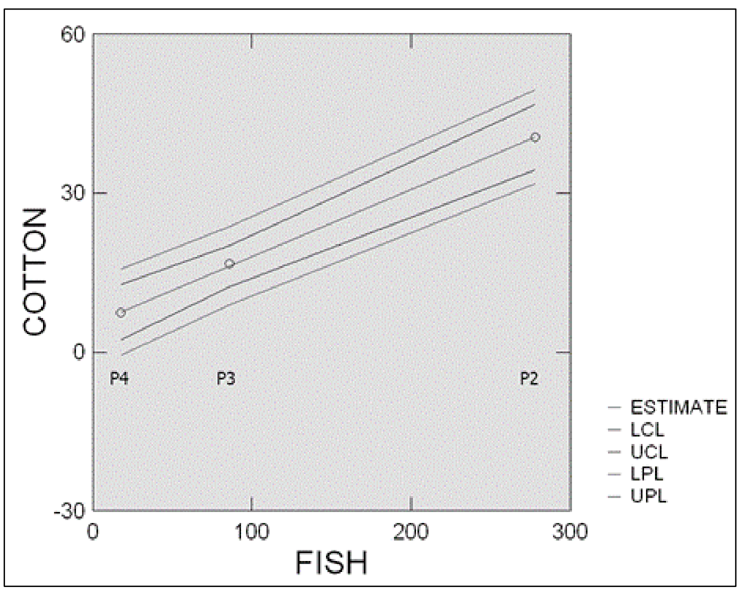

Figure 4.29 Linear regression of fish/ cottonseed density

To compare the relationship between industrial and food cultigens, cottonseed (representing industrial plant), and legume and squash (together standing for the food cultigens) are chosen for the comparison. The count of guava seed is excluded in this comparison not only because of the huge amount of seed in each individual fruit, but also because it is a resource that can be *gathered* in the surrounding area, rather than cultivated. As can be seen from Figure 4.30, the density of macro-botanical remains from the 2 mm collection is low, and neither industrial nor food cultigens exceeds a density of 0.5 per liter. Other than that, it is clear that food cultigens outnumber the industrial ones in Phase 1 and 2 by more than two times. The tendency slightly changes as the ratio between the two categories gets closer to 1:1 during Phase 3 and 4.

Two points should be mentioned when comparing the 2 mm contexts. (1) The decline of food cultigens in Phase 3 and 4 seems to contradict to the intuition that more cultigens should have been incorporated into daily life during the Initial Period. (2) In the 2 mm collection, the density of cottonseed stays stable throughout Phase 2 to 4 and only slightly drops in Phase 3. This tendency significantly opposes the result of 4 mm collection discussed above; therefore no certain conclusion can be drawn at this point. However, the fact that cottonseed is systematically collected from 4 mm screen, and it represents a much larger sample size (regarding soil volume), make cottonseed density from this context a more reliable proxy when only considering cotton remains.

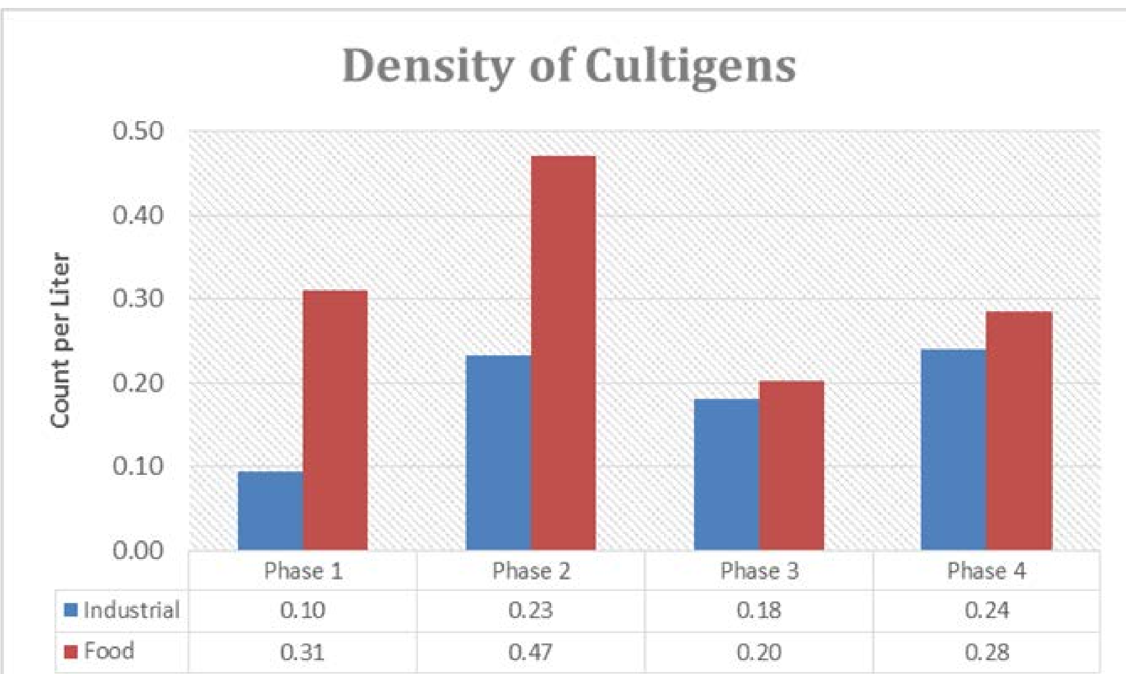

Figure 4.30 Comparison between the density of food and industrial cultigens from the 2mm collection

4.6 SUMMARY AND DISCUSSION OF SUBSISTENCE ACTIVITIES

This chapter presents the diachronic changing patterns of various subsistence resources, including fish, invertebrates (shellfish), mammal, bird, and botanic remains. While each category reveals a clear tendency of changes over time, a synthetic comparison helps to illustrate the social implications. In the following discussion, botanical remains and remains from Phase 1 contexts are excluded, as the limited data prevents further interpretation. For the rest of the faunal remains, cross-comparisons of general quantity, the degree of diversity, and catchment areas are made to further illustrate associated human behaviors. A general interpretation of subsistence activities concludes this chapter.

4.6.1 The Abundance of Subsistence Remains

Other things being equal, the abundance of faunal remains represents the relative importance of each exploited resource. In the case of Huaca Negra, all the materials were retrieved under the same field procedure, which makes the degree of abundance comparable between different categories, and the changes in quantity can be used to infer people's focus of resource exploitation.

Figure 4.31 summaries the density (per m^3) of different kinds of fauna from the 4 mm screen collection. The previous discerned patterns become even more evident when putting fish, shellfish, and other fauna together, and it can be seen that the emphasis on shellfish collecting increased while fishing activities declined through time. However, this is not to state that shellfish *replaced* fish as the major source of food, as the NISP should not be directly translated to the meat amount without further examination and calculation. The idea here is to present the shift of targeted food sources and the possible change of related activities.

As can be seen in Figure 4.30, it is clear that only fish and shellfish played a significant role throughout the history of occupation, while other faunal resources were possibly encountered and occasionally gathered without a purposeful plan for related hunting activities. This speculation is also supported by the lack of hunting tools from the current excavation.

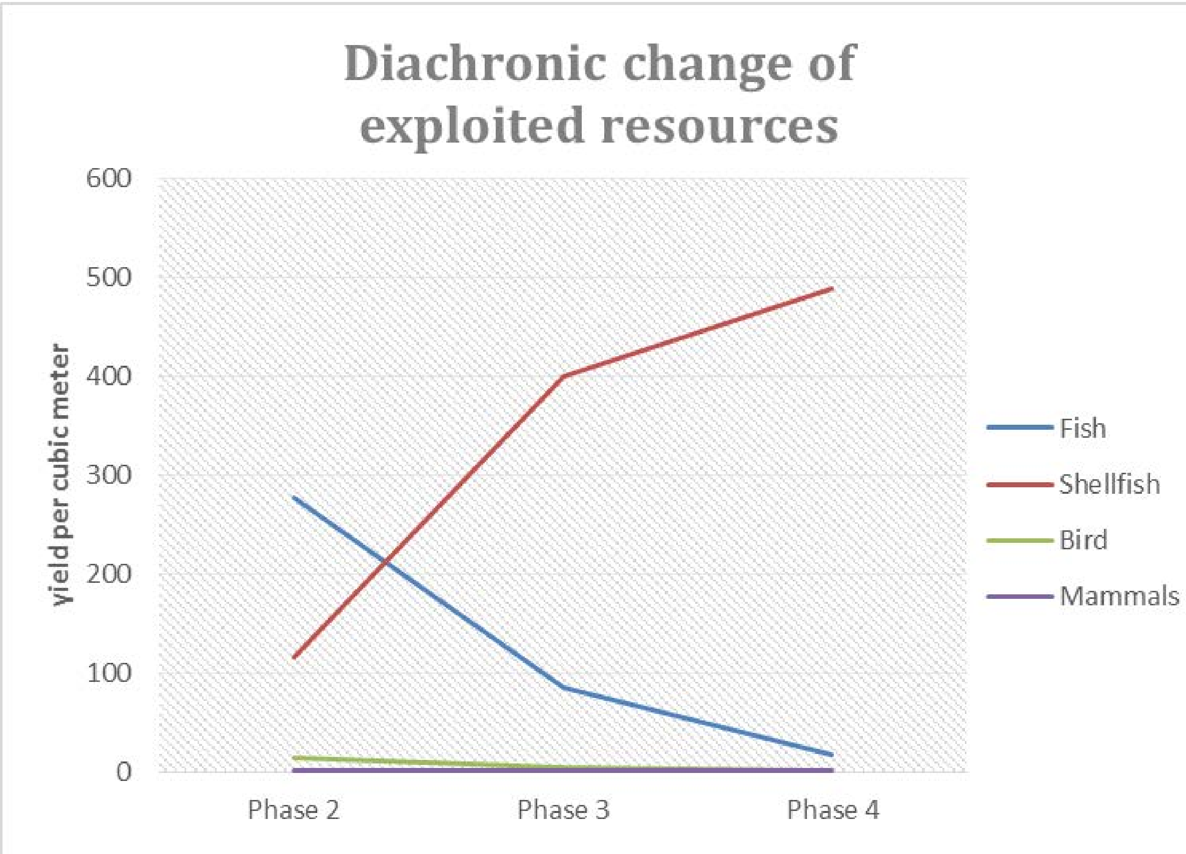

Figure 4.31 Comparison of fish and shellfish density

4.6.2 The Implication of Catchment Zones and Species Diversity

4.6.2.1 The Exploitation of Marine Resources from an Ethnographic Perspective

Given the focus on fish and shellfish, it is essential to bear in mind that fishermen and shellfish collectors would have to decide their strategies regarding "where to go for fishing or collecting shellfish" and "what kind of resources to target in a fishing/ collecting trip." These decisions were not only reflected in the quantity of broader categories discussed above, but also worth scrutinizing within each category, as they can be associated with different degrees of expertise and labor investment. In early ethnographic work done in Huanchaco, the fishing village north of the Moche Valley, Gillin identifies four methods to acquire marine products, including fishing from a sailboat, fishing from caballitos del mar (traditional reed floats), gathering shellfish and sea plants by wading, and fishing with hooks and lines from the shore (Gillin 1947:28-36). This classification illustrates a fundamental category of activities exploiting marine resources, and the following paragraphs attempt to put some flesh onto this framework from an ethnographic perspective. One can distinguish the fish caught from shore and the ones that require boat trips to an off-shore area. Shellfish gathering is another realm of study, and its review will be focused on issues such as labor division.

Incorporating his own interviews and previous ethnographic work, Prieto is able to illustrate a vivid picture of marine resource exploitation regarding tool preparation, labor division, and seasonality (Prieto 2013, 2015, 2016). Based on these works, it is clear that fishermen will choose their equipment based on the targeted prey and how far their trip would be from the shore. Other than hook/lines, cast nets, and scoop nets that are used year round, different kinds of trawl lines, haul seines, and gill nets, with different mesh size varying between 1 and 8 cm, are used in different seasons. The judgment is made according to the seasonal availability of targeted species in the ocean (Prieto 2015). The tools applied are also affected by the catchment zone. For example, in his ethnographic study in the Peruvian coastal community, Gillin mentioned that Moche fishermen sometimes didn’t use watercraft but applied various kind of tools, mainly lines and hooks, to conduct fishing from the shore, and this could be a year-round activity.

Other than fishing gear, the boat is another technology that is fundamental for fishermen to earn their living. Evidence of boats in the Central Andes can be traced back to the Preceramic Period as evidenced by the faunal remains that stand for off-shore fishing activity (Richardson and Heyerdahl 2001). Edwards' thorough survey and literature review provides the complete record of watercraft in South America, including hide floats, sewn bark canoes, plank canoes, gourd rafts, reed rafts, dugout canoes, and log rafts. His work also demonstrates that the log raft is capable of traveling between Ecuador and Peru (Edwards 1965). Another early ethnographic survey done by Brüning in the Lambayeque region suggests that wooden sailing boats began to be used by around the 1920s (Schaedel 1989). The implication of this observation is that watercraft technology was not subject to rapid change in the Central Andes, providing some ground for taking reed floats as (one of) the traditional boats for offshore fishing activity.

Another example of watercraft usage comes from Hammel and Haase (1962) as they also conducted an ethnographic survey of fishing communities along the Peruvian coast. In this work, they also recorded cases from Guañape and Puerto Moorin, two settlements that are 1.6 km apart and very close to the investigated site (Huaca Negra is 0.6 km from Guañape). According to Hammel and Haase, people in Puerto Moorin tended to fish from the beach, while the chalana (a plank made small vessel mainly for inshore fish) was occasionally used. In contrast, the traditional reed float was commonly used in Guañape village (ibid). What is fascinating about this work is that Hammel and Haase registered different tool assemblages for fishing, even within such a close spatial setting that people from both villages could access the same fishing field.

There are a few more factors that should be addressed regarding the construction and maintenance of the reed float, as this is a boat type considered traditional and unique in the current cultural context. Firstly, Prieto provides a clear process of reed float construction, and it is known that the size of reed float varies according to the body size of its human user because it affects the stability of the boat. As can be imagined, careful measurement is crucial for making a good reed boat (Prieto 2015:539). Secondly, a reed float is not long-lasting equipment. Instead, due to the nature of reed material, it lasts for only 15-30 days depending on the frequency of usage (ibid). Thus, reed floats should be considered as an ocean-goingtool that requires constant effort for the rebuilding process. Both aspects mentioned above indicate a considerable labor investment for using this critical equipment.

In contrast to fishing activity that requires entering a realm in which fishers would need the support of an artificial device to survive, shellfish gathering is a more straightforward subsistence activity regarding the required equipment. However, this is also a complex activity that evokes a lot of intriguing issues. For example, whether shellfish should be considered as high-return or low-return resources is hotly debated within and beyond the Andean context (Erlandson 1988, 1991, 2001; Osborn 1977; Raymond 1981; Wilson 1981). One classic example of shellfish gathering activity comes from Meehan's work on Anbarra people in Australia, where she systematically records shellfish collection, processing, disposal, and hunting performance by different individuals or groups (Meehan 1982). One crucial insight from Meehan's work comes from her careful evaluation of the role of shellfish in the total diet. The result suggests that, in this resource-rich environment, the proportion of shellfish net weight varies between 6.5-19.7% of the total food weight, 8.2-26.2% for protein, and 2.5- 8.5% for calories. As Anbarra people diversify their diet, shellfish does not dominate the diet but plays a relatively stable role. However, it was in January, the only season when people's daily calorie intake was lower than the recommended value, that shellfish was most heavily exploited (ibid). The implication here is that shellfish might be a good supplemental resource that was available to fulfill nutritional needs.

As shellfish gathering is a subsistence activity that has a lower technology threshold, an important aspect closely related to the current discussion is the labor division in the community. In fact, it is a common assumption that women are the ones in charge of shellfish gathering in most villages that depend on marine resources. Meehan's work in Australia shows that it is women and children who play a crucial role for shellfish gathering. There are occasions when two-year-old children were brought to the beach, and they still contributed a little to the collection (ibid: 123-124). More interestingly, men also occasionally participate in shellfish gathering, but their average travel distance is higher than women, and the gross weight of shellfish they collected per day is also greater than women (ibid: 125).

A similar tendency can also be seen in the Peruvian ethnographies. Brüning documented both women and men gathering mollusks and seaweed in the Lanbayeque area (Schaedel 1989). In the Moche Valley, Gillin recorded that women and children were the ones collecting shellfish and seaweed from the beach (Gillin 1947). In Puerto Morin, Virú, Hammel and Haase also noticed that it was women gathering shellfish, octopus, and seaweed. The case in Puerto Morin also suggests that there were no tools used for shellfish collection (Hammel and Haase 1962), while in other cases digging tools or containers were recorded. Data from Huanchaco collected by Prieto is also fascinating regarding the labor division. Here both women and men work on shellfish gathering, but men work less frequently. More importantly, albeit both men and women know how to predict the tides, women are the ones who learned the relation between the tide and the moon's phases by special songs. The knowledge also passes specifically to girls as they are the ones to be trained as specialists in *gathering* resources from the marine environment (Prieto 2015: 841-842). Both in the north coast of Peru and other parts of the world, women and children play more significant roles for gathering shellfish.

Extending from previous paragraphs, it is also worth discussng some research specifically on children's role in shellfish gathering as they also contribute, and are trained to contribute to this specific activity. In Australia, Bird and Bird's works at Merian Islands reveal different behavior patterns between children and adult collectors (Bird and Bird 1997, 2002). On the one hand, children's role in shellfish gathering can be a more opportunistic one when they are playing or fishing on the beach, thus less efficient than adults (mostly females) in the community. On the other hand, their behavior pattern is restricted by their stature, which affects the walking speed and distance into the sea while searching (ibid, see also Prieto 2015:838). As a result, Bird and Bird note that children are less selective than adult collectors, which helps them to maximize the return rate while foraging (Bird 2002). Albeit current data from Huaca Negra is not sufficient to examine this aspect, the work of children is presented here to provide another way to interpret the shellfish diversity we see in archaeological contexts at the site.

4.6.2.2 The Scenarios of Marine Exploitation in Huaca Negra

These ethnographic observations have significant lessons for interpreting the subsistence pattern in Huaca Negra and its diachronic change. It is evident that there are many different ways to acquire marine resources, and there is a strong correlation between targeted prey species, selected technology or tools, and amount and quality of labor investment. Table 4.73 incorporates the ethnographic ideas and the options represented in Huaca Negra to form a general picture of the four major activities that local people commonly conducted. Although a detailed comparison between the cost and benefit of the four scenarios, or even merely between fishing and shellfish gathering would constitute another dissertation, insights can be retrieved from this summary.

Table 4.73 The required labor for fishing and shellfish collecting

Activity	Catchment zone	Targeted species	Equipment	Personal skill	Personae	Travel time	Return per trip
Fishing	Oceanic zone	Anchovy, sardine	boat, fine net (mesh ≅2cm)	Sailing, boat making, net making	Group of fishermen	15 min walk to shore, about an hour or so by boat to fishing ground	High
	Littoral zone	Sciaenedae family (drums)	hook, net (mesh 2-8cm)	Tool/ net making	Individual or work group	15 min to shore	Medium
Shellfish Gathering	Sandy beach	Clam, snail	Container, chisel	Knowledge of tide, wading, (diving)	Individual or work group	15 min to shore	Medium to low
	Rocky beach	Mussel, snail	Container, chisel	Knowledge of tide, wading, diving	Individual or work group	45-60 min to Cerro Prieto	Medium to low

Although fish change their habitat seasonally and daily, they can be mostly associated with the zones and techniques in Table 4.73, which facilitates the following discussion assessing possible technological and labor investment from faunal remains. Regarding the required tool preparation, it is clear that fishing has a higher threshold than shellfishing. As the latter can be done with bare hands, a container (in any form) is the only required tool. In contrast, people rarely do fishing with bare hands, and hooks[10], fish lines, and nets for bigger fish (with larger mesh size) are the expected tool kit for the littoral zone fishing. If one goes off-shore fishing, one major extra investment will be making a boat (in any format). Fine nets with mesh size between 1 and 3 cm are also crucial when targeting anchovy or sardine. It is obvious that fishing, especially off-shore fishing, would require more technological investment in tool and boat preparation and maintainance than shellfish gathering.

While it is not necessary for fishermen to handle all the work of tool preparation or maintenance, ethnographic records suggest they are still the ones most likely to do so. The fact that a customized reed float tends to vary in size according to the owner's stature serves as an

[10] While not encountered in the 2015 excavation, example of hook was found by Strong and Evans. There is no harpoon registered from Huaca Negra (yet).

example that a fisherman would be the one most familiar with his tool kit. It is also crucial for fishermen to have a clear idea in mind about targeted prey for choosing the proper tool kit before departing from the base. This, in turn, relates to the personal skill needed for conducting subsistence activities. In contrast to fishing, the technological threshold is low for shellfish gathering, and the individual capability is mainly related to the knowledge of tides, and skill in wading or diving.

All the conditions mentioned above set the ground for the actual practice of the four different activities, a realm where the individuals participating and the resource yields also play crucial roles. In his observation, Prieto distinguishes individual and collective fishing activities as the former mainly happened at the shore while the latter is associated more with off-shore fishing. Even in the case that reed floats can carry one individual, fishermen tend to depart together and share their catch with other fishermen (Prieto 2015). Shellfish gathering varies dramatically between different cultural contexts or even between seasons, but one would expect that a work group is a more common practice because children tend to follow their mother and help gather shellfish on the shore.

The most critical aspect addressed in Table 4.73 is the comparison of the amount of resources obtained per trip. Calculating the actual amount is beyond the scope of this dissertation, and it is unrealistic as a huge variation can be expected between individuals and as a result of many other environmental factors. However, one would expect the mass capture of anchovy would be the most efficient way of getting a large quantity of subsistence resources per trip due to its abundance in the Peruvian coast. Prieto mentions that the capacity of a reed float is approximately 50-80 kg (Prieto 2015:539), which means a working group with two or more fishermen could easily bring home a hundred or more kg of fishery resources per trip. It is hard to give a number for shellfish yield as the location for processing, how serious a gatherer is, age and strength of the gatherer, and many other factors would affect the result. But, based on Meehan's observation, one can expect an average number around 8 kg *gross weight* per female per day, while it can vary from 0 to 17 kg between individuals (Meehan 1982: 130-131). It is thus expected that the net weight of shellfish collected per person per day would be less than 8 kg, a number significantly lower than offshore fishing.

Following the logic and discussion of Table 4.73, the discerned pattern in the three discussed phases at Huaca Negra can be summarized as follows:

(1) Phase 2: This phase contains the highest proportion of oceanic fish species (71.7%), 2.6 times more than littoral species. There was no shellfish consumption event identified. While the amount was limited, 79.3% of shellfish belongs to sandy habitat (Figure 4.13) and it has the lowest degree of diversity (0.48/m^3, Table 4.46).

(2) Phase 3: The declining exploitation of fish is associated with less sea-going activity, as the proportion of oceanic species dropped down to 63.5%. The widespread shellfish consumption events (N=13) are all small in scale and amount of remains, suggesting daily consumption rather than large-scale feasting events. People also put more effort into exploiting shellfish in the further rocky environment as its proportion increases from 20.6% to 30.4%. While the degree of shellfish diversity remains similar in a rocky environment, the diversity of sandy species increases up to 0.60. This tendency reflects less selection process that can be related to factors such as overexploitation of preferred species, less specialized collection process, and possible climate/ environmental change.

(3) Phase 4: A period when the utilization of fish wanes down to the lowest level. Moreover, the proportion of near-shore species reached its apex (44.44%). On the other hand, shellfish is

largely exploited from the nearby sandy beach (83.5%) with a fair degree of diversity (0.52). The scenario in the rocky habitat is very different from the sandy one, as the low quantity associated with the highest degree of diversity (0.82) throughout the discussed periods suggests this might be a secondary option for acquiring mussels and snails.

While massive quantities of anchovy and sardine can be caught in a very efficient way, and this fact is what led Moseley to formulate his Maritime Hypothesis (Moseley 1975, 1992), current data from Huaca Negra suggests that the heavily exploited shoal fishes *were not associated with the period when people paid more attention to mound construction*. In fact, the species from the oceanic environment were most abundant earlier, when people began to settle down in this fishing village. Over time, people not only decreased the amount of exploited fish but also shifted their fishing area from open sea to the near-shore environment. Both tendencies suggest that *less* expertise was invested in fishing activities in the later occupation.

While the discussion here cannot deal with gender labor division within a fishing community in detail, it is suggested from the ethnographic records on Peruvian fishing villages that fishing is usually men's work, and it is women (and children) who collect shellfish from the beach (e.g., Hammel and Haase 1962:222). This behavior pattern implies that shellfish collection is an activity that has a lower threshold to conduct; thus women or children alone are able to work on this project without using special tools (ibid). Hence the increasing exploitation of shellfish collection, together with the declining fish consumption, both imply less labor investment involved in subsistence activities, at the same time that people started to work on other projects in the community level. The tendency of less labor investment on subsistence-related activities in Phase 3 and Phase 4 also informs the fact that the diversity of shellfish species from sandy and rocky habitats are both higher than they are in Phase 2, a less selective process that implies the potential that children were (highly) involved in shellfish gathering, or that people simply paid less attention to the kind of shellfish gathered.

5.0 CRAFT PRODUCTION FROM PRECERAMIC TO INITIAL PERIOD IN HUACA NEGRA

It is demonstrated in chapter four that people in Huaca Negra eventually decreased their labor investment in subsistence-related activities. The consequent question would be, what did people do at the time they were constructing the mound and after the mound was constructed or used? This chapter focus on the artifacts related to craft production that partially sheds light on this question.

Products of craft production are limited in Huaca Negra. They can be classified into three major categories based on the raw material: lithic, textile and ceramic. Other than the classes associated with raw material, beads form a fourth category as they are made from different raw materials, but they might carry similar social meanings and serve the same function. In addition, there is evidence revealing the bead working process, which makes beads an independent category to be discussed.

5.1 LITHIC REMAINS IN HUACA NEGRA

Debitage and lithic tools unearthed from Huaca Negra are analyzed firstly by their morphological characteristics. Following the guideline of Andrefsky (2004) and Adams (2014), a protocol for analysis is constructed and conducted by Jhon Percy Cruz Quiñones, a licensed Peruvian archaeologist and the director of Huaca Negra Archaeological Project. The degree of reduction on lithic and debitage stage is taken as primary factors to discuss the production process. The lithic analysis also aims to access the raw material to determine the source and the possible range of interaction. The identification of raw materials applies a digital microscope to observe variables such as texture, inclusions, composition ranges, and mineral density. Geological maps and mineralogy and metallurgy database from Instituto de Geología, Mineralogía y Metalurgia del Perú (INGEMMET) were taken as a reference to decide the possible origin of raw materials.

In total, there are seven local, and ten non-local raw materials identified from both the surface collection and excavation contexts. Local material refers to the resources available within a 10 km radius (mainly the resources 4 km away at Cerro Prieto) that can be gathered within a day trip. This includes andesite, aphanitic basalt, porphyritic basalt, aphanitic quartzite, porphyritic quartzite, potassium feldspar, and granite. The non-local materials found in Huaca Negra are silicified sandstone, anthracite, chalcedony, chert, chrysocolla, crystal quartz, vein quatz, orthoclase cleavage, slate, and gypsum. The focus of this chapter will be the function of lithic tools and the implication of spatial activities or craft production. Further discussion of those foreign materials and exchange networks will be presented in the following chapter.

5.1.1 Types and Quantity of Lithic Remains

There are 337 lithic remains retrieved from the five excavation units discussed here. Besides these, there are also 20 items gathered from the surface collection. The surface collection contains 10 different kinds of raw materials, and the artifacts served for various functions. Unlike the excavated artifacts, objects collected from the surface don’t carry information about their temporal affiliation. Thus, the following discussion will focus only on the 337 excavated objects.

Other than the manufactured artifacts, there are also 47 heating rocks collected from the excavation. Heating rocks were registered in Strong and Evans' report, and they are commonly present in all the sedentary contexts excavated in the 2015 field season. While heating rock is associated with cooking behavior rather than craft production, it also refers to the labor investment collecting materials for daily use because rock is not abundant within the site area. As the quantity of heating rock is huge, the samples were collected with the purpose of identifying the raw material. The result will be presented in an independent section at the end of the lithic analysis.

Other than the heating rocks, lithic remains are classified into four major categories, including flaked tool (core and retouched tool), ground tool (with various functions that will be discussed in the following section), debitage, and raw material. The first two categories can be associated with a functional classification, and debitage remains mainly reflect the production process. The raw materials were collected in the field as some of them are non-local material, while others were misidentified as tools while in the field.

Table 5.1 presents the distribution of the four lithic categories across the excavation units. The overall density in each phase is calculated only for chipped tools, ground tools and debitage, as there would be many more raw materials not collected in the field and the number here makes less sense for calculation.

It is not surprising that Phase 1 contains the lowest density of lithic artifacts. Although there is a minor fluctuation in Phase 3, the abundance of lithics eventually reached the peak in Phase 4 context. As can be seen, among the three phases related to sedentary life, Phase 3 is the time that contains the lowest density of lithic artifacts. The amount of tools per cubic meter is less than half of the preceding phase, and the difference is even more dramatic between Phase 3 and 4. However, it is also noteworthy that there is a large portion of excavated Phase 3 soil associated with the mound refilling process, which mainly constituted by clay and adobe fragments. Thus, it is less surprising that a sudden drop of lithic density happened during this phase. Less lithic remains also imply different usage of the space, which also fits the general interpretation of Phase 3 occupation.

Table 5.1 Quantity and density of unearthed lithic materials

Phase	Total soil volume (m^3)	Types	Unit 1	Unit 3	Unit 5	Unit 6	Unit 7	Total	Overall Density
Phase 1	4	Chipped	1	0	.	0	.	1	1.25
		Ground	0	0	.	1	.	1	
		Debitage	1	2	.	0	.	3	
		Raw material	0	0	.	0	.	0	
Phase 2	12.36	Chipped	0	1	.	9	2	12	4.85
		Ground	2	5	.	4	10	21	
		Debitage	1	13	.	2	11	27	
		Raw material	2	4	.	2	1	9	
Phase 3	38.85	Chipped	3	1	3	1	3	11	2.14
		Ground	4	2	6	4	2	18	
		Debitage	15	15	9	6	9	54	
		Raw material	0	1	1	1	0	3	
Phase 4	29.69	Chipped	.	6	7	2	2	17	5.46
		Ground	.	3	8	0	4	15	
		Debitage	.	49	39	26	16	130	
		Raw material	.	1	4	2	8	15	

Other than the general quantity of artifact remains, comparing the proportion of categories can be insightful as it reflects the nature of production. Figure 5.1 illustrates the change in proportion between chipped tools, ground tools, and debitage. Again, the lithic remains from Phase 1 are too limited for further statistical analysis, but the presence of lithic artifacts is another line of evidence for human activities before settling down.

Proportionally speaking, it is clear that the chipped tools slightly decline from Phase 2 to Phase 4, but remained relatively stable. The most significant change is the decrease in ground tools and the increase of debitage over time. In fact, debitage should be associated more with chipped tools as this is usually byproducts during the reduction process. However, this is not the case in Huaca Negra, because the chipped tools do not increase as debitage does. The high proportion of debitage and a lower proportion of lithic tools, including both ground and chipped tool, suggests the site area might *associated with more lithic production during Phase 3 and 4*. It is also noteworthy that crystal quartz, an exotic material, constitutes the majority of the debitage. Its social meaning will be discussed in the following chapter.

The Chi-square test is applied to Phase 2 to 4, and the proportional distribution suggests that while the difference between phases is not substantial (Cramer's V= 0.168), the difference observed here is highly significant, reflecting actual differences (X^2=17.919, df=4, P-value=0.001).

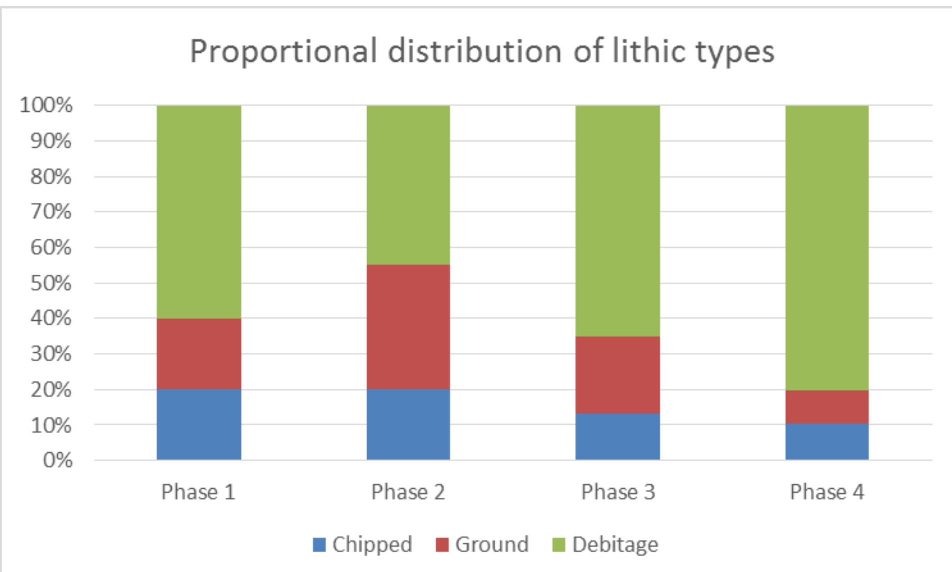

Figure 5.1 Proportion of different lithic in four occupation phases

Beyond the overall density and proportional change, the variation of type composition between different units also sheds light on the spatial differentiation in an intra-site scale. Among the three lithic categories, debitage is taken as the index of production, and the relative quantity of tools (mainly chipped tool) and debitage imply the nature of the activity area. Figure 5.2 is the frequency distribution translating from information in Table 5.1. It is clear that in Phase 2 there might be a spatial differentiation between Unit 3, 6, and 7. Unit 6 is the only place where chipped cores largely outnumbered debitage, Unit 7 contains more ground tools, and Unit 3 is the place where more than half of the lithic remains are debitage.

The scenario of Phase 3 is different from Phase 2. The general composition of tools illustrates a pattern that debitage constantly outnumbers chipped tools, and the quantity of ground stone remains relatively stable in these units. However, Unit 5 and Unit 6 do contain a lower proportion of debitage during Phase 3 occupation, implying these loci might be associated less with tool production. This inference also corresponds to an overall tendency that Unit 5 and Unit 6 yield the fewest archaeological remains, which can be attributed to the nature of activities held here, such as more frequent and careful cleaning process, or a public activity area related less to those material remains. Much more debitage was unearthed within the Phase 4 context. Other than that, the overall quantity of tools remains similar to the preceding Phase 3.

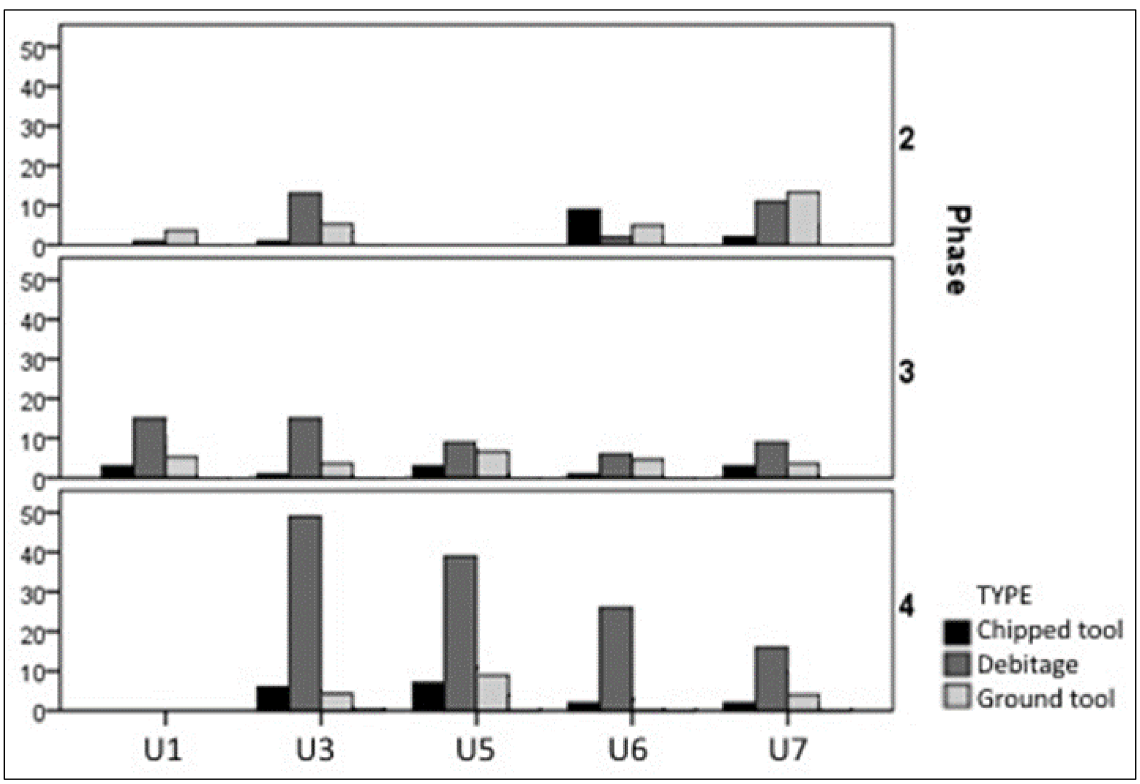

Figure 5.2 Temporal and spatial distribution of three kinds of lithic remains

5.1.2 Chipped Tools and Ground stones

Other than taking debitage as an index of production loci, type and function of lithic tools are also important for discerning the types of activities within site. This section aims to present more details of unearthed lithic tools from Huaca Negra. The preliminary decision is made based on the technique applied to the production.

5.1.2.1 Core and retouched tools

With a limited amount of lithic tools, the lithic toolkit in Huaca Negra is also low in diversity. Core (both unidirectional and multidirectional ones) and retouched tools together constitute the categories of chipped tools. There are no projectile points or other formal retouched tools retrieved from the excavation. Table 5.2 summarized all the excavated chipped tools from the five excavation units. Examples of cores in different raw materials are shown in Figure 5.3. Examples of retouched lithic tools are shown in Figure 5.4.

Table 5.2 Chipped tools in Huaca Negra

Phase	Type of tool	Unit 1	Unit 3	Unit5	Unit6	Unit7	Total
Phase 1	Retouched tool	1		.			1
Phase 2	Unidirectional core		1	.			1
	Multidirectional core			.	1	1	2
	Flake or retouched tool			.	3	1	4
Phase 3	Unidirectional core	1					1
	Multidirectional core	1				2	3
	Flake or retouched tool	1	1	3	1	1	7
Phase 4	Multidirectional core	.		1	1	1	3
	Flake or retouched tool	.	6	6	1	1	14

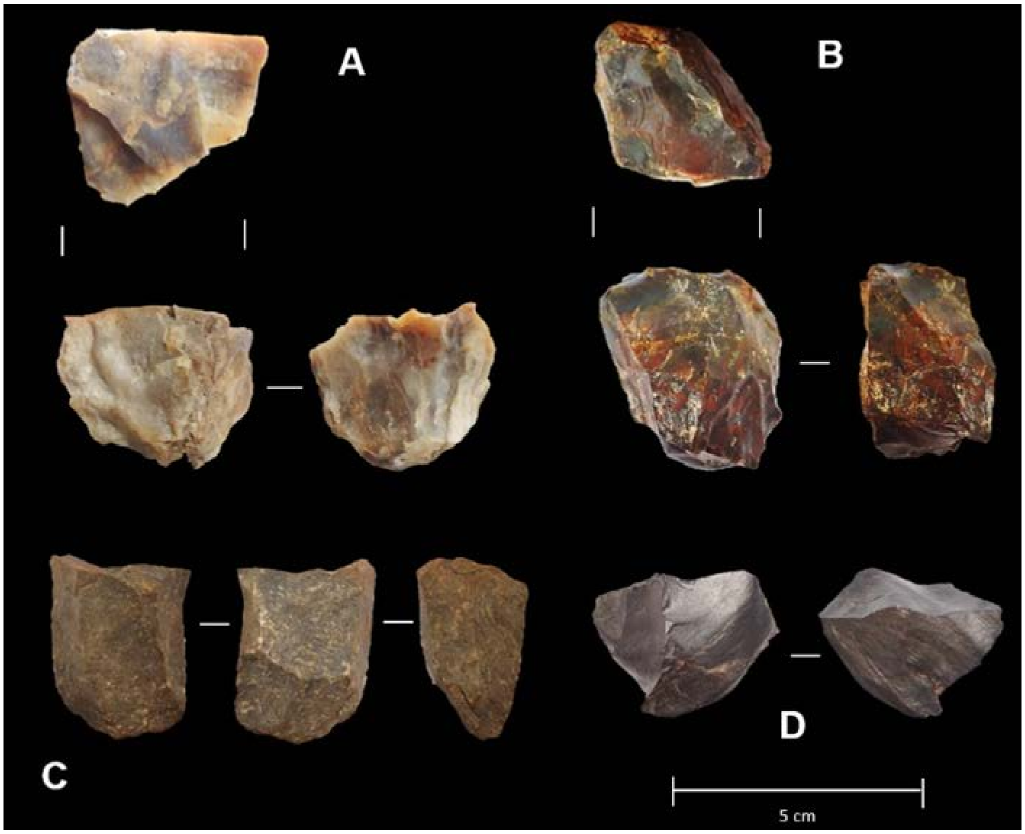

Figure 5.3 Lithic cores in Huaca Negra. A: unidirectional (chalcedony, surface collection); B: multidirectional (U6, Phase 4, flint), C: multidirectional (U7, Phase 2, andesite); D: multidirectional (U7, Phase 3, basalt)

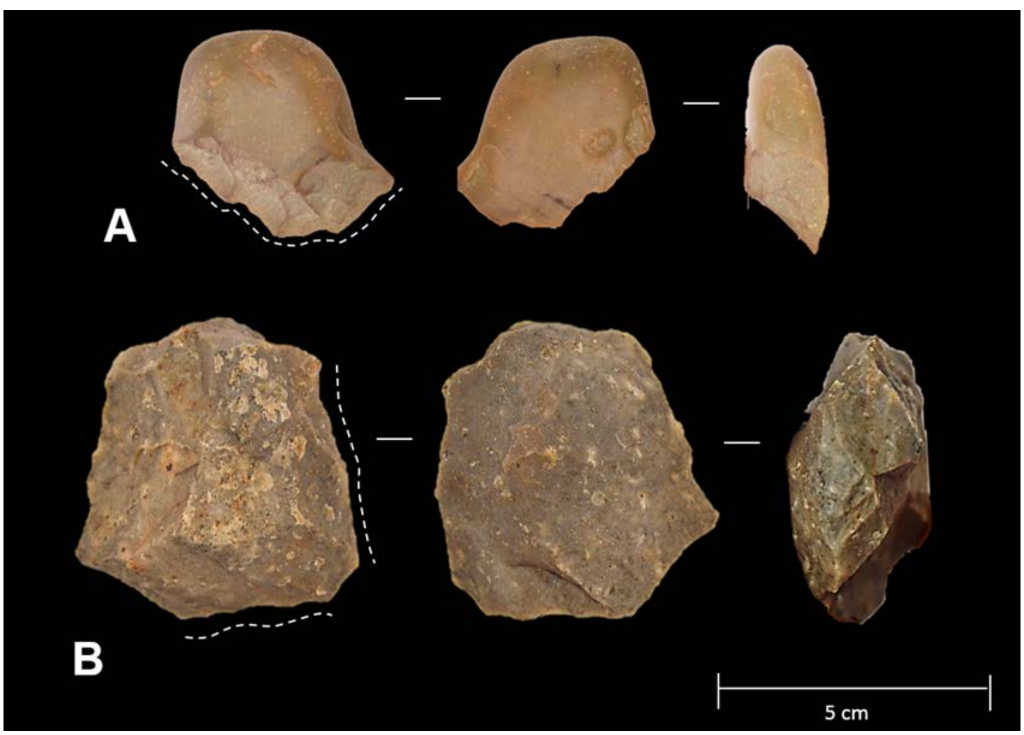

Figure 5.4 Retouched tools in Huaca Negra. A: Unit 6, Phase 2. B: Unit 5, Phase 4

Among the observed chipped tools, there is no clear evidence of standardized production process, morphology, or raw material. The only tendency is that there are 16 out of 26 flake or retouched tools (61.5%) with a sharp edge that might function as cutting tool or scraper. But this requires further analysis for a more explicit conclusion.

5.1.2.2 Ground stone

In contrast to the chipped tools, ground stone is a category that is more abundant in quantity and has higher diversity regarding forms and functions. In total, there are 55 registered ground stones in Huaca Negra, which can be categorized into four groups based on the function: (1) abrading or grinding tool. This group includes mortar, pestle, and other lithic tools that have use-wear produced by adhesive and tribochemical contact. For example, cases that do not present modification but with polished surface and traces at the distal and lateral ends are put into this group. (2) Percussion: lithic that has traces of impact and percussion, such as hammerstones. (3) Container: stone bowl or other forms of vessel; (4) other paraphernalia: other ground stone with functions such as personal ornaments, possible ritual function, or foreign material with undetermined function. Table 5.3 summarizes the distribution of ground stones found in Huaca Negra, and Figure 5.5 illustrates the overall proportional distribution of the four abovementioned categories. While the low number of cases in each category makes the result of Chi-square test less reliable, the comparison (excluding the type of container, as it is only present in Phase 4) suggests an insignificant difference in ground stone composition between phases (X^2=7.154, d.f.=6, p=0.128, and Cramer's V= 0.213). Overall, there is no doubt that Phase 4 is the time with a higher diversity of ground stone types and foreign raw materials.

Table 5.3 Quantity of ground stones in Huaca Negra

Phase	Function	Unit 1	Unit 3	Unit 5	Unit 6	Unit 7	Total
1	Grinding/ Abrading			.	1	.	1
2	Grinding/ Abrading	1	2	.	3	5	11
	Percussion	1		.	1	1	3
	Other		3	.		4	7
3	Grinding/ Abrading	2	1	4	2	1	10
	Percussion	1			2	1	4
	Other	1	1	2			4
4	Grinding/ Abrading	.		2			2
	Container	.		2		1	3
	Percussion	.				2	2
	Other	.	3	4		1	8

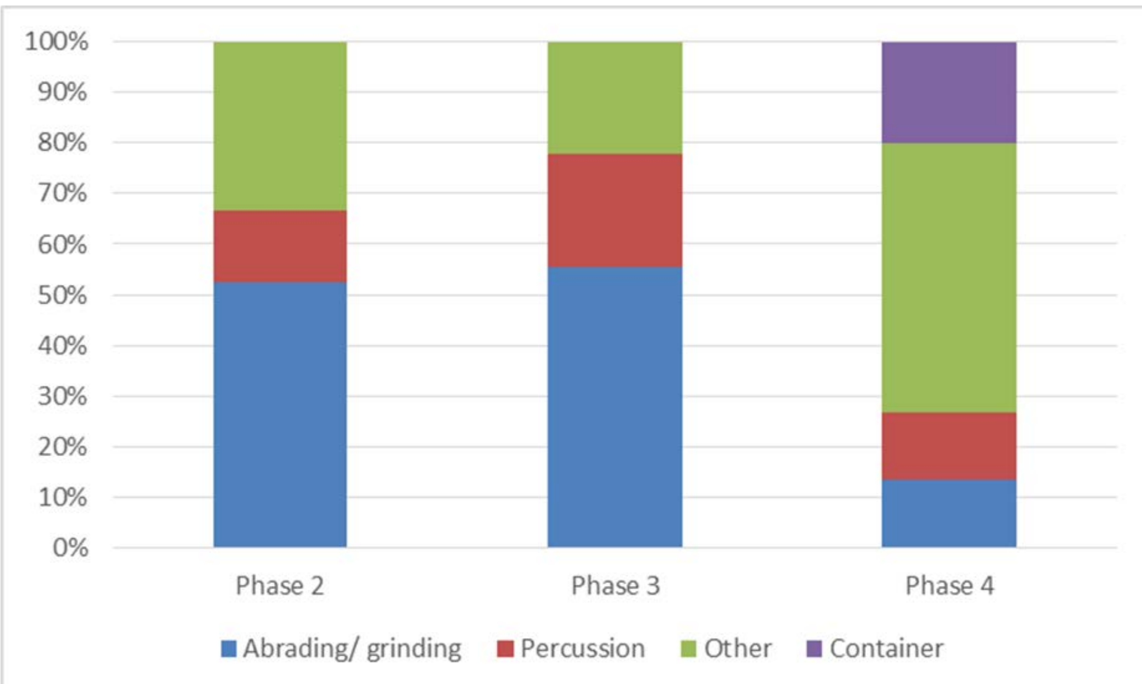

Figure 5.5 Proportion of ground stone with different functions

A. Abrading and grinding stone

24 out of 55 ground stones are classified into this category, which constitutes a major category within the ground stone group. All the abrading/ grinding stones are made of locally available materials, including porphyritic andesite, basalt, quartzite, potassium feldspar, and

granite. The diverse raw material implies a lower degree of standardization in terms of tool making. In addition, the use of local material also implies this kind of lithic had an ordinary daily function.

While no further residue analysis has been done to determine whether these tools are for processing food or related to other production processes, there are cases where red pigment was observed on the mortar and pestle from contexts of Phase 3 and Phase 4 occupation (Figure 5.6). This observation thus associates abrading and grinding with other craft production activities in the later period of occupation.

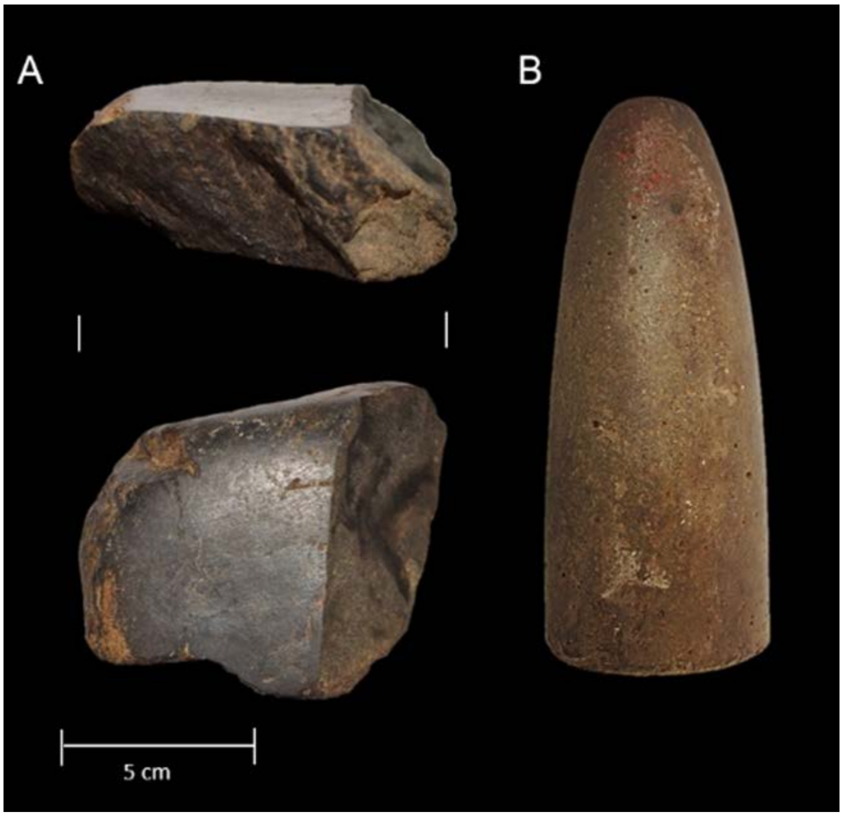

Figure 5.6 Example of mortar (A: U5, Phase 4) and pestle (B: U3, Phase 3)

<u>B. Percussion tools</u>

Percussion tools refers to those with traces of direct percussion and impact, occasionally found in Phase 2 (N= 3), Phase 3 (N=4), and 4 (N=2) contexts. The abovementioned traces vary from one object to another, and are concentrated on different parts of the artifacts, such as distal end, lateral side, or middle of the artifact. There is no evidence of intensive use with one single artifact. Thus these artifacts might be used during daily work processes and were not reused or well-curated afterward (Figure 5.7). The fact that all artifacts fall into this category are made of local material also fits this scenario.

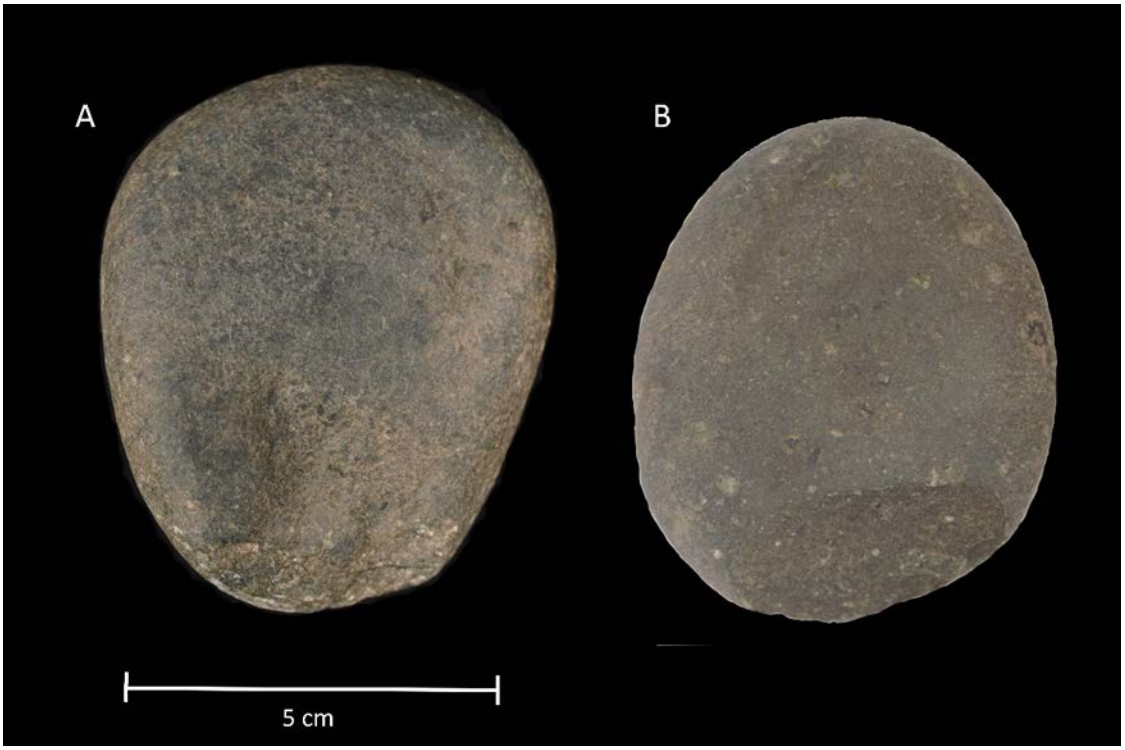

Figure 5.7 Examples of percussion tools (A: U1, Phase 3, B: U6, Phase 2)

C. Container

In Strong and Evans's excavation, they discovered one fragment of a stone bowl and three bowl-form artifacts made of anthracite in the strata 0-25 cm below the surface (Strong and Evans 1952: 40). During the 2015 field season, there is only one andesite stone bowl encountered from the surface collection (Figure 5.8). In addition, there are three cases of anthracite containers encountered in the Phase 4 stratum in Units 3, 5 and 7. Since anthracite is an exotic material and there is no evidence associating anthracite bowls with local craft production, the case of these anthracite containers will be discussed in Chapter 6.

Figure 5.8 Example of andesite stone bowl (surface collection)

D. Others

Other lithic artifacts are mainly constituted of foreign materials. Many of them should be associated with an exchange network rather than local production as there is no direct evidence related to the production process. This includes fragments of chert (Phase 3, N=1), anthracite (N=4, one in Phase 3 and three in Phase 4 stratum, Figure 5.9 E and F), chalcedony (Phase 3, N=1) and chrysocolla (Figure 5.9 C, Phase 4, N=1). Further discussion will be given in chapter 6 in regard to the foreign nature of these objects. Other than the exotic goods, the only examples made of local material are basalt beads (N=2) found in Unit 3, Phase 2 context (Figure 5.9 A and B). Another case is of possible local production using imported raw material. In phase 2 occupation, there are concentrations of orthoclase cleavage in Unit 1 and Unit 7 (Figure 5.9: D). However, this kind of material shows no trace of modification and remains in its natural cleavage form; no further conclusion can be made at this point.

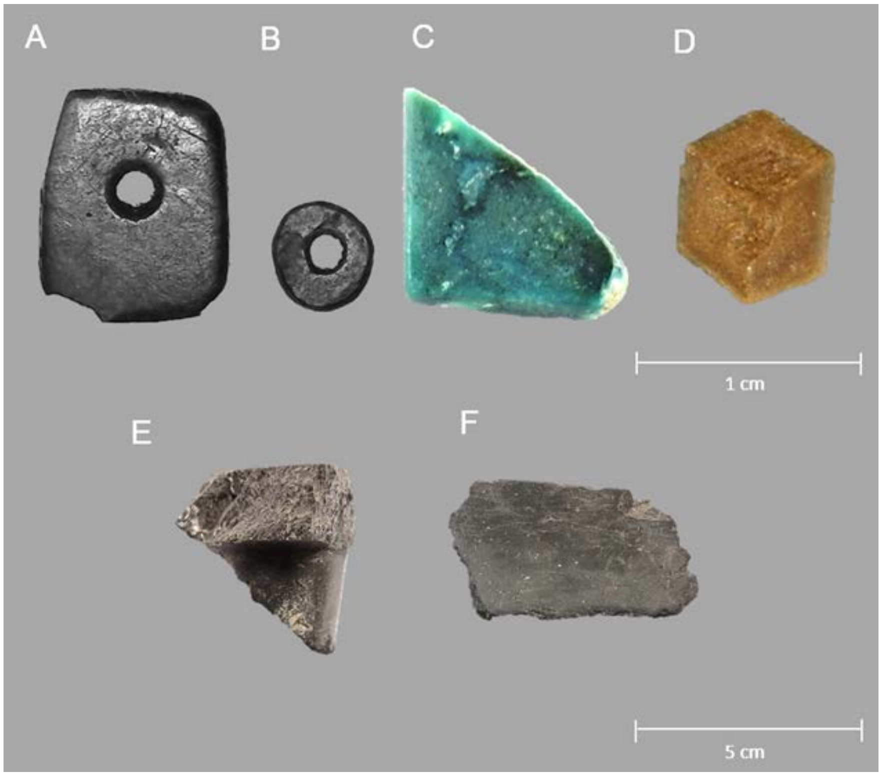

Figure 5.9 Examples of lithic artifacts with various forms and functions

5.1.3 Summary of Lithic Production

In Huaca Negra, the high proportion of debitage and presence of core remains both indicate local lithic production, especially related to chipped tools. The classification of ground stone is based on the function. It is clear that most of the ground stones are related to ordinary usage, made of local material, and not curated for long-term use throughout the occupation history. On the other hand, lithics that served more than ordinary use (such as ornaments or unusual stone bowls) or with undetermined functions tend to be made of exotic material (16 out of 19, 84.2%). The only exception is the beads found in early occupation (Phase 2). While the sample size is small, the distinction between local and non-local materials and objects might be a meaningful factor for people in Huaca Negra. I will go back to this discussion in Chapter 6.

A noteworthy diachronic tendency is that the increase of debitage and increase of ground tool diversity co-occurred over time. In sum, the lithic production and usage form a mosaic that requires more lines of evidence for deciphering. Again, to distinguish imported lithic tools, objects, or raw materials from locally made ones, and to determine their social function would help to shed light on this issue.

5.2 BEADS IN HUACA NEGRA

Beads are one of the evident types of artifact that can be related to craft production in Huaca Negra. Not only final products but also the semi-finished products were unearthed from the excavation, constituting direct evidence of local production.

In total, 100 beads or semi-finished bead products are registered from the five discussed units. Among the 100 items, 21 beads made of different materials are associated with the infant burial found in Unit 1, Phase 3 (see Chapter 3, Figure 3.9), suggesting the special role of this infant. In addition, there are 64 beads made of bird bone, spondylus, and chalcedony concentrated in one layer of the Phase 4 stratum in Unit 6. These objects are not associated with specific features, but the degree of concentration and their exotic nature might relate to a single event that happened at this corner of the site. Only 15 beads are registered in other than these two contexts. Table 5.4 summarizes the context of the 100 beads following the order of occupation phases.

Table 5.4 Summary of beads in Huaca Negra

Phase	Quantity	Raw material	Work stage	Sources	Context	Note
2	5	Bird bone	Finished	Local		
	1	Mammal bone	Preparation	Local		
	2	Rock[11]	Finished	Local		
3	2	Rock	Finished	Local	Infant burial in Unit 1[12]	Special design with red pigment
	3	Rock	Finished	Local	Infant burial in Unit 1	
	1	Otolith	Finished	Local	Infant burial in Unit 1	Robalo fish
	5	Tooth	Finished	Local	Infant burial in Unit 1	Sea lion
	10	Mammal bone	Finished	Local	Infant burial in Unit 1	
	1	Exotic rock	Finished	Non-local		Chalcedony
	1	Shell	Semi-finished	.		
	3	Bird bone	Finished	Local		
	1	Bird bone	Preparation	Local		
4	1	Bird bone	Finished	Local		
	1	Bird bone	Finished	Local	Concentration in Unit 6	
	1	Fishbone	Finished	Local	Concentration in Unit 6	With red pigment
	4	Shell	Finished	Non-local	Concentration in Unit 6	Spondylus
	58	Exotic rock	Finished	Non-local	Concentration in Unit 6	Chalcedony

While the small sample size impedes statistical analysis, observations can be made by scrutinizing samples. First of all, most beads are made of locally available material, and bird bone is the preferred material for bead making throughout Phase 2 to Phase 4 (Figure 5.10 and 5.11). There are only two cases of mammal bones found in general contexts: one is in its early stage of material preparation (Figure 5.10: C), and another is a finished product (Figure 5.11: C). Secondly, the diversity of non-local materials is low. Other than the bead concentration area in Unit 6, where beads made of chalcedony and spondylus are identified (Figure 5.12), there is only one bead made of chalcedony retrieved from the Phase 3 stratum in Unit 5 (Figure 5.11: E). Thirdly, the picture of local production is supported by artifacts such as the semi-finished mammal bone product in

[11] See: Figure 5.9, A and B

[12] For examples, see Figure 3.9

Phase 2 (Figure 5.11: D), and the bird bone bead in preparation in Phase 3(Figure 5.11: A). Despite the limited sample size, it is clear that local production occurred. Fourthly, the quality of all other beads, both the ones made of local material and non-local material, is not as good as the ones found in the burial. In fact, all the locally made bird bone beads can be considered as semi-finished products to some degree. They are treated as finished products here because most of them are similar in size, shape, and finishing (Figure 5.10: A, B, D; 5.11: B, C). Thus, they are considered as final products that reached a certain standardization.

Unlike the semi-finished bone bead products, there is no direct evidence to claim that the beads of exotic material such as chalcedony and spondylus (Figure 5.12: A and B) were locally produced. These beads were all found from the Phase 4 context, and possibly got into the archaeological context as a batch of imported finished goods. The collected chunk of chalcedony from the surface, while not directly associated with the Phase 4 context, suggests that people brought in raw materials from places that are far away. However, where the Spodylus and chalcedony beads were made remains an open question.

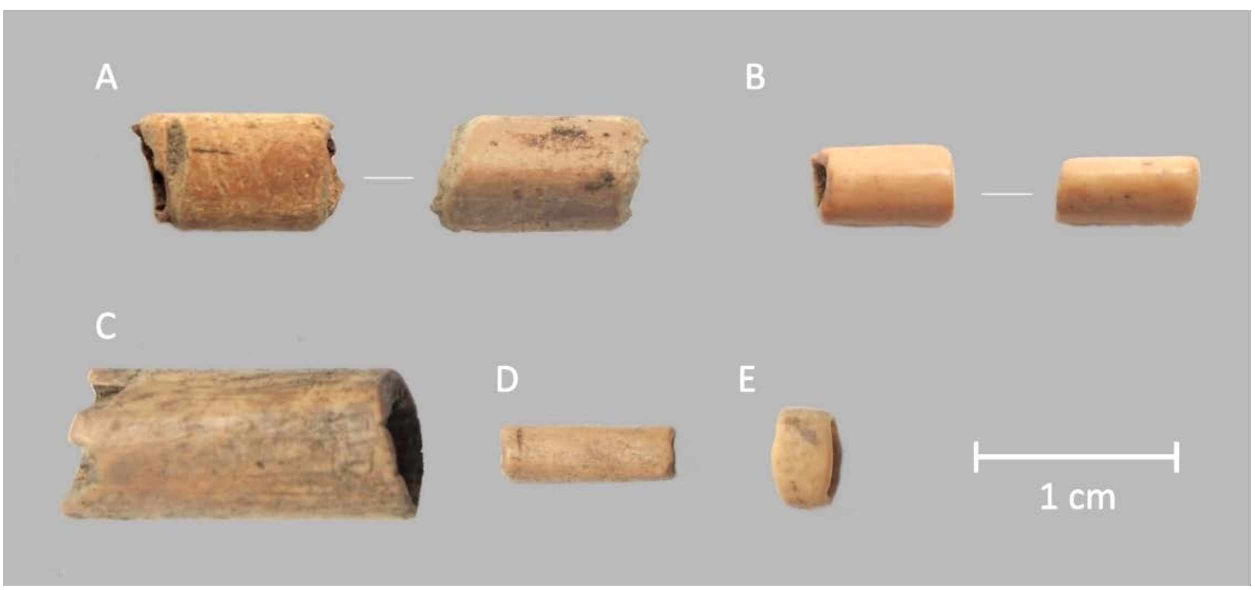

Figure 5.10 Bone beads (A, B, D, and E) and semi-finished products (C) from Phase 2 stratum

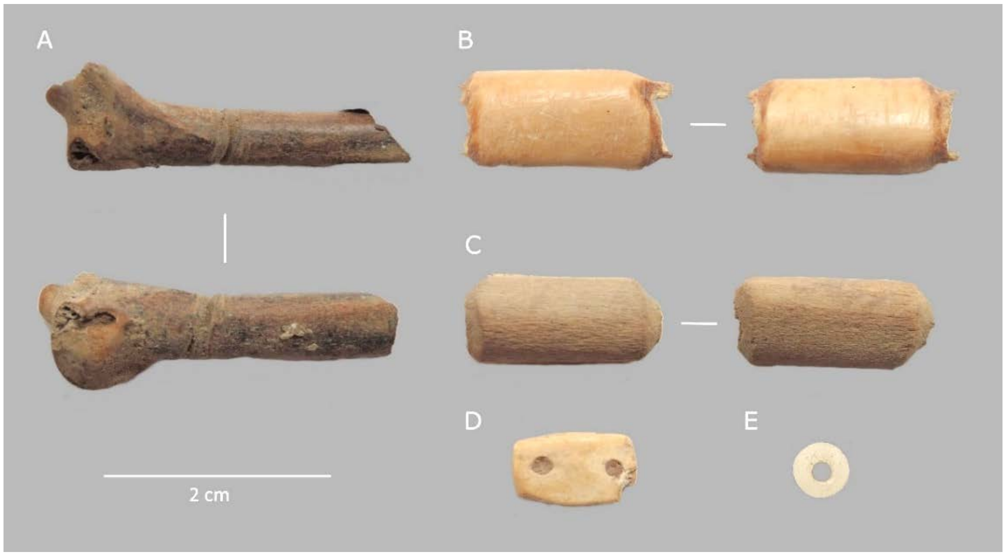

Figure 5.11 Raw material preparation, semi-finished product, and beads in Phase 3 stratum

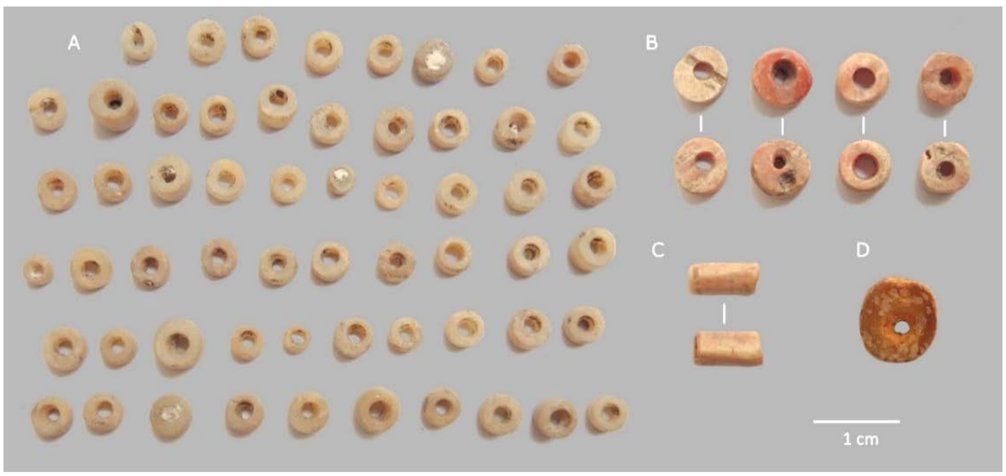

Figure 5.12 Beads in the Phase 4 stratum

5.3 TWINED AND WOVEN ARTIFACTS (TEXTILES)

Utilizing cotton and other materials to make twined artifacts and fabric is a long-term tradition and conveys important social meaning in the Andean context. Fabrics from Huaca Prieta, the contemporaneous site, constituted the most thorough fabric study in the Preceramic Period in Coastal Peru and laid the foundation for later studies (see Bird et al. 1985, Dillehay 2017). Other than fabric, cotton yarn is also crucial in coastal settings, as it plays a significant role in fishing activities in all scales. While the role of fabric and textile was expected to be important in Huaca Negra, the environment for organic preservation is not as good as other early coastal sites. Strong and Evans only encountered few cotton yarns, and two fragments of plain-weave cotton in their Strata Cut 1, from which they proposed a diachronic change in the fabric technology (1953: 40).

As in their earlier work, there are only limited fiber products registered during the 2015 excavation, which are presented in this section. As part of the discussion of craft production, the attempt of this section is not to go through a thorough analysis of unearthed fabrics. Instead, a general picture is illustrated by presenting diachronic change in fabric production even though meaningful statistical analysis is not conducted due to limited sample size. In addition, artifacts associated with textile production will also be addressed.

5.3.1 The Registered Textiles

In total, there are 93 items categorized as twined or woven items. The temporal and spatial distribution of these artifacts are summarized in Table 5.5, and the average yield per cubic meter (density) is also provided. It can be discerned from Table 5.5 that, while the sample size is small, the frequency of twined/ woven materials slightly increased over time, and seems most abundant in Phase 4 occupation. As has been discussed in Chapter 4, cottonseed is most abundant in Phase 2 and then declines. Thus, the trend of fewer remains in the early occupation might be the result of preservation issues. Four sub-categories are designed based on the possible function, including yarn, basketry, cordage, and textile. There are two cases of wool wads; one is present in Phase 3 and another in Phase 4 (Figure 5.13: A). These are classified as raw material because it is highly probable they were associated with textile work.

Table 5.5 Summary of unearthed fiber material

Phase	Types	Unit 1	Unit 3	Unit 5	Unit 6	Unit 7	Total	Density
Phase 1	Yarn		1				1	0.25
Phase 2	Yarn		7			1	8	0.65
Phase 3	Yarn	22	1	3			26	0.88
	Basketry	4					4	
	Textile	3					3	
	Raw material	1					1	
Phase 4	Yarn		13	21			34	1.68
	Textile		9	6			15	
	Raw material			1			1	

In Huaca Negra, almost all the registered twined or woven artifacts are made of cotton. The only exception is the reed cordages found in Phase 3 strata (Figure 5.13: B). This is a compelling case because the cordage is not a finished product but a semi-finished product that is still associated with raw material. Overall, yarn fragments are the most abundant textile remains (N= 69) that dominate 74.1% of total samples and are present in all the four occupation phases. All the 69 yarns are made of cotton, and all the identifiable samples are constituted by 2-ply, suggesting it was the most popular way of making yarn (Figure 5.14).

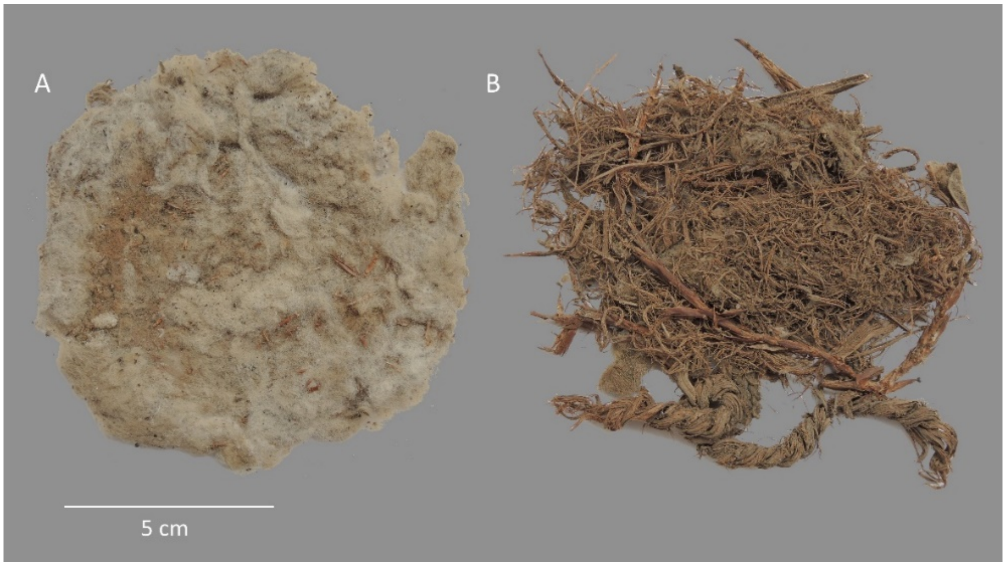

Figure 5.13 Examples of fiber material. A: a wad of wool from Phase 4 context; B: cordage made of reed (Phase 3)

Figure 5.14 Examples of 2-ply cotton yarns under the digital microscope

True weaving textile is not present until Phase 3 occupation and seems more common in Phase 4. While Strong and Evans found only plain weaving in their excavation, the pieces unearthed from Phase 3 context have weft-twining technique (Figure 5.15). Moreover, plain weaving technique is widely applied on the samples from the Phase 4 context (Figure 5.16), but it is also common that different weaving techniques are applied together on fabrics (Figure 5.17).

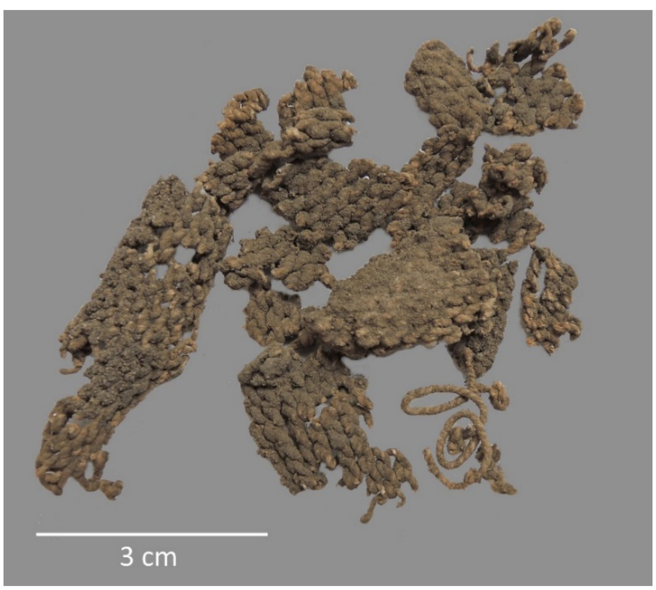

Figure 5.15 Weft-twining fabric (Unit 1, Phase 3)

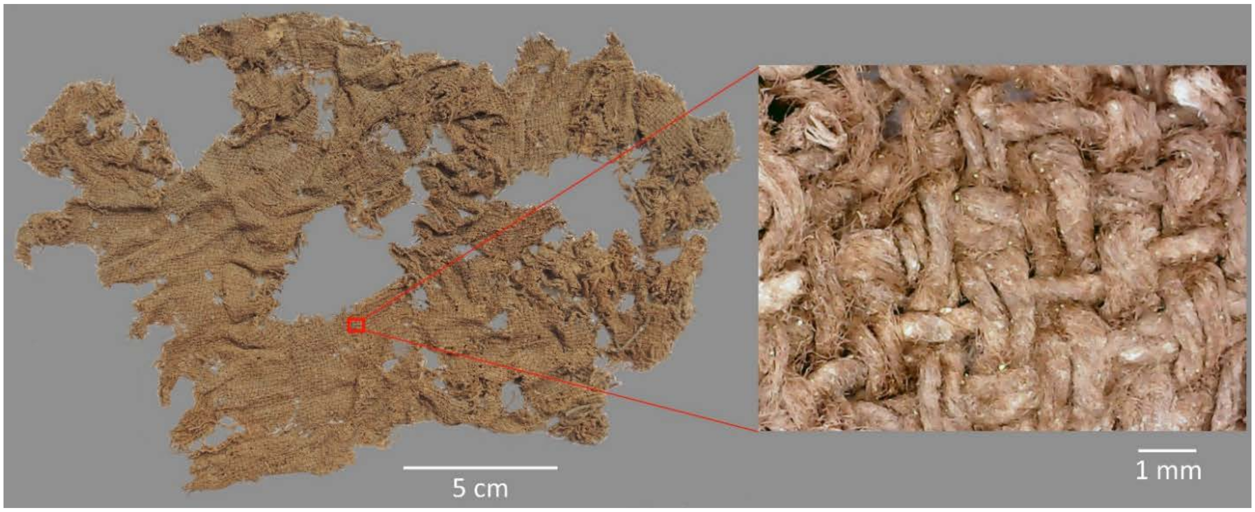

Figure 5.16 Plain weaving fabric and its technique details (Unit 5, Phase 4)

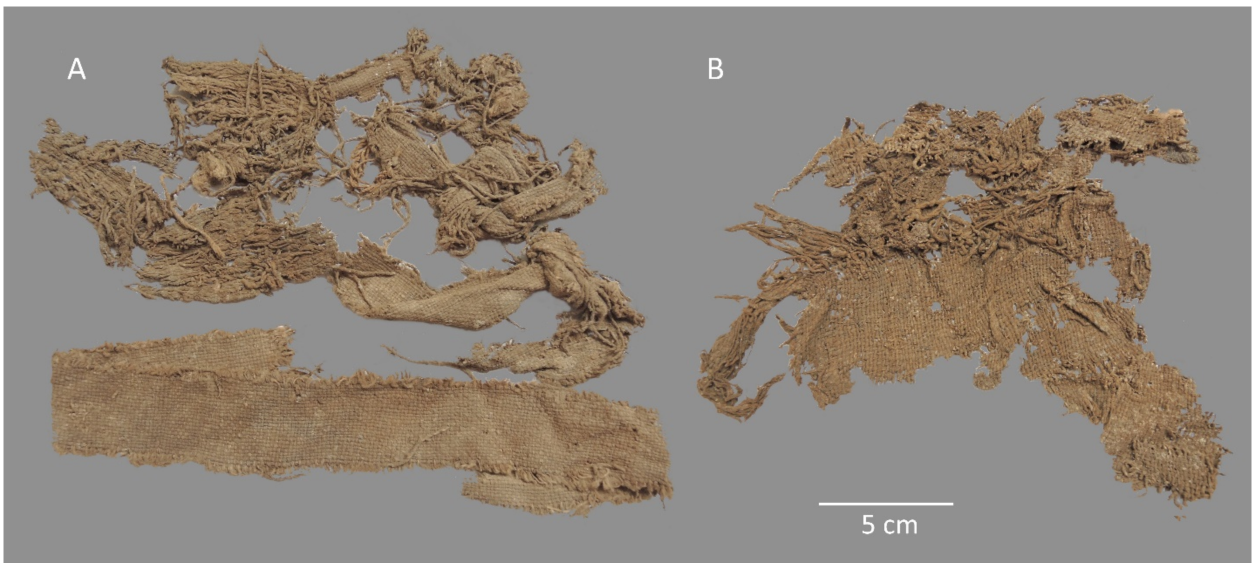

Figure 5.17 Fabrics with different techniques. A: belt from Unit 5; B: fabric from Unit 3

5.3.2 Tools Related to Fabric Production

Other than the fabric itself, unearthed tools related to fabric production form another line of evidence for local textile production. In Huaca Negra, this category includes artifacts such as spindle whorls, needles, and awls.

In total, there are five Phase 4 ceramic spindle whorls unearthed from Unit 3, 5 and 6. While slightly different in details, three of the five spindle whorls can be classified as bi-conoidal with truncated ends (Figure 5.18: A, B, and E), which is a form similar to that encountered by

Strong and Evans (1953: Figure 33). However, there are also other kinds of spindle whorls (Figure 5.18: C, D) that demonstrate a variety of objects. It is also noteworthy that each registered spindle whorl has different designs of decoration, implying a less standardized idea of this artifact.

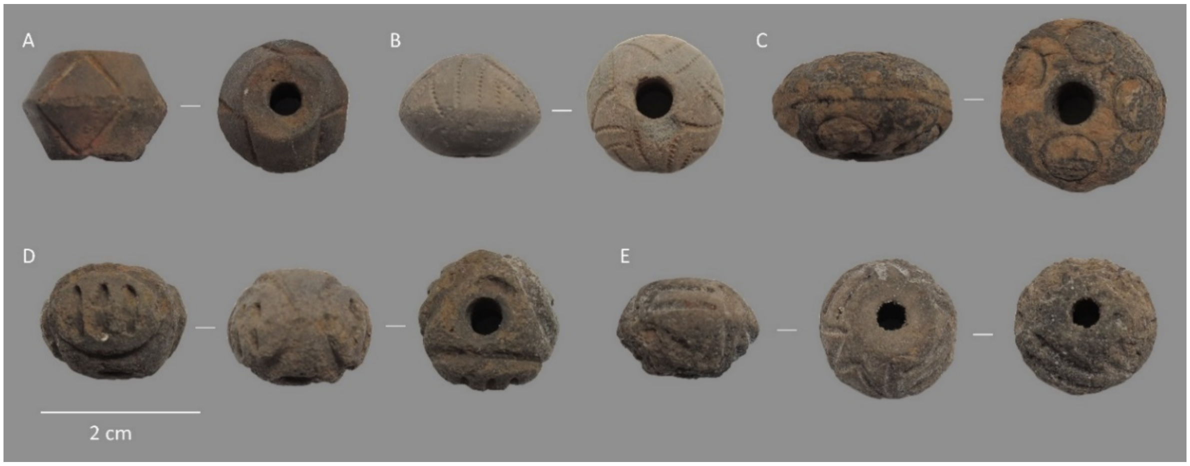

Figure 5.18 Five spindle whorls unearthed from the 2015 excavation

Other than the five spindle whorls, there are three bone tools unearthed from Unit 6 that might be associated with textile production or net making process, including a fragment of polished fishbone (Figure 5.19: A, Phase 2), a worked bone with similar size and shape to other uncovered awls (Figure 5.19: C, Phase 3), and a fish bone needle (Figure 5.19: B, Phase 3).

Figure 5.19 Possible tools for textile production form Unit 6. A: Phase 2, B and C: Phase 3.

In total, eight objects related to textile production are retrieved from the five discussed units, showing the presence of local textile production. However, it is hard to reach a concrete conclusion about the importance of textile production within the community with such a small sample size. Thus, it is worth incorporating a few more weaving tools found in Unit 2 into the discussion. Although unearthed from disturbed contexts, these tools can securely be associated with Late Preceramic occupation in Huaca Negra. Lacking concrete context makes it difficult to put those objects in a diachronic discussion, but the assemblage itself sheds light on the weaving toolkit and is thus worth presenting here.

There are three awls made of mammal bones found associated with an adult female burial in Unit 2, which can be dated back to the transition between Phase 2 and Phase 3 (Figure5.20: A-C). Other than the weaving tools and fragments of textiles, there are no other grave goods associated with this individual. Thus, the weaving tools might be her personal belongings. One bone needle (Figure 5.20: E) and two fragments of awls (F and G) are also registered in the disturbed strata in Unit 2. Other than the needle and awls, there are three cases of maize cobs skewered with wooden sticks (Figure 5.20: D). I was informed that local people utilize maize cob as a weight; in this way this assemblage serves as a spindle whorl (Prieto 2016, personal communication). This artifact also corresponds to the Preceramic context.

As can be seen, weaving tools are highly concentrated at this corner of Huaca Negra. Excluding the spindle whorls, there are three bone tools from Unit 6 and six from Unit 2 in the Preceramic stratum. The three awls from Unit 2 are the only available evidence that directly associates textile production with females in Huaca Negra. More importantly, as Unit 2 is located at the cemetery area of the site, and all the identified individuals are adult/ sub-adult females or infants, it is highly possible that the rest of the weaving tools are associated with burial contexts as part of the grave good assemblage. If this assumption is accepted, the concentration of weaving tools can be explained. Moreover, it also implies a possible gender division of labor regarding weaving activity.

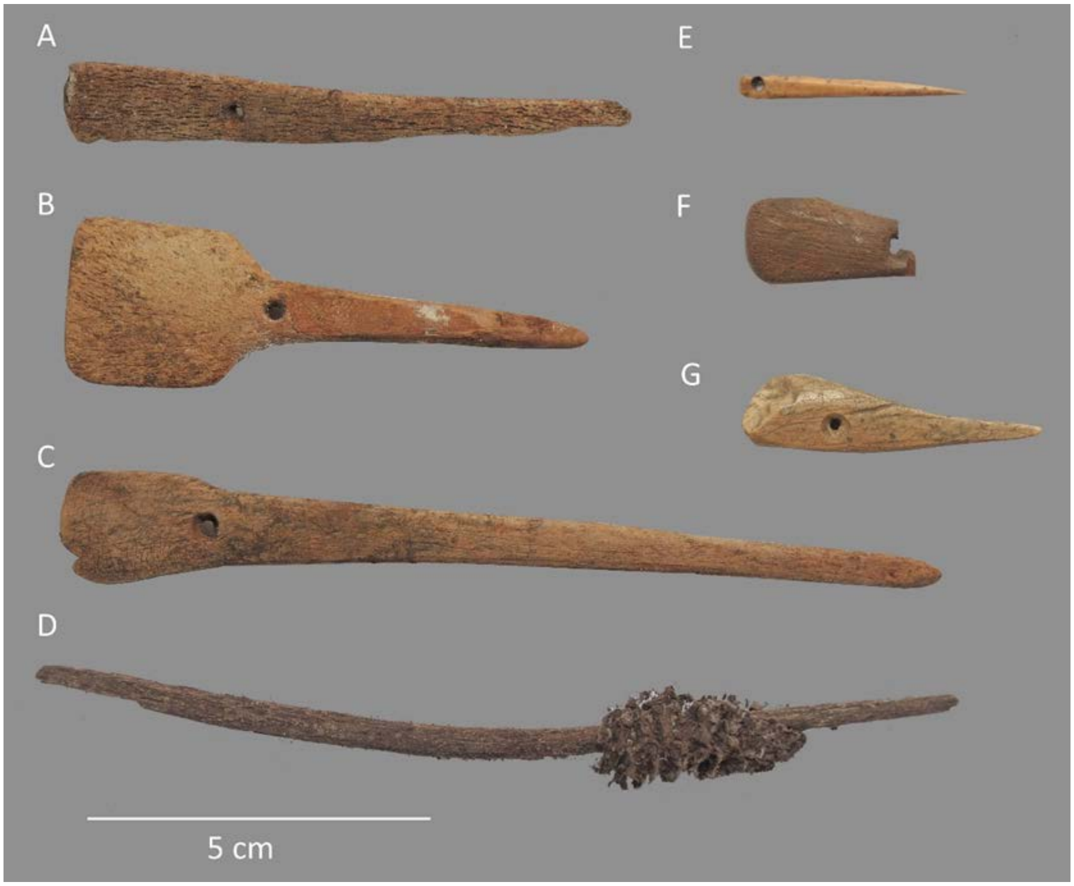

Figure 5.20 Weaving tools from Unit 2

5.4 CERAMIC REMAINS IN HUACA NEGRA

Other than the five ceramic spindle whorls, all the rest of the ceramic artifacts are sherds from vessels. Unlike other kinds of artifacts, ceramics are not produced from Phase 1 to 3, thus cannot serve for diachronic comparison. However, ceramic remains reflect the nature of activities associated with Phase 4 (the Initial Period) occupation, which can also be divided into early (4a) and later (4b) parts within its 400-year long time frame (see Table 3.4).

Although all the ceramics from the 4mm screen (and the few from the 2mm screen) were collected, the non-diagnostic fragments smaller than a quarter were just weighed rather than going through further analysis. In this coastal setting, there were also cases of sherds penetrated by salty water and later cracked because of the salt crystallization process. This kind of horizontal cracking makes some ceramic samples lack the external or internal surface for further analysis.

In total, there are 1,298 ceramic sherds registered from secure archaeological contexts in Units 3, 5, 6 and 7, and they constitute the body of the following discussion. While all the sherds belong to the Initial Period and can be classified as Guañape ceramics, the 1,298 shreds are divided into two broad categories based on the archaeological context and the ceramic-making technique. The two categories are (1) diagnostic sherds: those with specific decoration, or the ones with parts for identifying vessel form and function. (2) Non-diagnostic ceramics without the abovementioned characteristics. Table 5.6 is the summary of unearthed ceramic sherds discussed here.

Table 5.6 Ceramic remains in Huaca Negra

Phase	Sherds	Unit 3	Unit 5	Unit 6	Unit 7	Total
4a	Diagnostic	68	2	52	1	123
	Non-diagnostic	225	14	281	0	520
4b	Diagnostic	23	172	2	16	213
	Non-diagnostic	69	350	10	13	442
	Total	385	538	346	30	1,298

Although ceramic is a less important category in terms of diachronic comparison of craft production, its presence implies the adaptation of new technology into people’s daily life. Rather than focusing on the cultural traits and sequence, the following sections will illustrate the general tendency of applied pottery-making techniques, and the related vessel forms and decoration. For this discussion, I use the comparison between the two sub-phases.

From a regional perspective, ceramic style is essential for reconstructing the culture-historical sequence. Under a broader idea of style, the ceramic vessel form and decoration are presented in the first half of this section. However, cultural seriation is not the focus of this section. On the contrary, vessel form is taken as an index of function, so that the discussion of how the usage of ceramic might represent lifestyle can be made. Decoration motif constitutes the second part of this section as this is another set of data that contains various information related to ceramic style, and a diachronic change of preference can also be discerned.

5.4.1 Ceramic forms in Huaca Negra

There are six types of vessel forms registered in Huaca Negra: neckless olla (cooking pot), olla with neck, jar, bottle, bowl, and plate. Among the six forms, neckless olla is the most abundant one. Table 5.7 presents the sample size of each type. Although the counts are based on the sherds, the number here represents the vessel unit because all diagnostic sherds are measured and registered. Within a relatively small sample, those considered to come from the same vessel were registered during the coding process. As can be seen, there is a consistent pattern that neckless olla dominates the assemblage in both sub-phases. Moreover, the degree of vessel form diversity slightly increases over time as the neckless olla drops 8.5%. Jars are only present in Phase 4a and bowls only in Phase 4b; this transition makes the two ceramic assemblages statistically different from each other under the Chi-square test (X^2=16.48, df=5, p=0.006, Cramer's V=0.283). Interestingly, if the assemblages are divided by function, including cooking (the two kinds of ollas), container (jar and bottle), and serving vessel (bowl and plate), the difference between Phase 4a and 4b becomes less significant (X^2=4.22, df=2, p=0.121, Cramer's V=0.143). Therefore, the Chi-square analysis suggests that, while different kind of vessel forms are used, the general activities held in Phase 4 remained similar between the two sub-phases.

Table 5.7 Type and quantity of sherds

Phase	Neckless Olla	Olla w/ neck	Jar	Bottle	Bowl	Plate	Total
	75	2	7	12	0	1	97
4a	77.3%	2.1%	7.2%	12.4%	0.0%	1.0%	100%
	75	4	0	23	6	1	109
4b	68.8%	3.7%	0.0%	21.1%	5.5%	0.9%	100%

The fact that ollas dominate the ceramic assemblage suggests cooking is the main activity associated with ceramic usage. In the contemporaneous site of Gramalote, Prieto classifies ollas based on the incurved, everted form and the angle of the rim (Prieto 2015). The classification of incurved, (slightly) everted neckless olla is applied here, but no further distinction is made as it makes less sense to discuss the ceramic typology within a small sample. It is also observed that this is a context where the degree of standardization remained low, and a lot of minor variations are expected between vessels (e.g., Figure 5.21-22). It is also noteworthy that there is no case of everted neckless olla found in Phase 4a, but there are few cases in Phase 4b (Figure 5.22), implying an increasing diversity of vessel type rather than more standardized pottery production.

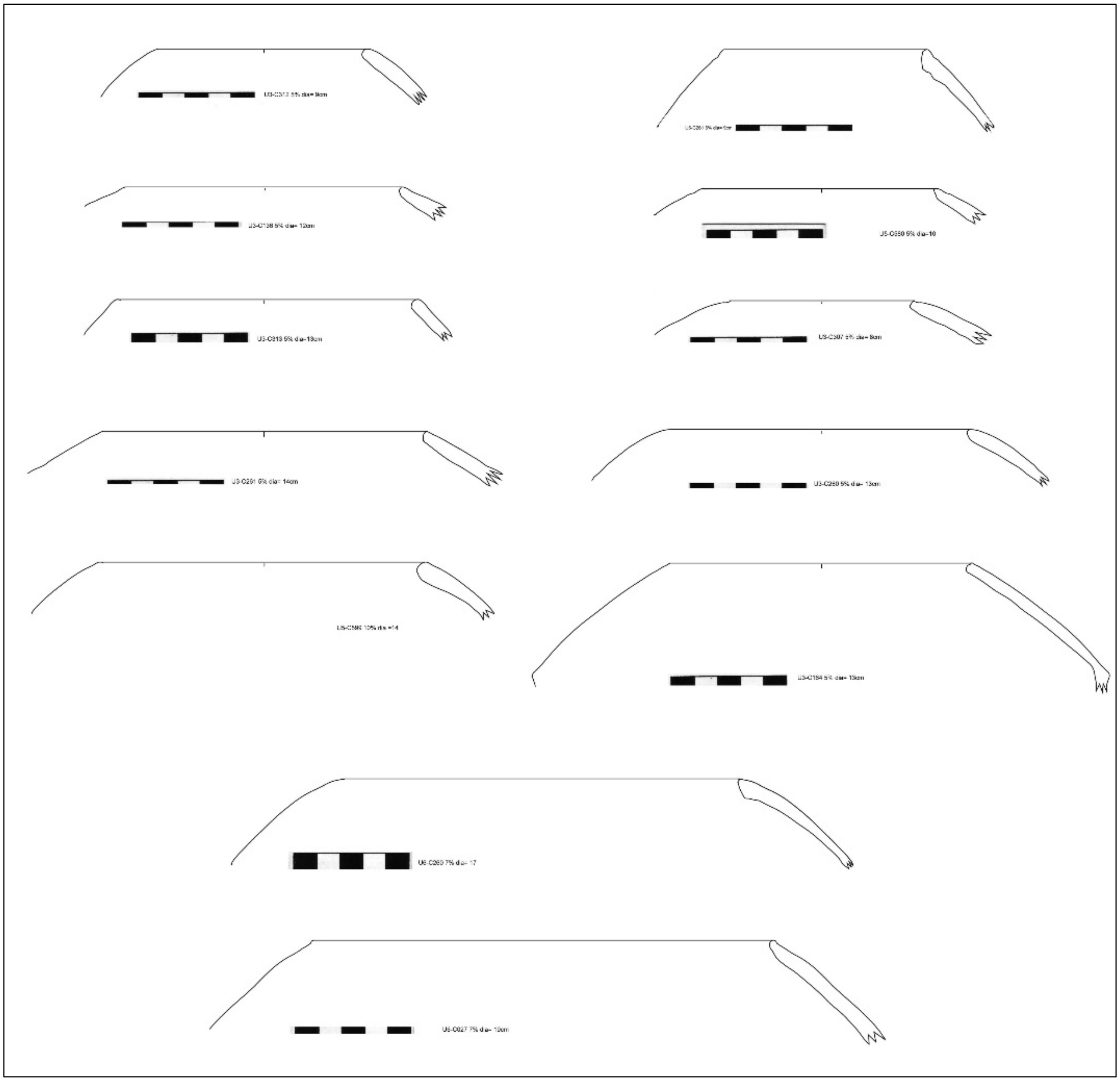

Figure 5.21 Examples of incurved ollas from Phase 4a

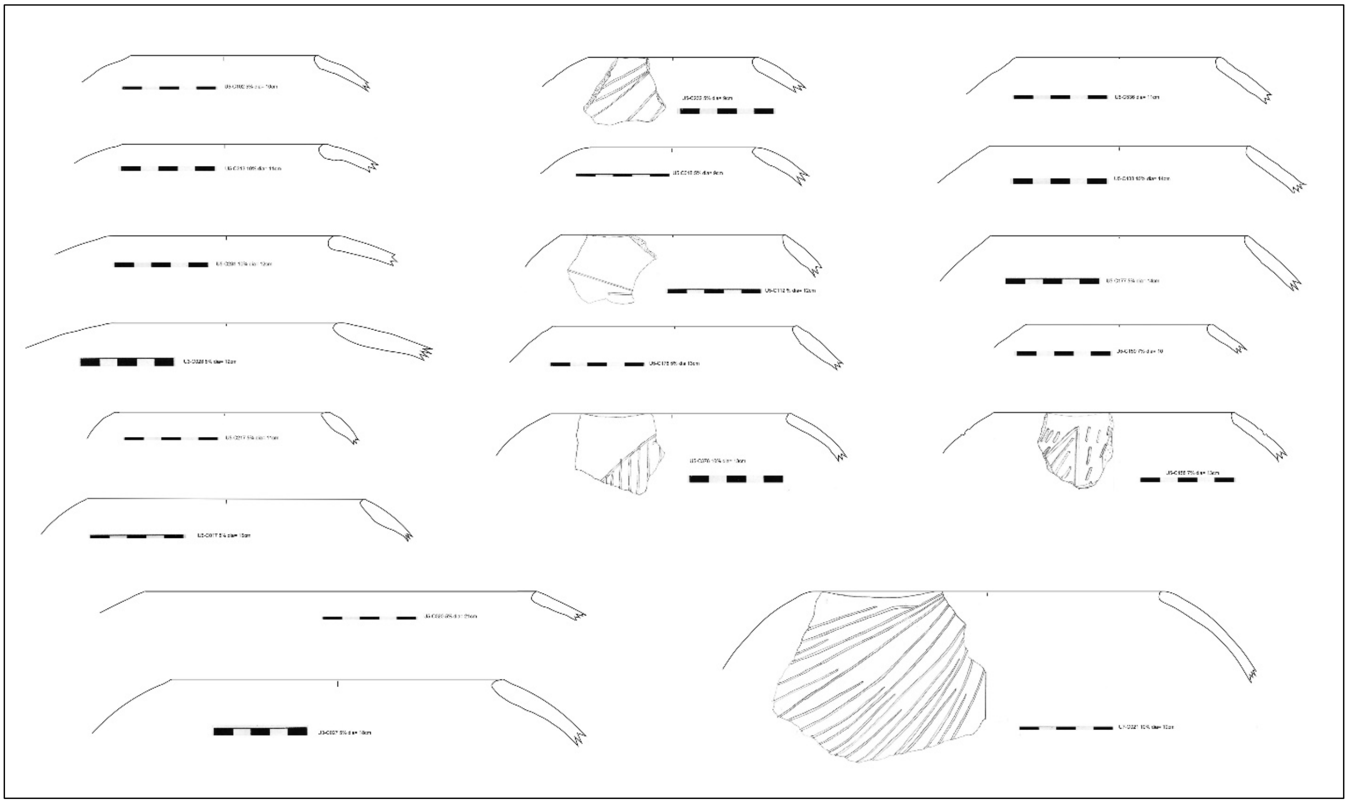

Figure 5.22 Examples of incurved ollas from Phase 4b

5.4.2 A General View of Ceramic Making

5.4.2.1 Ceramic Manufacture

Pottery-making technique is a broad topic that itself can form a complete dissertation. However, this facet of material remains provides relatively little information for the current research focus. This section presents preliminary data from attribute coding among all the diagnostic sherds, including rim sherds and the decorated ones. Four categories of attributes are considered related to manufacturing technique: modeling technique, surface treatment, firing environment, and temper size. Table 5.8 summaries the distribution of the samples from the two sub-phases.

Table 5.8 Manufacture techniques applied in Huaca Negra, data presented in quantity and proportion

Phase	Forming		Environment		Surface treatment			Temper		
	Hand modeled	Coil	Ox	Re	Smoothed	Burnish	N/A	Medium to fine	Coarse	Very coarse
4a	124	0	115	9	105	18	1	3	106	15
	100.0%	0.0%	92.7%	7.3%	84.7%	14.5%	0.8%	2.4%	85.5%	12.1%
4b	213	0	166	47	200	13	0	4	184	25
	100.0%	0.0%	77.9%	22.1%	93.9%	6.1%	0.0%	1.9%	86.4%	11.7%

Coiling technique was expected to be a major technique for constructing the vessel body, as this technique is popular in other contemporaneous contexts (e.g., Prieto 2015) and mentioned in the previous excavation (Strong and Evans 1953). In fact, this technique in Huaca Negra was only a supplemental one that was applied most often to the neck area for enhancing the vessel structure, and all the observed sherds were formed with hand-modeling technique (Table 5.8).

Another observation that differs from previous work is related to the firing environment. Strong and Evans considered the reduced firing environment to be mainstream in the earlier occupation, as Guañape Black Plain dominated the collection in the lower strata. People then began firing ceramics in an oxidation environment, and Guañape Red Plain ceramic become more popular in the later period. However, when scrutinizing the sherds excavated by Strong and Evans in the Natural History Museum in New York, it was observed that there is a blurry line between their Black and Red sherds, and many of the sherds categorized as Guañape Black Plain are actually dark brown in color and fired in an oxidation environment. This observation corresponds to the current ceramic assemblage in Huaca Negra: ceramics fired within an oxidation environment dominate both sub-phases by more than 75%, and they are as high as 92.7% in the earlier phase. As can be seen from Table 5.8, ceramics fired in the reduction environment increase over time. The fact that people incorporated more reduction technique suggests that people might have diversified their ways of pottery making, or improved their technique to produce pottery of better quality during the last part of the occupation of the site.

There is not much evidence for careful surface treatment on the sherds in Huaca Negra. While all the recorded sherds have smoothed surface, only a few of them had been further burnished. In fact, the proportion of burnished sherds declined from Phase 4a to Phase 4b. The tendency of careless surface treatment suggests less labor investment in making utilitarian pottery, especially for the cooking pots. There are 7 (out of 31) burnished sherds associated with bottles, which can be taken as supplementary evidence for this viewpoint.

Temper is the last criteria recorded from the sampled sherds. In this case, temper size is taken as an indicator to discern the effort for temper sorting and preparation. The categories of temper size is modified from Druc's classification (2015), where she classified temper size into very coarse sand (1-2mm), coarse sand (0.5-1mm), medium sand (0.25-0.5mm), fine sand (0.125-0.25 mm) and some other finer types. The surface and breakage of sherds were observed by the naked eye to get a general idea of grain size, and a digital microscope was also applied to retrieve a finer image. Not surprisingly, the sherds found in Huaca Negra rarely come with a well-sorted temper, as we are talking about the earliest ceramic production and usage in this region, and coarse temper dominates the assemblage by more than 85%. These sherds occasionally incorporated particles that are larger than 1mm but temper was classified as coarse if the majority of temper remained small enough. Very coarse temper refers to the least-sorted sherds, and this category is the second largest group in the Huaca Negra ceramic collection. The medium-to-fine group, the category with the least examples, refers to the rest of sherds that show a better sorting process; in them, no clear particles were observed from the surface or fresh breaks. Moreover, 5 out of 7 cases of finer temper are associated with bottles, which also indicate that bottle was a form of ceramic receiving more treatment not only in surface treatment but starting from the preparation of raw materials.

As there is no significant change in regard to the proportion of three kinds of temper and forming techniques, I suggest that there were relatively stable kinds of raw material preparation and forming techniques in Huaca Negra. However, there might be a gradual change in terms of firing technique, surface treatment, and vessel form composition.

5.4.2.2 The Application of Ceramic Decoration

Although it is common to treat ceramic decoration as one of the most essential traits for identifying cultural affiliation, the aim here is to illustrate the general tendency of applied techniques. This also makes sesnse under the consideration that ceramics already fall within a narrowed timeframe. As with the ceramic manufacture techniques mentioned above, applied decoration techniques shed light on the early stage of ceramic production in this coastal village. The decoration itself, of course, contains social meaning and possible messages, which can be addressed with the preferred styles and the frequency of decorated ceramics within the total population. While not being able to decipher the actual social meanings, the above-mentioned facets put more pieces of the puzzle together in the hope of eventually getting a clearer picture for this period of time.

There are three significant techniques that people applied to decorate their pottery: incised line, punctate, and applique. Each method can be further divided into different styles according to the tools and created patterns (Table 5.9). It is common that more than one method was applied to the same ceramic vessel. In fact, incised lines are commonly used for delimiting a zone for applying other patterns of incised line or punctate.

Among the entire sherd collection (N=1,298), there are 194 decorated sherds, which makes 14.9% of sherds decorated ones. This number is extremely high considering that fact that Strong and Evans only found 6.2% of their ceramic collection decorated. In the inland Virú Valley, Zoubek (1997) also retrieved a limited amount of decorated sherds, but a percentage can't be reached as the total population of excavated sherds is unknown. A striking difference can also be detected between Huaca Negra and Gramalote. In Gramalote, almost all the decoration motifs are similar to those found at Huaca Negra. However, only 1.8% of sherds from Gramalote are decorated (Prieto 2015). The high proportion of decorated sherds at Huaca Negra could be a result of style preference, or could imply special meaning for utilized pottery. While the actual reason for the difference is unknown, the fact that decorated sherds are eight times higher than other contemporaneous site indicates a different pattern in the application of decoration.

Other than the high frequency of decorated sherds, the general tendency of mainstream decoration can be seen in Table 5.9. In phase 4a, punctate applique is the most common method for decorating ceramics (Figure 5.23), but this method is applied to only 51.2% of the total decorated samples. As can be seen in Figure 5.23, there is a considerable variety of punctate applique within this category regarding the width, the shape of applique, and different tools applied for making a punctate pattern. Overall, the diversity of ceramic decoration in Phase 4a is also higher than Phase 4b, as incised line (Figure 5.24: F), punctate (Figure 5.24: A-E, G, L), and zoned punctate (Figure 5.24: H-J) are also present in more than 10% of the total population. The only case of modeled decoration is also found in Phase 4a (Figure 5.24: K). There are also different tools applied to created punctate and zoned punctate patterns that make the ten available samples from this period all different from each other in some ways. This tendency implies a non-standardized way of creating ceramic decoration in the early part of Phase 4, the early Initial Period occupation.

Table 5.9 Types of ceramic decoration and their distribution

sub-phase	Type of decoration	U3	U5	U6	U7	Total	%
4a	Fine line incise	1	1	6		8	18.6%
	Broad line incise		1			1	2.3%
	Modeled	1				1	2.3%
	Applique	1				1	2.3%
	Punctate applique	21		1		22	51.2%
	Punctate applique w/ incised lines					0	.
	Punctate	1		4		5	11.6%
	Zoned punctate			5		5	11.6%
	Total	25	2	14	0	43	100%
4b	Fine line incise	2	107		7	116	76.8%
	Broad Line	1	8		5	14	9.3%
	Modeled					0	.
	Applique		1			1	0.6%
	Punctate applique	8	2			10	6.6%
	Punctate applique w/ incised lines		4			4	2.6%
	Punctate	2	1		1	4	2.6%
	Zoned punctate		2			2	1.3%
	Total	13	125		13	151	100%

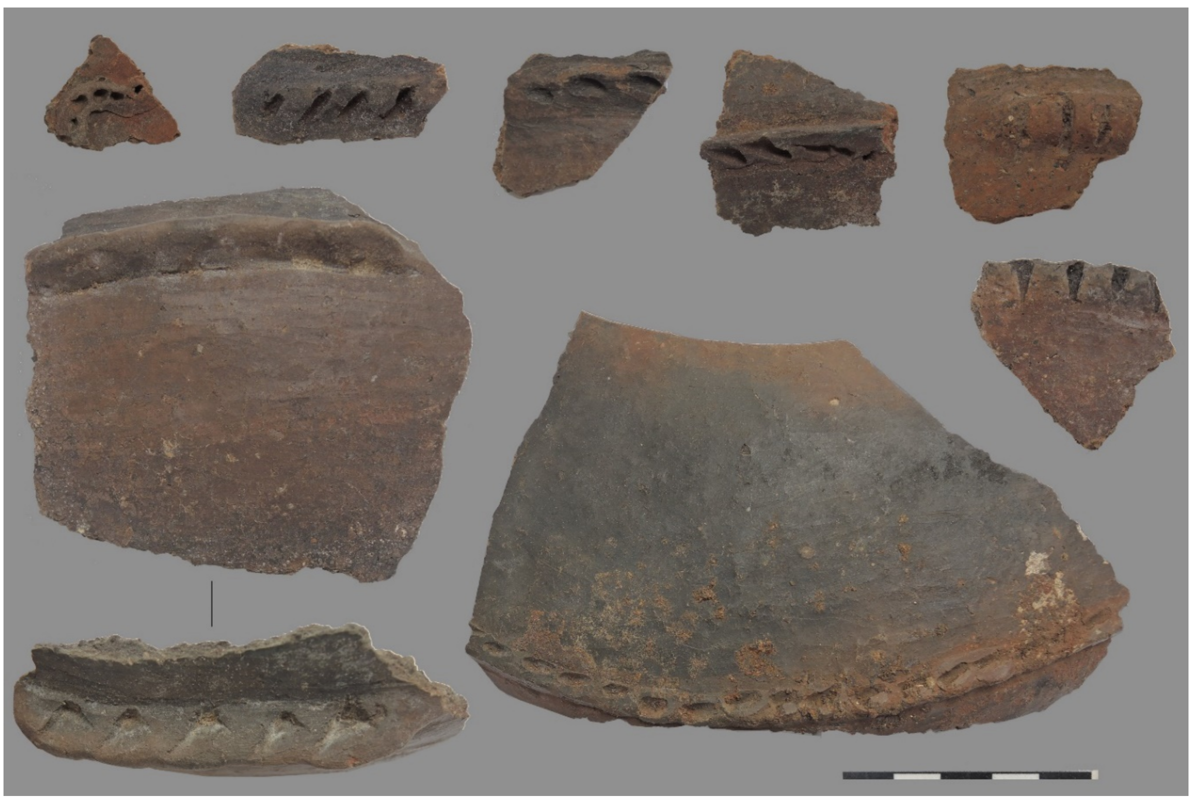

Figure 5.23 Punctate applique in Phase 4a. Note the fingerprint on the lower left sample suggest a hand modeled applique

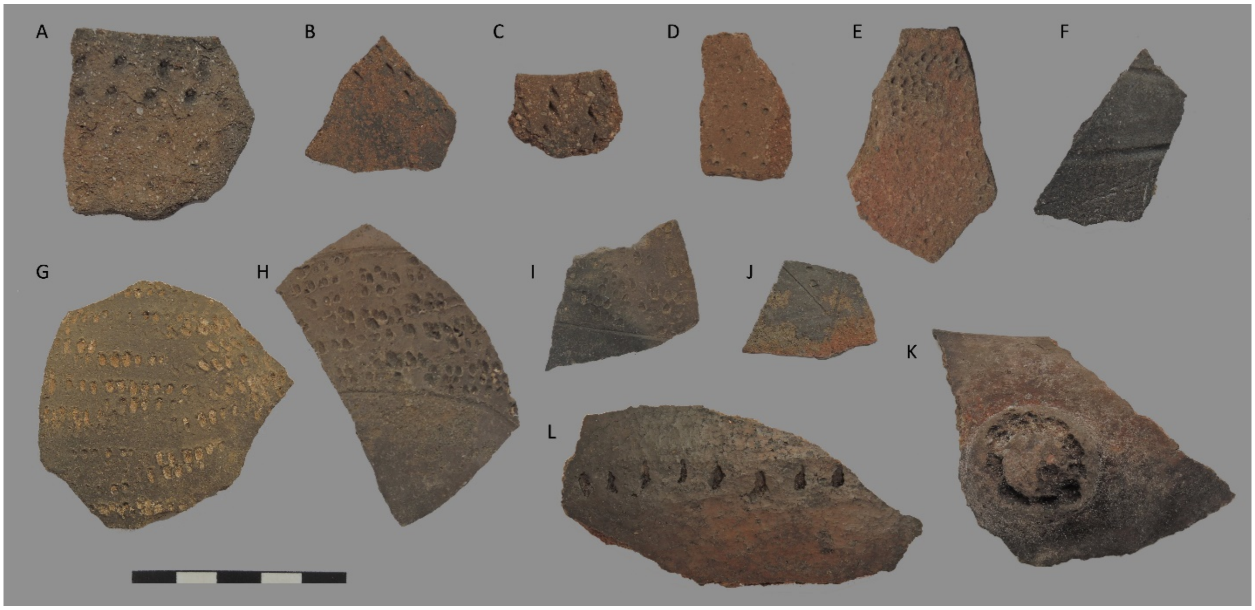

Figure 5.24 Other examples of ceramic decoration techniques from Phase 4a stratum

The scenario slightly changes in Phase 4b as fine line incised, a previously insignificant style, dominates the entire ceramic assemblage at more than 75%. Considering the incised technique alone, it (including fine line, broad line, and punctate applique with incise line) represents 88.7% of total decorated sherds in the last two hundred years of occupation. Figure 5.25 illustrates the incised line pattern applied near the rim and bottleneck, and Figure 5.26 presents examples applied to the body sherds. It is a common practice that incised lines are used to create a zone, and diverse patterns were placed within the defined area. Punctate patterns are commonly applied in Phase 4a, but in Phase 4b, incised lines that constitute geometric patterns became a more popular method for ceramic decoration. In comparison to Phase 4a, the incised line decoration in Phase 4b also represents a certain degree of similarity between examples from different layers of Unit 5. In addition, the patterns of punctate and punctate applique decoration remained similar between Phase 4a and 4b, just the quantity declines.

Figure 5.25 Incise lines applied near rim and bottleneck

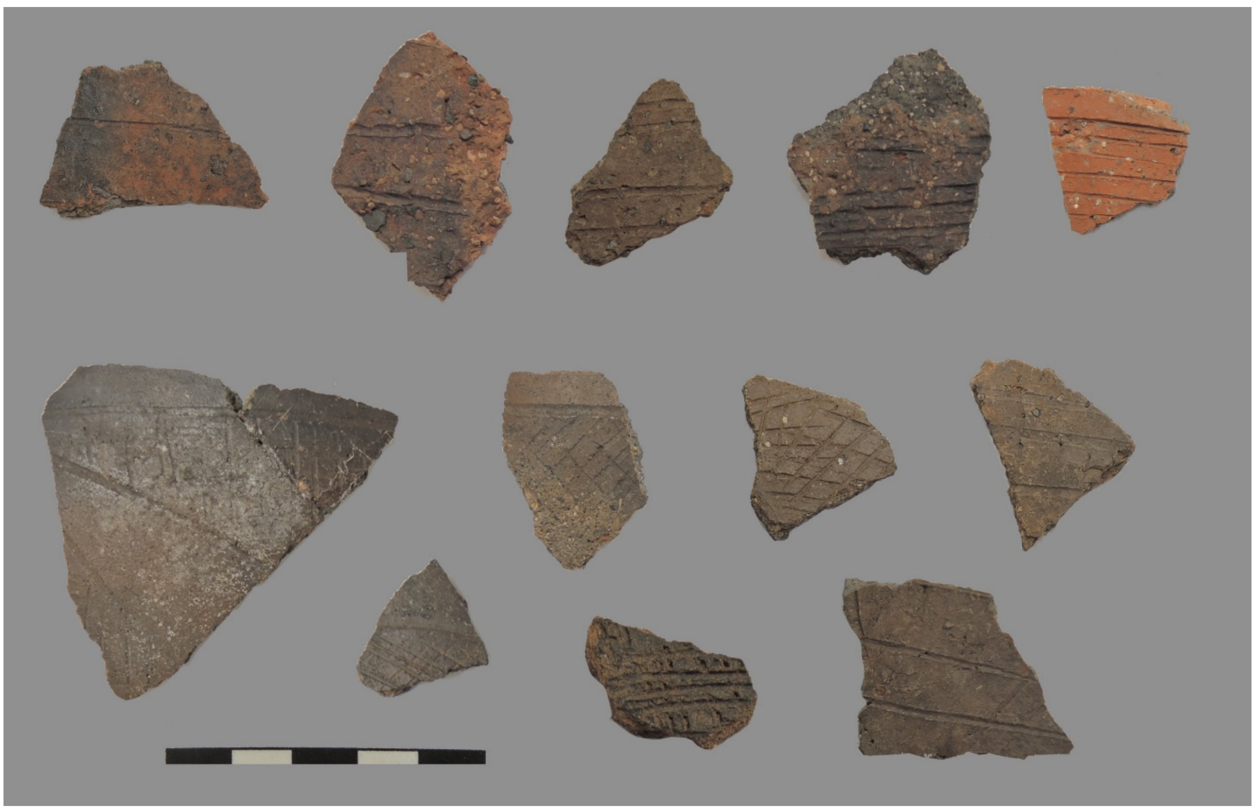

Figure 5.26 Diverse patterns of Incised lines on body sherds

5.5 SUMMARY

According to the results of this project, it is confirmed that inhabitants of Huaca Negra did conduct craft production locally, including stone-tool making, bead-making, weaving and spinning, and ceramic production. Unlike other craft categories, there is no direct evidence of ceramic production, but all the materials are locally available, and the quality of ceramics also contradicts the picture that these were imported items. Based on the current data, it is proposed that the importance of craft production was relatively stable throughout the occupation history. However, it should be kept in mind that the technology and diversity of craft products did increase over time.

With the exception of beads, most categories of artifact discussed in this chapter can be considered as daily utilitarian goods. The high proportion of debitage remains in Phase 3 and 4 implies the site area was a place where people made or modified their chipped stone tools. The modification was also applied to exotic material such as crystal quartz.

Due to the possible issue of preservation, it is hard to claim that the usage of textile increased over time simply based on the density of textile (see Table 5.5). However, the complexity of the textiles present does demonstrate improvement in weaving technique. The presence of fiber as raw material also indicates local production.

Although ceramic production is only associated with Phase 4 context, the comparison between the two sub-phases illustrates a gradual changing pattern regarding firing technique and preferred decoration. Another noteworthy tendency is the high proportion of decorated sherds in comparison to nearby Initial Period sites. For example, the proportion is more than eight times higher than ceramics in Gramalote. However, current data is not sufficient to provide a plausible explanation of this pattern. Other than these, the general scenario of ceramic assemblage and manufacture technique remained relatively stable without dramatic change within the four-hundred-year-long Initial Period occupation.

As mentioned, beads are another important category, despite its small quantity, that sheds light not only on craft production but also exchange and social meaning. The beads found in Phase 2 are all made of local materials in a relatively simple form. Changes occurred in Phase 3 and 4 as beads made of exotic materials were incorporated into the inventory. The repertoire of beads also expanded in the later occupation as diverse forms were found associated with one infant burial in Phase 3, and some of them represent careful design and labor investment.

In comparison with other utilitarian goods, bead production and usage contain more social meaning in the current context. At this point, there is no direct evidence for inferring whether exotic materials were imported for making beads locally, or the finished products were imported. However, the concentration of beads in Unit 6 Phase 4, suggests the possibility that exotic beads were associated with specific events, rather than these beads arriving as a long-term, gradual accumulation and being distributed throughout the site. Following this idea, the next chapter will focus on the artifacts that were made of exotic materials to place Huaca Negra in a broader regional scope in terms of the exchange network.

6.0 EXOTIC GOODS, AND THEIR SOCIAL IMPLICATIONS IN HUACA NEGRA

Following the structure for classifying the unearthed materials mentioned in Chapter 1, the presence of exotic goods implies that people in Huaca Negra were able to access non-local materials either by moving around the landscape or by building exchange networks with other communities that lived closer to those foreign resources. While the latter scenario implies a direct social network built up between communities, people, when attempting to retrieve non-local resources by themselves, would also encounter other groups outside the community when moving around the landscape, which forms another kind of social interaction.

Although there is no direct evidence to distinguish between getting materials by oneself and get them from someone else, especially for resources that are available in a relatively close area, it is expected that it would be less possible for people to get exotic materials from farther away (say, other valleys) without interaction with other groups. To avoid possible ambiguity, the raw materials that are not available in the coastal and lower Virú Valley are treated as non-local ones. These constitute the body of exotic goods, and these non-local materials are taken as possible evidence of exchange networks and social interaction.

In Huaca Negra, exotic materials are mainly constituted by non-local mineral and rock. Thus, this chapter can be taken an extension from the previous discussion of lithic remains, but with a specific focus. There are also a few examples of spondylus beads and anthracite products incorporated into the current discussion. Table 6.1 lists all the non-local material found in Huaca Negra. Their closest source and estimated distance are also provided.

Table 6.1 Identified exotic materials in Huaca Negra[13]

Material	Valley	Location	Distance
Anthracite	Chicama	Baños de Chimú	180 km
Chalcedony	Chicama	Malin	150 km
Chert	Chicama	Malin	150 km
	Virú	Carambita river	45 km
Orthoclase cleavage	Chicama	Baños de Chimú	180 km
		Sausal	110 km
Slate	Virú	Carambita river	45 km
	Chicama	Quebrada Guabalito	100 km
Vein quatz	Chicama	Malin	150 km
Crystal quartz	Virú	Carabamba	65 Km
	Moche	Salpo-Milluachaqui	85 km
Silicified sandstone	Virú	Carambita river	45 km
Gypsum	Moche	Simbal and Chacchito	70 km
Chrysocolla	Pisco	Mina Lily	~730 km
Spondylus shell	.	North of Santa Elena Peninsula, Ecuador	>700 km

In total, there are 630 items can be classified as exotic goods, with the provenance either of inland Virú Valley, or other valleys. As will be discussed later, items that are small and present in only one context in a large quantity will be considered as a single event and counted as one to avoid skewed data and interpretation. After this procedure, the population of exotic goods for calculation and discussion is 217.

As the deserts between valleys in north Peru form natural barriers and increase the difficulty of inter-valley interaction, the discussion of exotic goods is divided into two parts: the goods from inland Virú, and the ones from areas outside the Virú Valley. As can be seen in Table 6.1, many kinds of exotic goods are from other valleys, while chert and slate are also available in other parts of Virú Valley. Silicified sandstone is the only material that could only be retrieved

[13] The distance presented here is not Euclidean distance as the most sourcing areas located in the inland area. Rather, it is the estimation based on the choice of shortest modern route on the google map, which should be topographically efficient on the landscape

from the middle Virú Valley. For the material that has multiple provenances, the closest option is taken as a conservative estimate to avoid exaggerating the importance or weight of the exchange network. The diachronic comparison will be made between phases, and a general picture of the exchange network will be provided as a conclusion of this chapter.

6.1 EXOTIC GOODS WITH VIRÚ VALLEY PROVENANCE

Among the 217 exotic objects, 182 (83.9%) of them could be retrieved from the Virú Valley. Table 6.2 presents the types of material, quantity, the diachronic distribution, and an overall density of exotic objects that come from other parts of Virú Valley. Two major trends can be observed from Table 6.2: (1) the overall density of exotic objects increases over time; (2) crystal quartz was constantly present in all the four registered phases, and the change in its quantity largely affects the overall density, suggesting its significant role in this category. Among four different kinds of exotic goods within the Virú Valley, the usage of crystal quartz will be discussed in detail.

Table 6.2 Count of exotic goods from the middle or upper Virú Valley

Phase/ Type	Chert	Slate	Crystal quartz	Silicified sandstone	Total	Overall density
Phase 1			1		1	0.25
Phase 2		1	9	1	11	0.89
Phase 3	2	1	41		44	1.13
Phase 4	1	1	123	1	126	4.72
Total	3	3	174	2	182	.

6.1.1 Contextualizing Crystal Quartz

Although Strong and Evans didn’t address the actual amount of crystal quartz, they noticed its common presence from the surface to 3.25-meter depth in their Strata Cut 1. They considered the usage of crystal quartz as “*one characteristic that signifies Guañape Period*” (Strong and

Evans 1952: 40, italics added). This observation fits the results of the current excavation as there seems to be a deep-rooted tradition of using crystal quartz from Late Preceramic to Initial (Guañape) Period. In fact, one example of crystal quartz found in Unit 3 (4.3 meter below the surface) is the only case of exotic objects associated with Phase 1 occupation, suggesting this material was used from the very beginning of human activity here. The increasing quantity also implies the importance of this material.

One should be curious about how crystal quartz got to Huaca Negra. As the nearest source is located in the middle Virú Valley, 65 km away (and another source in Salpo-Milluachaqui can be reached following the same route but going further), the preference for crystal quartz suggests three possible scenarios: (1) people in Huaca Negra traveled to acquire it directly from the outcrop or (2) from other nearby communities with higher accessibility to the resources. (3) It is also possible that people from the inland Virú visited Huaca Negra and brought in this non-local material. The scenarios 2 and 3 imply interaction between groups and seem more plausible for retrieving non-local resources dated back to 5000 years ago. However, evidence of Preceramic occupation in the inland Virú is lacking for making a further inference.

As will be discussed later, the function or usage of crystal quartz is another issue of interest. Strong and Evans suggest that these items might contain "magical significance" mainly because of their transparent nature (ibid). A similar interpretation can also be found from other parallel contexts such as in the recent work of Huaca Prieta (Dillehay 2017). However, there is no particular foundation for supporting this assumption. In the excavation of Gramalote, Prieto (2015) discovered tools made of crystal quartz, which suggests the potential that crystal was used with an actual utilitarian function.

In fact, the reason that crystal quartz is rarely present in the form of a formal tool can be related to its physical nature. Crystal quartz tends to break easily into sharp but irregular pieces. Thus, these pieces might serve a utilitarian function without being modified into specific forms. One example comes from the Hoko River on the west coast of North America, where crystal quartz was used for making tools such as side-hafted microlithic knives or end-hafted microblades (Croes 1995). An experiment working with replicas of these microlithic tools also suggests crystal quartz can be an efficient tool for handling fish in a coastal context (ibid). The Hoko River case provides a reference for interpreting the function of crystal quartz from a different perspective.

6.1.2 Crystal Quartz from the 2015 Excavation

Following Sullivan and Rozen (1985), debitage is divided into debris (the ones with bending or conchoidal fracture) and flakes. Other than debitage, other crystal quartz objects include raw material, cores, and examples with other traces of modification. As can be seen in Table 6.3, debris is the most abundant category of crystal quartz remains. As flakes are also commonly present, debitage constitutes the majority (88.9- 92.7%) of crystal quartz remains.

Among the three sedentary phases, it can be seen that the proportion of flakes decreases over time. In contrast, the debris increases from Phase 2 to Phase 3, and then stays at a similar proportion in the Phase 4 context. Although there are some cases showing crystal quartz being used as tool (Figure 6.1), most items are in irregular shape and lack a sharp edge (Figure 6.2). The absence of actual tools and the fact that only a few items have traces of usage make it clear that crystal quartz was not brought in to the site specifically for utilitarian purposes. Nevertheless, a certain degree of modification was been applied to this material.

Table 6.3 Different types of crystal quartz in quantity and percentage

Phase	Raw material	Debris	Flake	Core	Other	Total
1		1				1
2		4	4	1		9
3		25	13	3		41
4	5	78	32	6	2	123
1		100%				100%
2		44.4%	44.4%	11.2%		100%
3		61.0%	31.7%	7.3%		100%
4	4.1%	63.4%	26.0%	4.9%	1.6%	100%

Table 6.3 reveals another trend that there is a higher diversity of tool types present in the Phase 4 occupation, along with the increasing quantity of imported crystal quartz. Other than the raw material without traces of modification, there are also two other items with some trace of polish. This tendency implies that not only the quantity of crystal quartz but also the associated behaviors might change over time.

The examination of crystal quartz objects shows that ten items contain extra work or modification. Nine out of the ten are associated with Phase 4 stratum, including five retouched cores (83.3% of total cores in Phase 4) and four flakes (12.5% of total flakes in Phase 4) with activated edges (Figure 6.1). There are two possible interpretations of this change in Phase 4: (1) people in Huaca Negra began to explore more ways of using crystal quartz; or, (2) more modifications of crystal quartz are made along with the increased amount in Huaca Negra, which might also be associated with a wider distribution (of smaller pieces) of this material.

The two interpretations are *not* mutually exclusive. But the former suggests a changing behavior pattern widening the utilitarian purpose of imported non-local goods, and the latter refers to a positive correlation between quantity and diversity of objects while the *function* might remain similar. As mentioned in the previous section, importing crystal quartz can be related to utilitarian or non-utilitarian purposes. The following discussion aims to distinguish the two points of view, which would help to identify peoples' perception of this material.

Figure 6.1 Tools made from quartz. Top: used flake and its edge. Lower: two examples of retouched core

First of all, the intensity of local modification can be examined through the material itself. Considering the modification process that produces debitage, it can be assumed that the smaller a *debitage* is, the higher chance it is produced or modified locally, because crystal quartz is a material that breaks easily, and small pieces are hard to curate or to carry while traveling around. Thus, the general size of crystal quartz can be taken as evidence to argue for the intensity of local modification. As can be seen in Table 6.4, the average weight of crystal quartz decreases over time, implying an emphasis on local modification. Figure 6.2 presents some examples of crystal quartz retrieved from the Phase 4 context. Most items are quite small, and there is no standardized form of modification or pattern of use. Thus, it is suggested that the second scenario better fits the current data that more modification existed in Phase 4 occupation as the result of an increasing amount of imported crystal quartz.

Figure 6.2 Examples of small fragments of crystal quartz from Phase 4 stratum

At first glance, it seems to be a chicken-and-egg problem that the abundance of the material supports the inference of local modification, and the behavior of modification is the reason for a lot more debris in terms of item count. This issue can be solved by scrutinizing the overall density of each phase not only by count but also by weight. The ubiquity of crystal quartz also sheds light on the nature of its usage. The diachronic comparison is presented in Table 6.4.

Table 6.4 Quantity and ubiquity of crystal quartz

Phase	Soil volume	N of sample	Total weight	Average weight (g)	Density (N)	Density (g/m^3)	Ubiquity[14]
2	12.36	9	24	2.67	0.73	1.94	6.7%
3	38.85	41	61.7	1.50	1.06	1.59	27.5%
4	29.69	123	132	1.07	4.14	4.43	69.8%

[14] The ubiquity here is calculated as $\frac{Number\ of\ artifical\ layer\ with\ presence\ of\ crystal\ quartz}{Total\ artifical\ layers\ in\ each\ phase}$. Since the strata of occupation in Huaca Negra are compact, 10 cm artificial layers can represent sufficient gap of time avoiding separating contemporaneous artifacts into different context. Artificial layer thus is considered as a legit unit when considering ubiquity.

As can be seen in Table 6.4, although the average size (weight) did decrease through time, the quantity of crystal quartz increased *not only* in total number but also in the average weight per cubic meter. Thus, it can be inferred that the high quantity presented here is not just the debris result from modification, but *an actual increment of imported goods*. Another index to assess the distribution of the exotic crystal quartz is the calculation of ubiquity. The result shows that crystal quartz is present in 69.8% of total Phase 4 contexts, meaning more than two-thirds of excavated layers contain crystal quartz, which is much higher than the ubiquity in Phase 2 (6.7%) and Phase 3 (27.5%) and indicates the wide utilization of this material.

It is clear that crystal quartz was present from the beginning of human activity at Huaca Negra. From Phase 2 to Phase 3, people increased the degree of exploitation. There were fewer larger pieces in the first phase, which caused the lower density of the sample but heavier average weight. People in Phase 3 kept using this material, with four times higher ubiquity associated with the smaller sample size. The scenario here is that people brought in the material to the site, slightly modified the material, and spread it out to other villagers in the community. Overall, there is no dramatic change between Phase 2 and 3 except in ubiquity.

Phase 4 is the time when crystal quartz became really common by all measures. The high ubiquity is the result of (1) increasing the amount of imported goods, and (2) more knapping behavior to create more abundant, but smaller items for (re)distribution. The positive correlation between quantity and distribution (ubiquity) implies that crystal quartz was imported to the local context due to people's *preference.* The higher diversity of tool type and the fact that tools with use wear are mostly associated with the Phase 4 stratum indicate that the function of crystal quartz might have slightly changed toward a utilitarian perspective later in the site. However, one should keep in mind that most crystal quartz items remained debris, thus making utilitarian tools was not the only or primary explanation for this material. Instead, the pattern was the result of exploring new applications for the already familiar non-local material.

The widely distributed crystal quartz in Huaca Negra and the lack of evidence of spatial concentration also shows that this material was *not restricted* to specific people or groups in this community. On the contrary, it is possible that the purpose of knapping was to create more fragments for distribution. The increasing ubiquity can be taken as evidence for this statement.

6.2 EXOTIC GOODS FROM OTHER VALLEYS

In contrast to the material retrieved from the Virú Valley, the presence of goods from other valleys is stronger evidence of exchange, as it would have been less possible for people in Huaca Negra to travel a long distance all the way up to Ecuador or down to Pisco and collect exotic materials by themselves. The rarity of exotic goods from areas beyond the Virú Valley also is shown by n the number of objects unearthed from the excavation. In total, there are seven different kinds of exotic materials from other valleys. Although they have been discussed in different sections of chapter 5, putting them together provides a better picture illustrating possible exchange networks. Other than the orthoclase cleavage and chalcedony/ spondylus beads that are concentrated in one context and represent a single event (thus count as 1), all other excavated items are listed in Table 6.5 with actual counts. The following discussion will first consider the kind of material, and then a general overview of diachronic change will also be addressed.

Table 6.5 Count of goods for inter-valley exchange

	Orthoclase cleavage	Vein quatz	Anthracite	Gypsum	Chrysocolla	Chalcedony	Spondylus shell	Total	Density
Phase 1								.	.
Phase 2	P	4						5	0.65
Phase 3	P	5	1			1		8	0.21
Phase 4		12	7	1	1	P[15]	4*	26	0.87
Total	.	21	8	1	1	61	4	35	.

6.2.1 Orthoclase Cleavage

Orthoclase cleavage is one of the rare examples of a high quantity of mineral remains directly imported to the site without evidence of further modification (Figure 6.3). This material was found in two distinct contexts: 305 pieces from the Phase 2 stratum in Unit 7, and 47 pieces in the Phase 3 stratum in Unit 3. Considering the facts that (1) the quantity is much higher than any other exotic goods, (2) all the items are in their natural form and small in size, and (3) all the remains are highly concentrated in a single context in each phase, it is suggested that the presence of orthoclase cleavage is the result of one-time events. Thus, orthoclase cleavages are coded as present in Table 6.5, because putting a real number for comparison between different goods will alter the result and will also severely skew the density of exotic goods in Phase 2 and Phase 3.

Although the actual number is not considered here, the presence of orthoclase cleavage is significant in two ways: (1) it is evidence of introducing an amount of raw material from other valleys from the early time of the site occupation; (2) while they are not crystal clear, most of the orthoclase cleavage pieces are translucent, which make these raw materials somewhat similar in nature to the crystal quartz discussed above. The latter point has a social implication that there may have been a long-term preference for translucent or transparent objects in Huaca Negra.

[15] Two debitage and fifty-eight beads. P counted as one for calculating the density

Figure 6.3 Examples of orthoclase cleavage and rocks (Unit 7, Phase 2)

6.2.2 Vein Quartz

In total, there are twenty-one vein quartz pieces registered from the 2015 excavation. Most of them are debitage, and there are two cases of cores with traces of retouch. There are also raw materials without a trace of modification. The limited sample size prevents any further interpretation in regards to possible modification, but this counts as another kind of exotic rock material that did not serve a utilitarian function.

Similar to crystal quartz, vein quartz was incorporated into the repertoire of exotic goods from the early occupation history in Huaca Negra. This material is not translucent, but sparkly in a similar way to crystal quartz. The source of vein quartz, however, is much farther than the crystal quartz. As this material tends to be associated with copper or antimony deposits, the nearest source is in the Upper Chicama Valley that is 95 km away from Huaca Negra. Thus, it is harder to retrieve than crystal quartz. Another difference between crystal and vein quatz is that the latter is harder to break and produces less sharp edge for a utilitarian purpose.

Figure 6.4 One example of vein quartz from Phase 4, Unit 3

6.2.3 Anthracite

Anthracite is one of the significant materials that has been found from sites between the Lurin and Lambayeque Valley that can be dated back to Initial Period and Early Horizon Period (e.g., Bird et al. 1985; Burger 1984; Elera 1994, 1998; Izumi 1963; Larco 1941; Onuki 1995; Prieto 2015). Strong and Evans also encountered more than five "jet mirrors" in their excavation from the upper part of the stratum (Strong and Evans 1953:40). Thus, the presence of anthracite in Huaca Negra fits the general cultural context.

There are eight pieces of anthracite fragments unearthed from the 2015 excavation, and a fragment from surface collection. Seven of the eight items are from the Phase 4 stratum in Units 3, 5, and 7. Unit 6 is the only Phase 4 context that does not contain this material. It is also noteworthy that the only case of anthracite from Phase 3 context is from Unit 5, the center of the mound, implying its special social meaning.

Regarding the type of artifact, three out of eight are in the form of containers (Figure 6.5), and the rest are fragments of finished objects, most likely fragments of mirrors as both surfaces are flat and well-polished. As there is no clear evidence of local production, and the forms of anthracite artifact remain similar to the objects found from other sites, it is safe to claim this is a kind of exchange good, possibly carrying special social meaning.

There is no sourcing work on archaeological anthracite artifacts, but geological records suggest that a rich source of anthracite can be found in Alto Chicama area. Baños de Chimú, more than 120 km from Huaca Negra, is the most famous mine and a close provenance of anthracite from Huaca Negra (Carrascal and Silva 2000). Another possible anthracite source is from upper Santa Valley, which is also more than 100 km away from the site.

In fact, people in Huaca Negra might not need to travel that far for this kind of object. In Gramalote, 148 pieces of anthracite artifact were unearthed from a much larger excavation area. Based on the archaeological context, Prieto discerns interesting patterns, including (1) the increasing amount of anthracite throughout the occupation (from early to later Initial Period), and (2) a shift of anthracite distribution from domestic area in earlier occupation to public plaza in the later phase (Prieto 2015:1065-1067). Prieto also suggests that the anthracite found in Huaca Negra might be the result of exchange with people in Gramalote (ibid: 89), as Gramalote is closer to the source. This statement might be correct, as there are more diverse forms of artifact, including mirror, bowl, plate, polisher, and bead registered in Gramalote and forms are relatively limited in Huaca Negra. It is noteworthy, however, that there is one item coming from the context of Phase 3 (Table 6.5), which is dated back to Late Preceramic and thus earlier than Gramalote.

Figure 6.5 Fragments of anthracite containers

6.2.4 Chalcedony and Spondylus Beads

The usage of chalcedony is recorded by Strong and Evans (1953: 40), although there is no further description of the encountered objects. In the 2015 excavation, there was only one chalcedony bead found in Phase 3 (Unit 5, Figure 5.11: E), but there were 58 beads and 2 debitage encountered in Phase 4 context. The two debitage are found in Unit 3 and 7, while all the beads, together with another four spondylus shell beads, were retrieved from the same context in Unit 6 (Figure 5.12). The highly concentrated beads might belong to one single batch of imported goods.

As discussed in Chapter 5, bead production is one of the most significant forms of craft production in Late Preceramic Huaca Negra. This tendency doesn't continue into the Initial Period (Phase 4), as 64 out of 65 beads are from one single context, and 62 of them are made of exotic material (chalcedony and spondylus) without evidence of local production. As can be seen in Figure 5.12, the technique required for making these chalcedony and spondylus shell beads is quite different from the ones made with animal bones. Although the presence of chalcedony debitage makes the idea of local production of chalcedony beads possible, it was not a common practice as the high quantity of beads was concentrated in one context. Instead, it is more likely that people in Huaca Negra directly imported the finished products from other communities. The single batch of exotic beads and the decreasing amount of local beads in the Phase 4 context implicitly indicate a possible replacement of locally crafted beads with exotic ones, but more evidence is needed to make a solid statement.

Beside chalcedony itself, some supplemental evidence should be addressed here. Although there is no chalcedony reported from the contemporaneous Gramalote site, there are spondylus shell beads registered from Gramalote. Chrysocolla (greenstone, Figure 5.9: C) is another example, with one sample registered from Huaca Negra, and samples also found in Gramalote. This tendency suggests that by the Initial Period, there were certain kinds of exotic goods, anthracite, chalcedony, chrysocolla, spondylus, circulating around the north coast of Peru, and Huaca Negra is one of the spots that was involved in this possible network.

6.3 DIACHRONIC CHANGE IN EXOTIC GOODS AND THE SOCIAL IMPLICATIONS

This section summarizes the exotic goods found in Huaca Negra to provide a broader overview. Diachronic change in density, human behavior and preference will firstly be addressed. The information retrieved from Huaca Negra will then be placed into a larger geological scale to see how it connected to other regions in the north coast of Peru, either directly or indirectly.

6.3.1 Diachronic Change

Similar to the previous discussion, one way to evaluate the diachronic change of imported goods is to review the overall density in each phase, which serves as an index of the frequency of utilization, and the possible importance in each social context. Figure 6.6 combines the density data from Table 6.2 and 6.5, and it illustrates different patterns of the exotic goods retrieved within and beyond Virú Valley.

From Phase 2 to Phase 3, there is a gradual increase in the usage of exotic goods (mainly crystal quartz) retrieved from other parts of the Virú Valley, but the utilization of materials beyond the Virú Valley slightly declines in this time. Overall, the quantitative change between the two periods is subtle at both inter- and intra-valley scales. However, it is noteworthy that Phase 3 is the time when people started to introduce new kinds of materials, such as chalcedony and anthracite artifacts into Huaca Negra. Albeit the overall quantity is not significant, the new materials cause the slight increment of diversity as well.

The more significant change happens from Phase 3 to Phase 4, when the usage of crystal quartz boomed in terms of both quantity and ubiquity. Not only did the average amount per cubic meter grow three times larger from Phase 3 to 4, but the average weight per cubic meter also increased by 2.8 times in the latter period. This tendency suggests increasing exploitation of inner valley crystal quartz resources. The scenario is even more interesting incorporating orthoclase into consideration. While there are only two events (similar in soil volume) registered from the 2015 excavation, the quantity of orthoclase decreased from 305 in Phase 2 to 47 in Phase 3. Similar in size, transparent color, and non-utilitarian nature in the first place, the amount of crystal quartz augmented in Phase 3 and reached an apex in Phase 4 when orthoclase totally faded away.

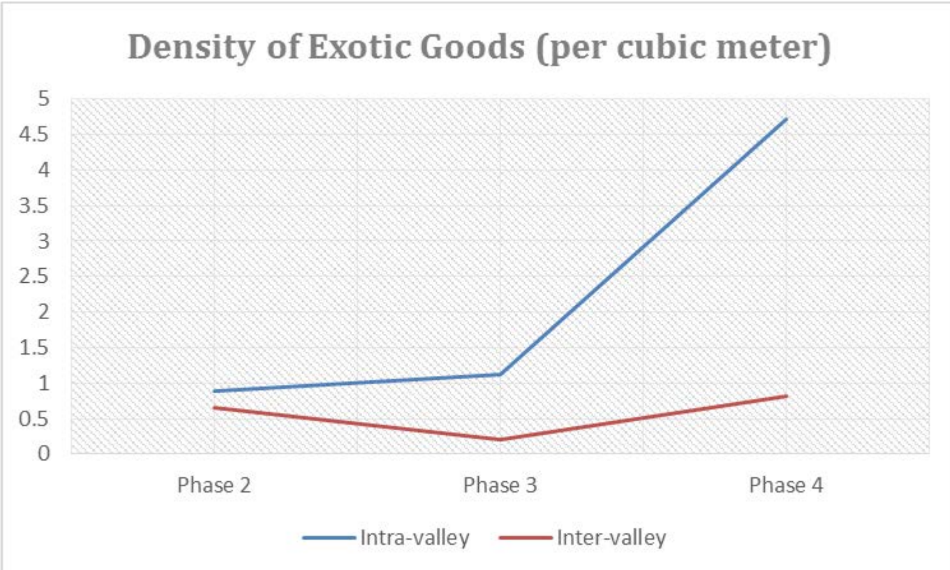

Figure 6.6 Density of exotic goods by occupation phase

As can be observed from Figure 6.6, the density of exotic goods showing inter-valley interaction doesn't witness a dramatic increment but a slight fluctuation from Phase 2 to Phase 4. The diversity of material, on the other hand, does increase as more kinds of material are introduced into Huaca Negra (Table 6.5). In addition, the seven fragments of anthracite within the small excavation area can be considered a significant amount. Overall, it can be claimed that during Phase 4 (the Initial Period), inter-community exchange and interaction become more critical than during the Late Preceramic Period. It is also in the Initial Period that we see items from very far away, demonstrating much more extensive networks chained together in the Initial period.

6.3.2 The Exploration of Other Regions and Possible Social Networks

To further discuss the network for gathering exotic goods, possible provenance is visualized and marked on the map. Figures 6.7-6.9 are the results of this work, in which Google map images are used to represent the three occupation phases with the major and minor sources marked.

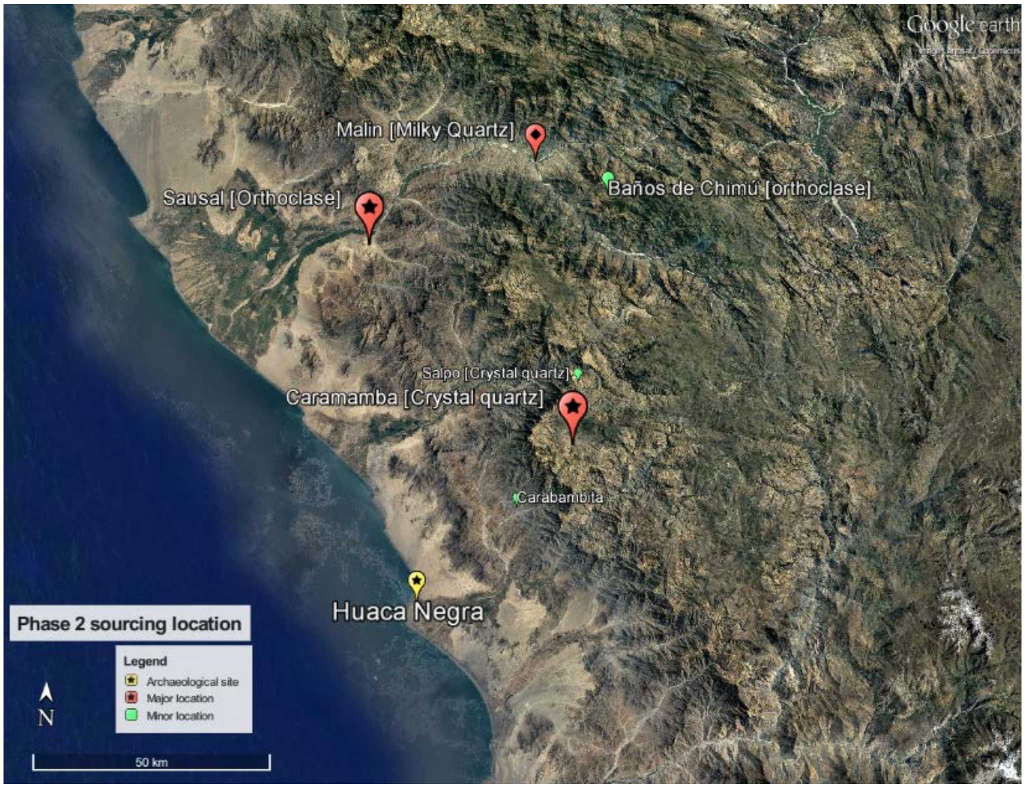

Figure 6.7 Map of the sources of exotic goods from Phase 2 occupation

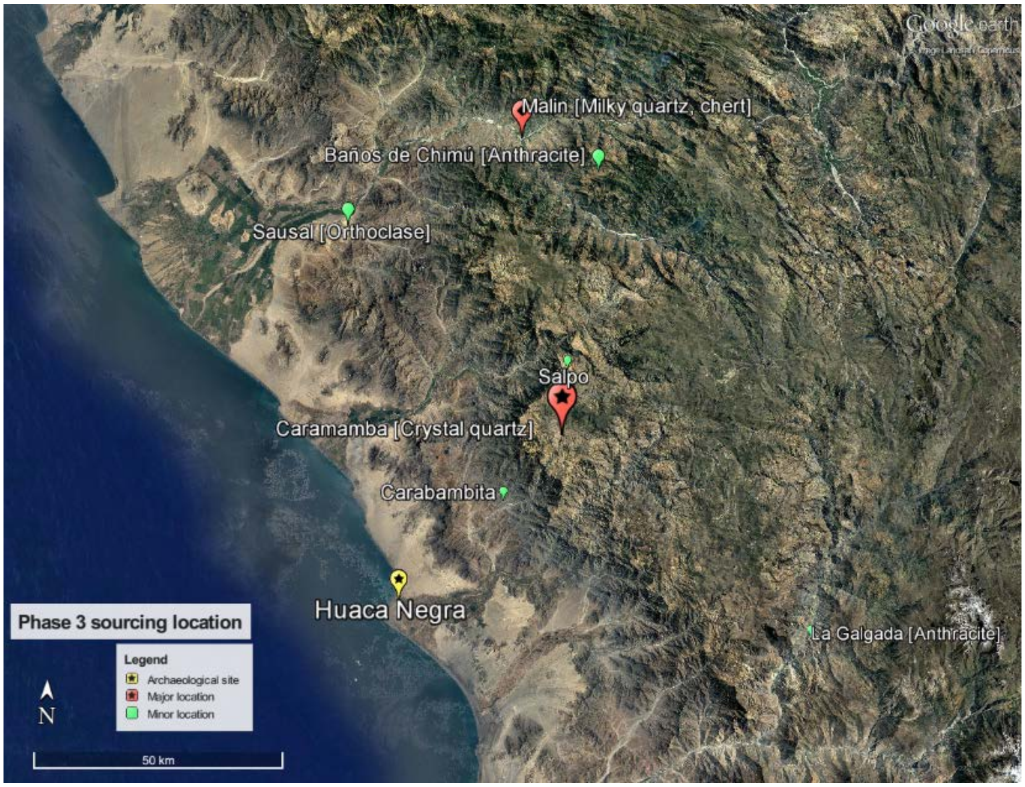

Figure 6.8 Map of the sources of exotic goods from Phase 3 occupation

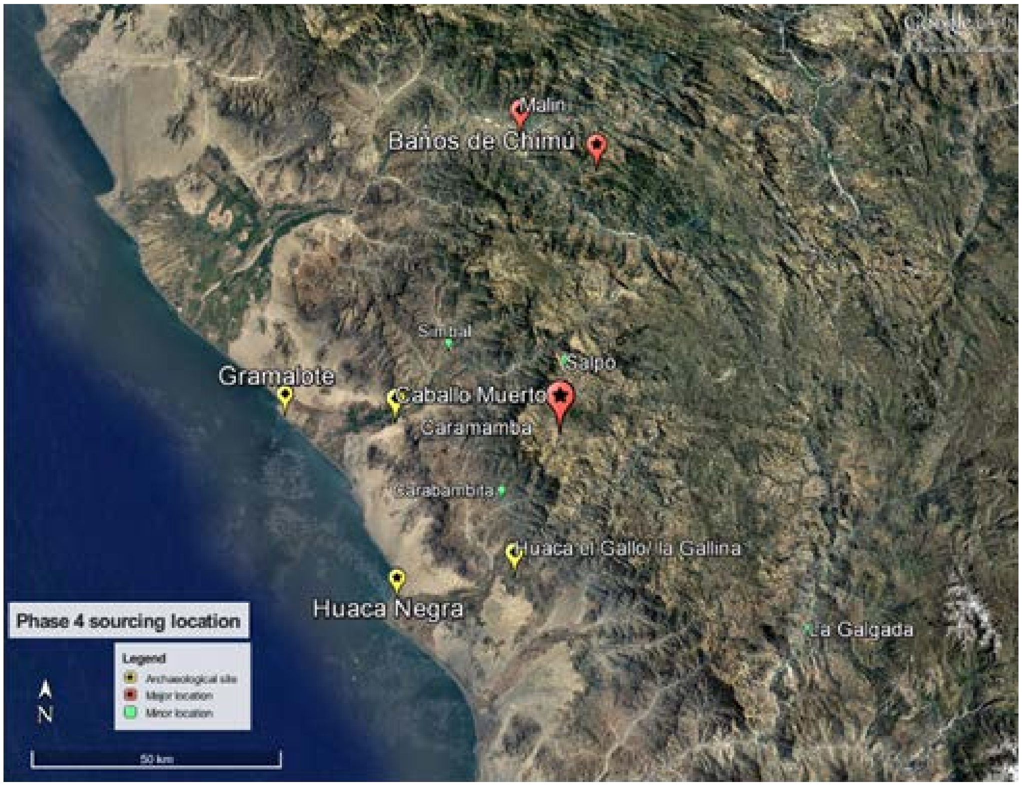

Figure 6.9 Map of the source of exotic goods from Phase 4 occupation

The maps illustrated here suggest people not only continuously worked with certain areas such as Caramamba for crystal quartz and Malin for vein quartz but also expanded their targets for other available resources in that region. For example, Malin was a source where people retrieved vein quartz from Phase 2 on. As chalcedony and chert can also be sourced back to this location, both were eventually incorporated into the inventory in Phase 3 and 4. Another interesting place is Baño de Chimú, one of the possible sources of orthoclase (while Sausal is closer to the site), where anthracite was also available and was incorporated into the inventory later.

From the geological perspective, the areas for acquiring the imported material are relatively limited. As can be seen on the three maps, there is no significant change in exploited locations during the three phases. However, this does not mean that the possible social network remained the same throughout two thousand years. Although the information for the Late Preceramic Period is insufficient, there are important Initial Period sites in the neighboring valleys of Moche and

Chicama, which are closer to probable sources for non-local materials. Also, in the middle Virú Valley, Huaca el Gallo/Huaca la Gallina could serve as an intermediate point for exchange (Figure 6.10). Moreover, the increasing diversity of materials could also be the result of interacting with different groups of people, who had different access to diverse resources. Although the limited sample size prevents any conclusive statement, the stable bond between Huaca Negra and Caramamba within the Virú Valley for crystal quartz is confirmed. There was also a constant connection with Malin in Chicama Valley.

6.3.3 Summary: Social Implications of Exotic Goods in Huaca Negra

The presence of exotic goods always excites archaeologists as it links local people and community with a broader area and other groups on the landscape. However, to really study and decide where the exotic goods come from would be a research question for another dissertation. As discussed above, one can't merely link the local community with source places without considering the intermediate groups and the nature of the interaction. It is always hard to decide whether it was local people who went out, or foreign people who came in for exchange. In the case of intra-valley goods, it is also possible that people went for the desired resources such as crystal quartz without direct interaction with other groups of people.

Although lacking direct evidence to reconstruct the actual scenario, the distinction of intra- and inter-valley exotic goods helps to shed light on this issue. As travel cost should have a positive correlation with distance, the threshold for longer distance (inter-valley) exchange should be higher than the intra-valley one. This tendency is well-presented in Figure 6.6, in which the frequency of materials from farther areas is constantly lower than the materials that can be retrieved nearby, suggesting heavier exploitation of nearby resources.

Another question about exotic goods is: in what form were exotic goods brought in to the local community, as raw materials or finished products? Most of the time archaeologists would suggest that the cost of transportation inhibits bringing in large chunks of raw materials. This argument is not exactly true in the context of Huaca Negra, because there are cases of exotic raw materials such as orthoclase cleavage and crystal quartz registered in the 2015 excavation. In fact, the two materials dominated the exotic collection throughout. As no specific function can be assigned to the two materials at this point, it is argued that the natural form of raw material (shape of orthoclase, and the crystal color of quartz) might be the reason why they were imported to the community. Their small size also would not cause problems for transportation. Chalcedony is another example in that both finished beads and debitage are recovered from different units of excavation.

The imported raw material also reveals a rare pattern in the Late Preceramic and Initial Period community: there is no clear cut division between craft production and exchanged goods, especially since people in Huaca Negra conducted modification on many of the exotic materials. Crystal quartz is extremely important to address this statement. First of all, the high quantity is unusual in similar archaeological settings. Six rock crystals are registered in the 732m^3 excavation in Huaca Prieta (Dillehay et al. 2017: 454). In Gramalote, the excavation area is 1478m^2, from which only three crystal quartz pieces were encountered (Prieto 2015:1085). In Huaca Negra, it is 174 items recovered from 87 m^3 excavated volume. On the one hand, the high quantity is the result of a long-term preference. On the other hand, local production also produced more debitage in smaller sizes, and thus increased the sample size.

Other than the two north coast examples mentioned above, there are no other comparable cases nearby that help to shed light on the exchange and utilization of quartz in Huaca Negra. One crucial fact is that this material is not reported in the excavation of Huaca el Gallo/ la Gallia (Zoubek 1997), the community that occupied the middle Virú Valley and could be the best option for passing on this material from further inland to the coastal area.

Why would people import goods from other areas? In general, the answer can be attributed to the unique qualities of foreign materials that are not locally available. This is valid when looking at the exotic objects in Huaca Negra such as anthracite bowl and mirror. More significantly, the idea applies well to beads made of chalcedony and spondylus shell. Although the total amount is not huge, there is a significant transition from local to non-local beads in Huaca Negra (see Table 5.4). In addition, the quality of the final product also improved in the later exotic beads. The single event of brought-in beads makes it hard to confidently claim these were a replacement of local beads, but this assumption remains plausible and awaits future examination.

In Huaca Negra, people seem to have preferred the translucent or transparent nature of rocks; even if they had little or no utilitarian function, items such as orthoclase and vein quartz fall within this category. The preferred characteristics echo the statement that people look for special nature of exotic goods. Another material that shares a similar nature is crystal quartz, and its presence is often associated with magical or ritual meaning in early prehistoric contexts (e.g., Strong and Evans 1953, Dillehay 2017). Although this stance might come from how people today incorporate crystal into ritual events and, most of the time, lacks direct archaeological evidence, the shared characteristic of transparency makes it logical to categorize crystal quartz together with orthoclase and vein quartz. These might be sought for their aesthetic, not utilitarian qualities.

Although a magical meaning or people's preference can be the explanation for the presence of crystal quartz in Huaca Negra, this is not the only possibility. As mentioned in the previous sections, the fact that crystal quartz breaks easily into irregular, sharp pieces makes it a kind of crude stone tool. The utilization of quartz is not only demonstrated in the case of North America. In Gramalote, Prieto also argues for a utilitarian function as two of his three examples of crystal quartz are flake and drill (Prieto 2015).

As has been demonstrated in this chapter, the scenario in Huaca Negra is even more complicated because people changed how they modified and used crystal quartz over time. In Huaca Negra, crystal quartz might have had magical significance at first, with a similar nature to other non-utilitarian items. It might also have replaced other kinds of material as the imported quantity increased, and its social meaning may have remained similar before it was widely distributed within the community. But in the latter part of the occupation, crystal quartz was not a kind of resource that was limited to certain people or areas within the community. Rather, its presence is associated with more modification and chipping behaviors, which resulted in a wider (re)distribution as the ubiquity of crystal quartz dramatically increased from one phase to another. Fragments of crystal quartz might then have served for not only non-utilitarian purposes but also actual functions. The higher diversity of types in the last phase of occupation would be the result of people exploring more ways to "work with" this material, indicating the multiple functions or multiple meanings of this material.

Overall, the data from Huaca Negra suggests a relatively stable use of exotic goods from Phase 2 to Phase 3. A more significant increase from Phase 3 to Phase 4 is then witnessed. The major materials can be sourced back to only a few locations in Virú and Chicama Valley, but the focus of the targeted materials shifted from one to another, such as orthoclase to anthracite in Baño de Chimú, and vein quartz, chert, and chalcedony in Malin. The evidence also suggests local modification of some of the exotic materials, which made the exotic good more "localized" and better fit the people's need in Huaca Negra.

7.0 RESOURCE DISTRIBUTION AND SYNTHETIC SPATIAL COMPARISON

With the fundamental data presented in the preceding chapters, this chapter aims to synthetically discuss issues including: (1) whether the resources are evenly distributed between units; (2) diachronic change in resource distribution; and (3) the possible function of sampled spaces. The three aspects help to answer the research questions raised at the beginning about (1) the scenario of daily life in this early fishing village, (2) the existence and the form of possible diversity between social groups; and (3) reconsidering the traditional dichotomy of public and domestic realms in archaeological contexts.

As discussed in chapter 3, thick deposits in Huaca Negra with long-term occupation prevented the current project from excavating a larger area and revealing the layout of architecture, which is a fundamental factor for interpreting the function of space, especially in Andean archaeological contexts. Missing that information about architecture, on the other hand, frees the interpretation from prejudicial notions about the function of space, enables the focus on material remains, and helps to clarify the nature of activity at specific spots in the site. Although one should keep in mind that the excavation deals with the materials in discard contexts rather than primary ones, the work here follows Drennan and colleagues' idea that those deposits "are more likely to accurately represent the average run of garbage" produced nearby because people rarely carry garbage for a long distance (Drennan et al. 2010). In addition, it is clear that the discard pattern of shell consumption events remains undisturbed, so these events can be associated with the vicinity rather than another corner of the site. Thus, the assessment of material remains between different units can be taken as a reference for resource distribution across the site. While the archaeological contexts are complicated and vary dramatically from one unit to another, the continuity and discontinuity of space usage can be illustrated by taking a closer look at each unit.

Before synthetically analyzing material remains for the interpretation of space usage, Table 7.1 summarizes important archaeological features registered during excavation (see Chapter 3 for a detailed discussion), which provides preliminary interpretations for the nature of sampled space. With this background knowledge established, how the subsistence resources, selected local craft products, and exotic goods are distributed in different units during different time periods will be discussed in the following sections. A broader, overall review of the human activities held in Huaca Negra and its implications concludes this chapter.

Table 7.1 Summary of archaeological contexts by Unit and occupation phase

Unit	Phase	Major archaeological features	Preliminary interpretation
1	1	.	Temporary human activity
	2	Circular clay hearth, living floor	Domestic
	3	Storage structure, living floor, child burial	Domestic
3	1	Lens of charcoal and ash	Temporary human activity
	2	Hearths, living floor, post holes	Domestic
	3	Hearths, floors, shellfish concentration	Domestic
	4	Domestic trash	Domestic
5	3	Large adobe wall; space filled with adobe fragment; female sacrifice	Center of the mound, public space
	4	Shellfish concentration	Activity area (domestic scale)
6	1	Shellfish concentration	Temporary human activity
	2	Circular clay hearth	Domestic
	3	Hearth, floors	Activity area (domestic scale)
	4	Layer of charcoal	Activity area (domestic scale)
7	2	Multiple walls, floors	Domestic-public
	3	Shellfish concentration	Domestic
	4	Shellfish concentration	Domestic

7.1 RESOURCE DISTRIBUTION

In the theoretical framework, resources discussed here are considered as accruable capital, and they are categorized into different forms of capital: (1) economic capital for subsistence resources that sustain people's basic needs in archaeological context. (2) Cultural capital for craft products that represent craftsmen’s knowledge. (3) Social capital for exotic goods/ material that illustrates the potential social/ exchange network. Other than classifying archaeological remains into these categories and attempting to discern the kind of capital that was accumulated, there is another fundamental factor that affects the accumulation of any kind of capital forms mentioned above, the allocation of labor investment.

Arnold stresses that in hunter-gather society, non-kin labor is a central element of political hierarchy (Arnold 1992). In a small-scale community like Huaca Negra, people might not always get everything they want: the allocation of labor could be crucial to the different capitals mentioned above as there should be a *tradeoff* for achieving one goal or another given the limited population (i.e., labor). As labor is a required condition for gathering or producing desired capitals, it is expected that the size and composition of families in Huaca Negra had a positive correlation with the amount of labor and quality of labor. Thus, changes in the quantity or quality of certain resources should reflect change in labor allocation or organization, which is an important factor for discerning intra-community differences, and is central for explaining possible social changes that happened in Huaca Negra.

Again, the proxy applied for the comparison between units is the density of material remains. This decision is made because the deposit rate and excavation area vary from one unit to another, which makes the direct comparison of the quantity of material remains from each unit less meaningful.

Although many factors can skew the value of density (such as diverse nature of space and activity, change of elevation and other taphonomic processes), the ambiguous layers without clear time period affiliation are trimmed to minimize the effect. One extreme example comes from Unit 7, where the deposit is thinner than other units, and the Phase 2 stratum was encountered less than 2-meters below the surface. One might expect the high density of material remains was the result of the compacted accumulation of human activities rather than reflecting the consumption of a higher quantity of something than other units in a given time. By trimming the ambiguous layer, the time span discussed in Unit 7 is shorter than other units, which increases the reliability of the density comparison. In addition, the thinner strata is partially a result of space modification: people at this corner of the site removed garbage before putting down another floor, which also balanced out the possible problem of density.

Finally, as will be discussed later, there are kinds of materials unevenly distributed from one unit to another, while other categories were more similar in quantity. If taphonomic issues like compacted deposits were the main factor driving density, one would expect higher density in all kinds of material (in Unit 7), which is not the case here. Overall, the difference in material density could be discerned during the excavation process, and this is by far the most reliable index for the following discussion.

7.1.1 The Distribution of Subsistence Resources

The change in subsistence between phases represents the most significant pattern that can be discerned from previous chapters. Instead of associating the overall change with the general social background, contemporaneous comparisons between units will be made in this section. There are important facts that help to decide the relative value/ rank of each kind of subsistence resource: (1) the importance of fish resources declined over time; (2) sea-going fish for the oceanic species stands for a more intensive labor investment, (3) the rocky habitat provided supplementary shellfish resources in contrast to the preferred resources from sandy beach; and (4) other mammals and seabirds were not systematically exploited but more likely to be occasionally consumed when encountered.

To compare subsistence resources in different units, the quantity of material remains is presented in density (count per cubic meter). As the small shoal fishes were not systematically collected from the 4mm screen, the *ratio* of littoral/ oceanic fish retrieved from 2 mm collection is taken as an index to *estimate* the amount of oceanic fish in each context. The count of remains will then be compared in two ways: (1) the stacked bar chart reveals the actual amount and proportion of different subsistence remains *within* each unit; (2) the normalized Z-score is used to compare each category *across* the units. It should be noted that the sample size (number of excavation unit) is small in each period (N=4 or 5). Thus, the Z-score comparison should be used with caution, and the result mainly illustrates the general pattern and differences between units.

7.1.1.1 The Diverse Subsistence Distribution in Phase 2

Phase 2 is the period when people began to settle down for village life. Living floors are encountered in all four discussed units. Two of the four units, Unit 1 and 3, have postholes registered and can be associated with domestic contexts. The nature of the multiple-wall structures unearthed in Unit 7 remains uncertain as the layouts are not revealed by the current project. The distribution of subsistence resources in the four units in Phase 2 are summarized in Table 7.2 and Figure 7.1. The density of faunal remains is the raw data so that any subcategory can be directly compared between units.

Table 7.2 and Figure 7.1 illustrate a huge degree of diversity regarding resource distribution (in density). It is clear that Unit 7 consumed much more food than any other unit, especially for fish and hunted animals. In contrast, shellfish was mainly consumed in Unit 3, although fish also dominated the faunal collection here. Overall, Units 1, 6, and 7 had a similar amount of shellfish remains. As discussed in the previous section, the similar density of shellfish can be taken as side evidence that the high quantity of remains in Unit 7 is not a result of a condensed stratum of a long period of time.

Table 7.2 Resource distribution in Phase 2

Context	Unit	U1	U3	U6	U7
Density (NISP/m^3)	Oceanic Fish	253.5	764.5	182.9	2850.4
	Littoral Fish	443.7	291.9	121.9	599.0
	Total Fish	**697.2**	**1056.4**	**304.8**	**3449.4**
	Rocky Shell	2.8	41.2	4.5	12.2
	Sandy Shell	1.4	200.0	3.4	6.9
	Snails	1.4	62.6	4.3	2.8
	Total Shellfish	**5.6**	**303.8**	**12.2**	**22.0**
	Mammal/ Ave	**0.0**	**14.4**	**5.3**	**65.9**
	Total food	**702.9**	**1374.6**	**322.3**	**3537.3**
Ratio	O/L Fish	0.6	2.6	1.5	4.8
	S/R shell	0.5	4.9	0.7	0.6
N	Shellfish consumption event	0	0	0	0
Z-score	Total_fish	-0.480	-0.226	-0.758	1.464
	Total_shellfish	-0.552	1.498	-0.507	-0.439
	Total_mammal/Ave	-0.707	-0.231	-0.532	1.471

Although the resource distribution varies dramatically from one unit to another, three major categories of faunal remains (fish, shellfish, and hunted game) can still be standardized and translated to a Z-score that constitutes the last part of Table 7.2, also presented in Figure 7.2. The Z-score is a straightforward way to compare the differences between units. It is also noteworthy that the comparison here is made between standardized Z-score; the value of "0" refers to the mean. Also, due to the small sample size and huge error range, anything between 0.5 and -0.5 is considered as a value close to the average quantity of remains.

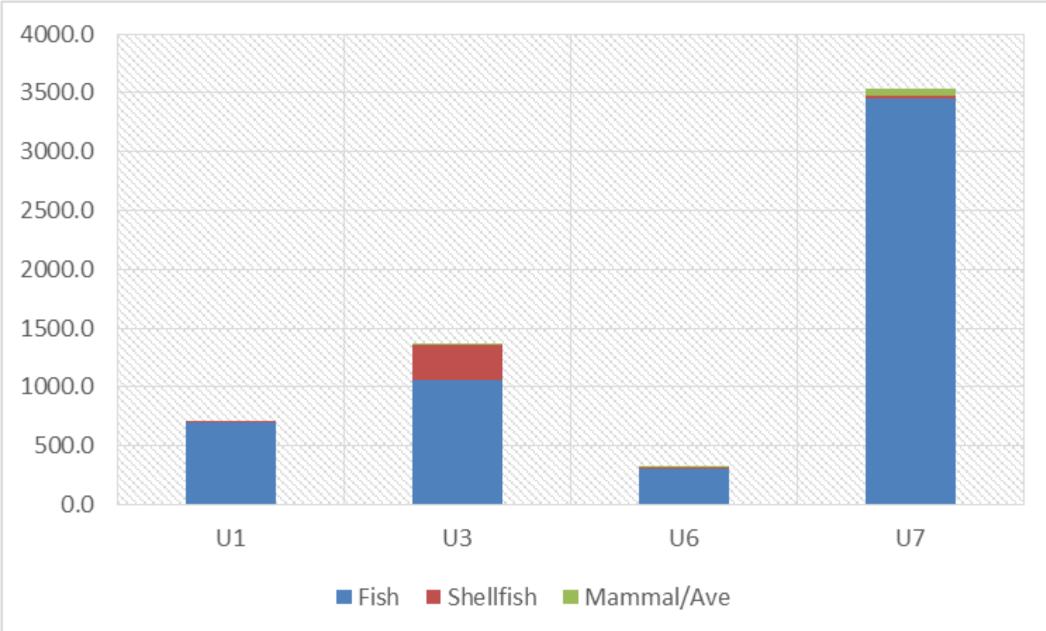

Figure 7.1 Cumulative density of subsistence remains in Phase 2

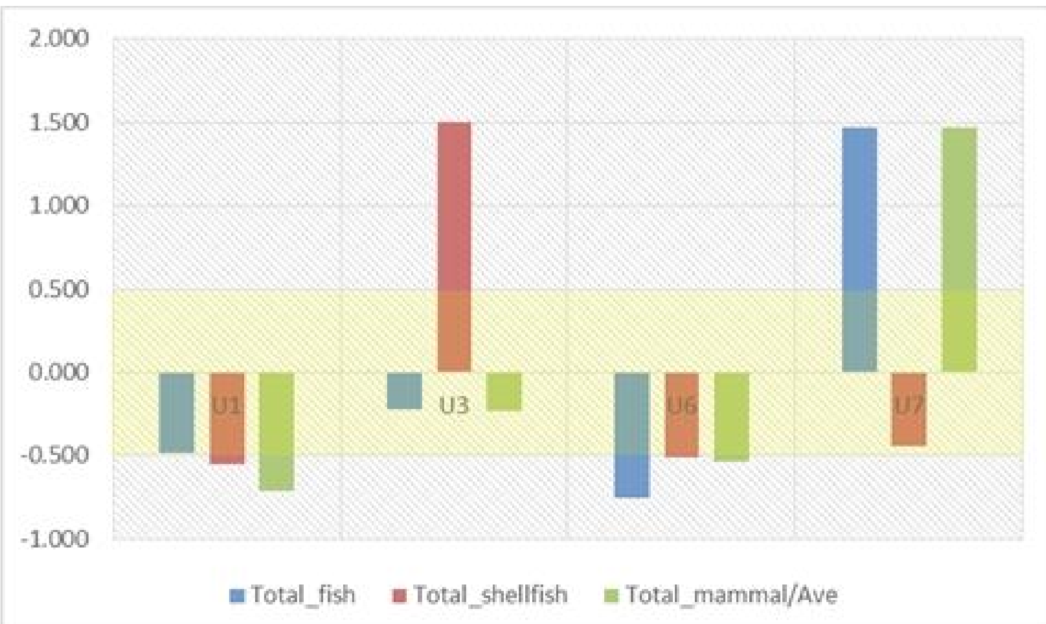

Figure 7.2 Subsistence distribution in Phase 2 contexts

Figure 7.2 clearly echoes the pattern that Unit 1 and 6 yielded fewer subsistence remains in the three compared categories. In addition, an interesting pattern can be observed between Unit 3 and 7: whereas the former consumed much more shellfish (mainly from the sandy environment), the latter context contained a higher amount of fish and mammal/ ave remains. Thus, the activities held in Unit 3 and 7 are distinct from each other as one focused more on shellfish and the other on fish and some hunted game consumption.

In contrast to Unit 3 and 7, Unit 1 and 6 are scarce in subsistence remains, but the Z-scores are only slightly beyond the -0.5 range. The distribution represents similar activities between the 2 units while the abundance is significantly lower than Unit 3 and 7.

Other than the actual quantity of archaeological remains, the ratio of oceanic/ littoral fish and sandy/ rocky shellfish sheds light on the idea of labor investment. Phase 2 occupation is the time when fish was the most critical subsistence resource. During Phase 2, the oceanic shoal fishes were widely exploited, which suggests a higher working efficiency. Thus, the higher ratio of oceanic/ littoral fish belongs to the mainstream of subsistence activity, and a lower value implies a relatively *marginalized* activity as the littoral resources played a supplemental role in this time. A similar idea can be applied to the shellfish remains. Since the sandy beach is the closer catchment zone for shellfish collecting, and the rocky species are supplemental resources, the higher the ratio of sandy to rocky species is, the higher chance it is that people were able to access the preferred area and exploit the resources in a more efficient way.

When examining the two ratios in the four units, striking patterns can be discerned: both units rich in subsistence remains have a high oceanic/ littoral ratio, implying the places, especially Unit 7, that contained more subsistence remains are the same places where people conducted more off-shore fishing. Unit 1 and 6, on the other hand, seem marginal in this regard: off-shore fishing plays a minor role. One should keep in mind that, due to the nature of shoal fish, we would expect remains of the mass-captured species much more than other larger fishes even when people invest their labor equally in the two activities. Thus, the ratio of 1.5 between the two categories in Unit 6 is not significant enough to claim that off-shore fishing played a more important role than fishing in the littoral zone.

The ratio of shellfish tells another story. Unit 3, the locus that consumed the most shellfish during Phase 2 occupation, has a high S/R ratio (R= 4.9) while people in all the other units paid limited attention to the nearby sandy beach (R< 1). The contrast between units suggests that people in Unit 3 were seriously exploiting shellfish resources, while other units might just have occasionally brought shellfish remains to the site.

In summary, both the quantity of archaeological remains and the ratios of species suggest Unit 1 and 6 were marginal places for food consumption during Phase 2. In contrast, Unit 3 and 7 were abundant in diverse ways. Unit 7 focused much more on fishing, mainly off-shore fishing targeting oceanic species. The exploitation of hunted game was also associated with Unit 7. By contrast, albeit fish also played an important role, the social group in Unit 3 was the earliest one to starts to exploit shellfish resources and potentially dominated the nearby sandy beach catchment zone.

7.1.1.2 The Diverse Subsistence Distribution in Phase 3

Phase 3 is the time that witnesses the emergence of larger scale architecture built in Unit 5. The multiple walls and the later refilling events suggest there were several construction phases and some were large scale. The refilling material has less to do with domestic garbage, and the density of material remains is not significant on top of the mound. Hearths and evidence of shellfish consumption events are still registered in Unit 5 during this time, but the scale was not significant enough to claim public feasting events. Living floors were still present in all the discussed units, suggesting domestic contexts or small-scale activities both on the margin and the central place of the mound. Table 7.3 and Figure 7.3 summarize the distribution of subsistence remains in the same manner as the previous section.

Overall, the density of food remains declines in two units: from 3537 to 1058 in Unit 7, and from 322 to 109 in Unit 6. In contrast, the overall density stays similar in Unit 1 (remained 702) and 3 (slightly increased from 1374 to 1525). The newly added Unit 5 also represents an average standard regarding the subsistence quantity.

Table 7.3 Resource distribution in Phase 3

Context	Unit	U1	U3	U5	U6	U7
Density (m^3)	Oceanic Fish	262.6	174.5	78.3	23.3	252.1
	Littoral Fish	149.1	79.6	52.2	22.9	113.0
	Total Fish	**411.7**	**254.1**	**130.5**	**46.2**	**365.1**
	Rocky Shell	49.4	206.4	92.3	28.4	540.5
	Sandy Shell	175.9	523.3	324.8	32.2	90.7
	Snails	54.3	534.2	38.9	28.6	56.4
	Total Shellfish	**279.5**	**1263.9**	**456.1**	**89.3**	**687.6**
	Mammal_Ave	**11.0**	**6.2**	**5.6**	**3.6**	**5.5**
	Total food	**702.3**	**1524.2**	**592.1**	**139.0**	**1058.2**
Ratio	O/L Fish	1.8	2.2	1.5	1.0	2.2
	S/R shell	3.6	2.5	3.5	1.1	0.2
N	Shellfish consumption event	6.0	3.0	4.0	0.0	2.0
Z-score	Total_fish	1.105	0.082	-0.721	-1.268	0.802
	Total_shellfish	-0.608	1.563	-0.219	-1.028	0.292
	Total_mammal/Ave	1.673	-0.065	-0.283	-1.007	-0.319

As discussed in chapter 4, the most significant change from Phase 2 to Phase 3 is the transition from fish to shellfish consumption. This pattern is present in all the five units discussed here (Figure 7.3). Interestingly, a clear continuity is presented in Unit 3, where the intensity of food consumption remains the same. At this corner of the site, people kept focusing on shellfish exploitation, but they no longer monopolized the sandy beach as the S/R ratio declined to 2.5, which is lower than Unit 1 and 5.

Although the occupation from Phase 2 to Phase 3 refers to a thousand-year-long occupation, there are continuous behavior patterns present in Unit 3 and Unit 7. When comparing each unit with the standardized quantity (Figure 7.4), Unit 3 remains the locus where people consumed the most shellfish in comparison to other units. Unit 7, on the other hand, contains significantly more fish than the three other units: only Unit 1 yields more fish remains than Unit 7 during the Phase 3 occupation. Overall, Unit 3 and 7 remain the loci that yield the most abundant subsistence remains, just like the Phase 2 occupation.

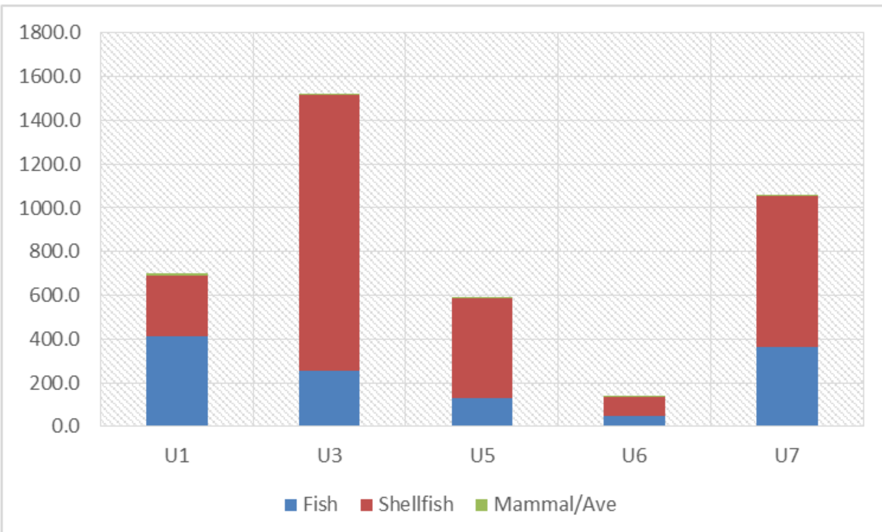

Figure 7.3 Cumulative density of subsistence remains in Phase 3

Figure 7.4 Subsistence distribution in Phase 3 contexts

As the relative importance of fish resources starts to decline in Phase 3, and the mammal/ ave remain insignificant in quantity, Unit 3 becomes the most important spot in terms of food consumption. In addition, Unit 5 and 6 are the two spots where fewer food remains are encountered, implying that consumption activities were not the focus in the center and northeast of the mound.

Other than the comparison of quantity, there are a significant number of shellfish consumption events identified in four out of five units in the Phase 3 context. Unit 6, again, is the only exception without any event registered. Figure 7.3 and 7.4 also suggest Unit 6 is actually a place that lacks all kind of subsistence remains in a very significant way. Thus, it can be inferred that consumption activities were rarely held at this corner of the site, an enhanced pattern from its Phase 2 occupation.

Another interesting example comes from Unit 5, the center of the mound where four different shellfish consumption events are registered. One might expect these events to be large in scale and intended for communal consumption, considering their location at the center place of the site. This is not the case, as the density of shellfish is lower than average, suggesting small-scale events (but held multiple times) with a limited number of participants. A similar scenario can also be seen in Unit 1, where many shellfish consumption events are noted but there is no positive correlation between the frequency of the event and the quantity of food consumed. It can thus be inferred that most shellfish consumption events were *small in scale* and served limited people rather than being a communal feast, even when the events were held on top of the mound.

Although the density of different subsistence remains varies dramatically between units, several different patterns can be discerned comparing the two ratio indices listed in Table 7.3. Overall, people from different units exploited their fish and shellfish resources mainly from the preferred catchment zones (all ratios >1). The only two exceptions are the fish remains in Unit 6, where a similar amount of littoral and oceanic fish was registered; and the shellfish in Unit 7 represents a much higher quantity for rocky species.

Considering the nature of NISP of littoral and oceanic shoal fish, the ratio of the two categories (range between 1.0- 2.2) suggests there was no significant difference for catchment zone access between units. As for the shellfish, the major animal protein sources in Phase 3, three out of five units were able to exploit resources from the preferred habitat, showing consistent preferences for sandy beach species. The low ratio presented in Unit 6 and 7 indicates these were relatively marginal places regarding shellfish collection.

By examining the excavation units, it can be seen that people had various ways to respond to the shifting focus from fish to shellfish consumption. People who started to exploit shellfish early on (in Unit 3) enhanced this way of living and consumed shellfish dominating 83% of total food remains. In contrast, Unit 7, while it did rely on shellfish as the major food resource in Phase 3, still kept its earlier focus on fish exploitation in comparison to other groups. Moreover, people here also exploited the rocky environment more, with rocky mussels dominating the collection. This is a diverse approach that differs from other units. Unit 1 represents another transition process: fish remained proportionally important but people also exploited relatively more hunted faunal remains. Unlike Unit 7, the group in Unit 1 was able to access the sandy beach, even though shellfish played a less significant role at this corner of the site. On the top of the mound, Unit 5 represents rather ordinary food consumption in both total quantity and scale of consumption events. It is noteworthy that the proportion of shellfish in this context is similar to Unit 3 (77%), especially considering the adobe backfill within the mound lowers the overall density. Other than the mound space and refilling process, the consumption activities held here are similar to the ones in Unit 3 in nature. Unit 6 is another spot where the tradition continues from Phase 2 to Phase 3 but the trend is in the reverse direction. The quantity of food remains is low in Phase 2 (322 counts per m^3), and it keeps shrinking in Phase 3 (139 per m^3). It is clear and will be discussed later that food consumption was never a focus of activity in Unit 6.

7.1.1.3 The Diverse Subsistence Distribution in Phase 4

Phase 4 is the time when the consumption of shellfish reaches a peak and the importance of the fish resources, especially the oceanic species, wanes. In this post-mound period, patchy floors, occasional consumption events, hearths, and ceramic usage are registered in all the discussed units. Albeit there is no architecture unearthed, the scale of consumption and the nature of archaeological remains still connect the excavated contexts to domestic activities. Table 7.4 summarizes the distribution of major subsistence remains and Figure 7.5 represents the cumulative density.

From Phase 3 to Phase 4, the overall density of subsistence remains slightly declines from 803 to 669/m^3. Among the four units with Phase 4 strata, Unit 7 and Unit 5 are the ones producing a similar quantity of faunal remains in comparison to their Phase 3 context (1050/m^3 in Unit 7 and 600/m^3 in Unit5). Unit 3, in contrast, witnesses a significant shrinking of density from 1524 to 867/m^3, which also shifts the overall density. It is noteworthy that Units 3, 6, and 7, while different in quantity, share the same composition of subsistence remains as shellfish dominates about 90% of the faunal collection (Figure 7.5). This tendency might reflect the picture of domestic consumption during this time. Unit 5 is the only case where the proportion of shellfish reaches 98%, meaning other fauna played almost no role in this context.

In Phase 4, Unit 7 is the locus where most abundant subsistence remains are registered. The high quantity of shellfish remains, together with five times more consumption events than

Unit 3 and 5, suggest food consumption is the focus of activity in Unit 7. Unit 7 also represents a different pattern from other units in that people paid equal attention to both sandy and rocky beach shellfish resources. Since this is the locus with the richest shellfish remains, this tendency can be explained by the general need for getting a sufficient quantity of food, either due to the small scale environmental fluctuation or slightly more mouths to feed at this corner of the site.

Table 7.4 Resource distribution in Phase 4

Context	Unit	U3	U5	U6	U7
Density (m^3)	Oceanic Fish	38.6	2.9	7.2	61.6
	Littoral Fish	32.7	8.4	4.1	40.6
	Total Fish	**71.3**	**11.3**	**11.3**	**102.2**
	Rocky Shell	135.8	59.9	3.8	352.7
	Sandy Shell	516.7	470.3	54.6	367.9
	Snails	141.1	90.2	36.3	237.0
	Total Shellfish	**793.7**	**620.3**	**94.7**	**957.7**
	Mammal_Ave	**2.4**	**3.5**	**3.7**	**4.0**
	Total food	**867.4**	**635.1**	**109.8**	**1063.8**
Ratio	O/L Fish	1.2	0.3	1.8	1.5
	S/R Shellfish	3.8	7.9	14.2	1.0
N	Shellfish consumption event	1.0	1.0	0.0	5.0
Z-score	Total_fish	0.491	-0.832	-0.832	1.173
	Total_shellfish	0.473	0.010	-1.395	0.912
	Total_mammal/Ave	-1.433	0.143	0.430	0.860

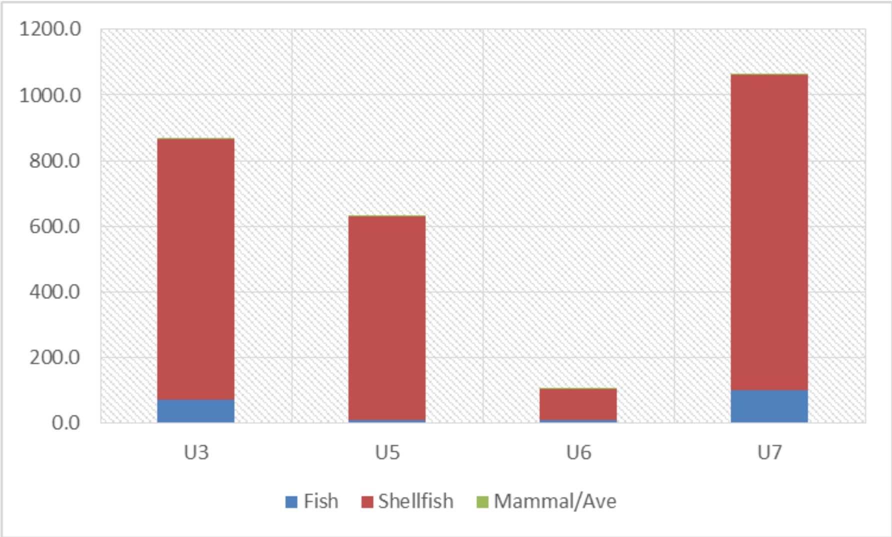

Figure 7.5 Cumulative density of subsistence remains in Phase 4

Both the cumulative density (Figure 7.5) and the comparison of z-score (Figure 7.6) suggest that Unit 6 remained a spot where food consumption was insignificant. On top of the mound, Unit 5 had moderate shellfish consumption while the fish remains were as insignificant as in Unit 6. Based on this standardized Z-score comparison, plus the consideration of the importance of different kinds of resources in this time period, it can be claimed that food consumption varied significantly from one unit to another. In sum, Unit 7 is the one with the richest resources in all three categories compared to other Phase 4 contexts. Unit 3 also presents abundant remains of both fish and shellfish. In the center of the mound, moderate food consumption with a focus on shellfish can be observed, and Unit 6 s again left out from food consumption in the last part of the occupation history.

Figure 7.6 Subsistence distribution in Phase 4 contexts

7.1.1.4 Summary of the Subsistence Distribution

The comparisons made so far illustrate not only changes in human behavior but also long lasting patterns in the discussed units that are worth summarizing here. One of the most striking patterns is that Unit 7 was continuously the locus that yielded the most abundant subsistence remains (except on one occasion when it was surpassed by Unit 3 during the Phase 3 occupation). In contrast to Unit 7, Unit 6 represents a case where food consumption was never a focus of activity here. In Unit 6, the overall resources also shifted from fish to shellfish, and the proportion of different categories of subsistence remains corresponded well to other units.These two facts help to exclude the possibility that the scarcity of subsistence remains is the result of a systematic error during the excavation. Instead, what has been observed refers to actual activities held in this spot.

Similar to Unit 7, Unit 3 is another place where food consumption played an important role. The content of subsistence remains tells a slightly different story as Unit 3 was the locus where people started to consume shellfish early on.

With only the Phase 3 and 4 strata present, Unit 5 was expected to be a locus with public-oriented activities. Small-scale food consumption events from both phases, however, contradict the assumption that the center of the mound served as a space for larger-scale public activities. In fact, there is no clear distinction in the nature of the subsistence remains between Unit 5 and other units, which can be attributed to the domestic or supra-household scale of consumption, rather than public consumption at the community level.

7.1.2 Food, Goods, and Exotic Goods: The Synthetic Comparison

Unlike the abundant subsistence remains, the excavation retrieved a limited amount of craft and exotic goods, which makes separating the two categories for discussion inefficient. Two other factors also prevent separation of craft and exotic goods: first, there is no clear cut division between exotic goods and craft products. As has been demonstrated, people in Huaca Negra modified some of the major exotic goods (i.e., crystal quartz) in situ. Secondly, craft goods such as ceramic remains and textile are not appropriate for inter-phase comparison due to the issue of taphonomy (e.g., textile) or its restriction to a specific time period (e.g., ceramic). Thus, other than discussing each category with limited data, this section takes a synthetic comparison that combines three main categories throughout this dissertation: craft goods, exotic goods, and the lesson of subsistence remains learned from the previous section. Through these three facets of social life in Huaca Negra, their weight in different units can be illustrated. Archaeological contexts will also be incorporated into the discussion so that clearer interpretations of the unit in each phase can be reached as well.

The way to compare the three kinds of material is with the same logic as the previous section, cumulative density (representing the actual amount of goods) and normalized Z-score (illustrating the even/ uneven distribution of material between units). Among all the unearthed materials, only a few are chosen for a meaningful comparison. Ubiquity and overall quantity of objects are the main criteria for selecting appropriate types of artifact, as these mark off the most important items in each category. In the following discussion, local lithic (including tool and debitage) is taken as an index representing craft production. Crystal and vein quatz together represent an index of imported goods that had different meaning and function than tools made of local material. Aside from these two major categories, local beads, and the sum of all other exotic goods are taken as extra references for diachronic comparison, but their Z-score is not compared as the small quantity of these remains can cause a dramatic difference in Z-score.

As there is a huge difference of quantity between these craft/exotic goods (range between 0 and 11) and subsistence (up to 3,500), subsistence remains will not be incorporated into cumulative density, but the information can be reached from the previous section. On the other hand, the z-score of the three kinds of materials, including all the lithic, exotic quartz and total subsistence remains will be compared, in this way the overall change can be illustrated

7.1.2.1 Resource Distribution in Phase 2

In the Phase 2 occupation, Unit 7 is the locus with most abundant food remains associated with architectural walls. More evidence suggests this corner of the site contains the densest human activities not only in food consumption but also craft production (the highest debitage/ lithic ratio) and remains associated with exotic goods (Table 7.5). In fact, the overall quantity of lithic remains in Unit 7 is much higher than anywhere else during this time (Figure 7.7). In addition, although only a moderate amount of quartz was left in Unit 7, the use of exotic goods could be significant as this is the only spot that yields other kinds of exotic goods such as orthoclase.

Table 7.5 Synthetic comparisons of major resources in the Phase 2 context

Context	Unit	U1	U3	U6	U7
Density	Local lithic	4.23	1.90	2.96	6.30
	Local bead	0.00	0.71	0.39	1.26
	Quartz	0.00	2.62	0.00	0.83
	Other exotic goods	0.00	0.00	0.00	2.52
	Total food	702.9	1374.6	322.3	3537.3
Ratio	Local Debitage/Tool	0.50	0.60	0.15	0.88
	Quartz Debitage/Tool	.	10.00	.	.
Z score	Z_local lithic	0.202	-1.029	-0.469	1.296
	Z_quartz	-0.698	1.423	-0.698	-0.026
	Z_subsistence total	-0.544	-0.076	-0.809	1.430

During the Phase 2 occupation, Unit 3 is another spot with dense human activity. Unlike Unit 7 which contained a much higher quantity of lithic and food remains, the moderate amount of food in Unit 3 is associated with more quartz than any other unit. The high ratio of quartz debitage/ tool remains in Unit 3 also suggests this could be a spot where people worked on chipping or modification for this exotic material.

In the previous section, the Z-score comparison suggests that Unit 1 and 6 were loci that had fewer subsistence resources. A similar tendency can also be discerned when putting all the major indices together (Figure 7.8). In fact, not a single exotic good was encountered in Unit 1 or

6, implying somewhat marginal spaces in regard not only to consumption but also possible social networks or events associated with exotic goods. However, it is noteworthy that a moderate amount of lithic tools was present in the two units, and the quantity is higher than Unit 3, which is another way to illustrate the spatial distinctions between quartz and other lithic production.

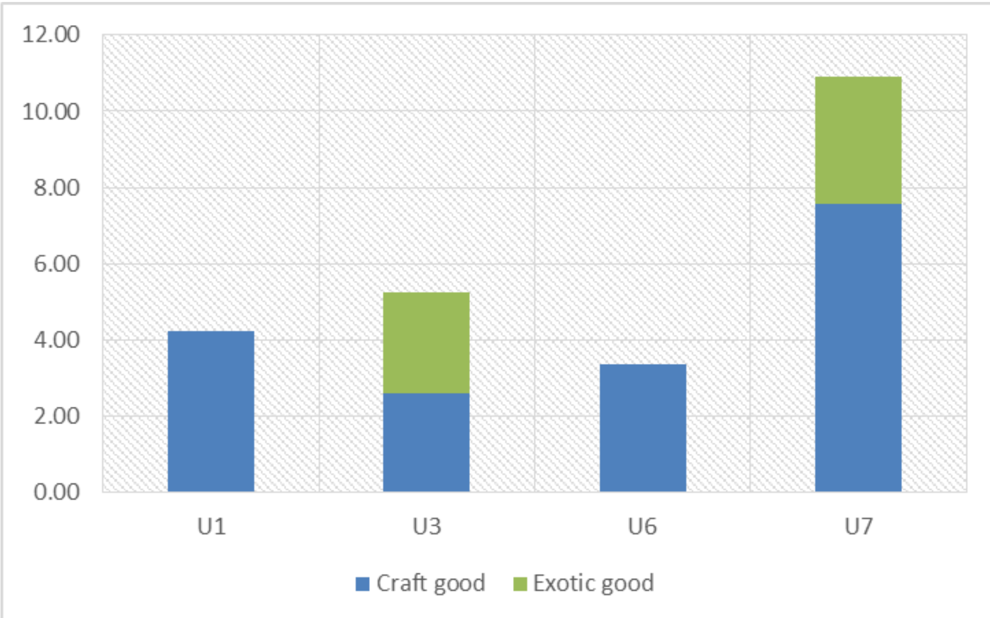

Figure 7.7 Cumulative density of craft and exotic goods in Phase 2

Figure 7.8 Z-score of resources in the Phase 2 contexts

7.1.2.2 Resource Distribution in Phase 3

When comparing lithic remains, exotic quartz, and the overall quantity of subsistence in different Phase 3 units, there is both continuity and new patterns regarding the use of space. Similar to the situation observed in Phase 2, Unit 3 and 7 remain the crucial spots for human activities, especially in terms of quartz distribution. The other three units in this time produce a slightly lower quantity of craft and exotic goods and represent different kinds of activity. Table 7.6 lists the fundamental data for further discussion in this section.

Table 7.6 Synthetic comparisons of major resources in the Phase 3 context

Context		U1	U3	U5	U6	U7
Density	Local lithic	0.80	0.48	0.60	1.46	1.03
	Local bead	0.32	0.00	0.17	0.36	0.00
	Quartz	0.88	2.24	0.77	0.55	3.09
	Other Exotic Goods	0.08	0.16	0.17	0.00	0.69
	Total food	702.3	1524.2	592.1	139.0	1058.2
Ratio	Local Debitage/Tool	1.50	0.50	0.17	0.60	0.00
	Quartz Debitage/Tool	4.50	No tool	8.00	No tool	8.00
Z score	Z_local lithic	-0.191	-1.014	-0.705	1.509	0.402
	Z_quartz	-0.566	0.663	-0.665	-0.864	1.432
	Z_subsistence total	-0.194	1.387	-0.406	-1.278	0.491

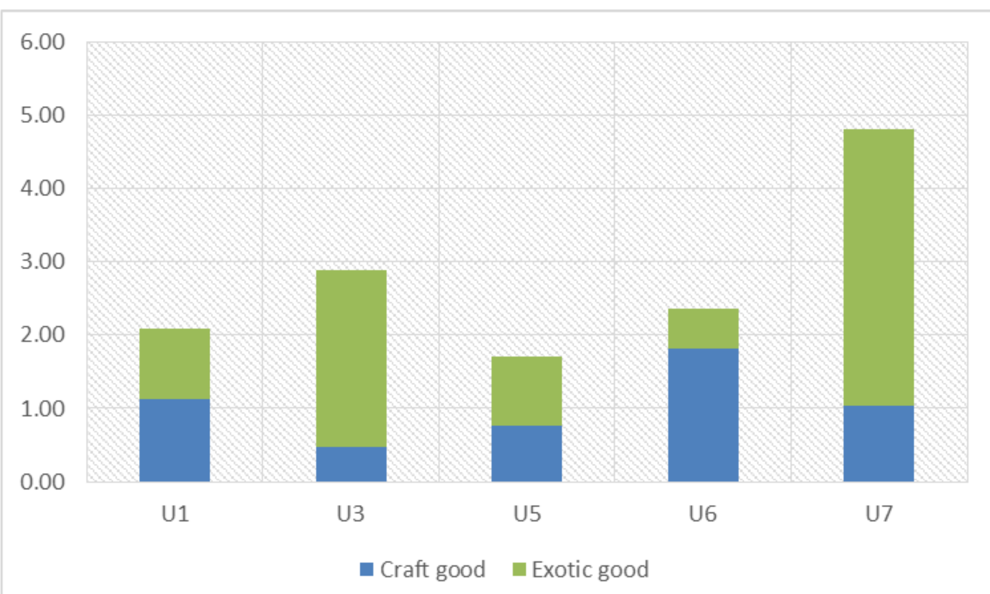

Figure 7.9 Cumulative density of craft and exotic goods in Phase 3

As can be seen from Figure 7.9, the quantity of lithics and food remains in Unit 7 is still higher than many other units, and it is the high quantity of quartz that distinguishes Unit 7 from others. In Phase 2, Unit 7 already produced exotic goods such as orthoclase, albeit not so much quartz. This tendency suggests the importance of exotic goods in the Unit 7 context in both Phase 2 and Phase 3. In fact, Unit 7 can be considered as the locus that represents the transition from emphasis on orthoclase to quartz. Moreover, all the local lithics found in Unit 7 are tools rather than debitage. This fact also suggests that this was not a spot for making ordinary tools, but for consumption, for using tools, and for holding occasions that incorporated the use of exotic goods.

Figure 7.10 Z-score of resources in the Phase 3 contexts

Similar to Unit 7, Unit 3 is identified as a household context (See Table 7.1 and previous discussion) where a lot of food remains (mainly shellfish) are encountered. This is also a spot associated with a higher quantity of exotic goods (quartz) (Figure 7.10) while it contains the fewest number of local lithics. The low debitage/ tool ratio (0.5) also excludes lithic production activities in this locus.

In contrast to Unit 3 and 7, Unit 6 in Phase 3 became the location with the densest lithic remains (Figure 7.10). Although it would be tricky to claim this was a spot for lithic production due to the low debitage/ tool ratio (0.6), the extremely low quantity of subsistence and exotic goods make Unit 6 outstanding for its quantity of lithic remains. Either lithic production or activities associated with ordinary lithic tools could happen in this corner, *without* accompanying other social events.

Overall, Unit 1 and 5 yield a slightly lower quantity of all the craft and exotic goods compared with other units (Figure 7.9). The Z-scores in the two units are also low, mainly because the dramatic variation between a few units causes the amount of artifacts in Unit 1 and 5 to be lower than average. The interpretations of Unit 1 and 5, however, are quite different ones when their archaeological contexts are also considered. In Unit 1, there are postholes and remnants of small-scale structures, suggesting a household context. The child burial with rich grave goods also indicates possible higher status of the individual, and by implication, the affiliated family. Thus, Unit 1 can be interpreted as a cleaned household space.

As mentioned before, the scarce material remains in Unit 5 were the result of the sealing behavior that refills the public space with clay and remnants of adobes, lowering the overall density of artifact remains. The composition of the three kinds of materials, however, suggests that Unit 5 was not outstanding in either the richness or rarity of material remains. The central locality of the mound thus has less to do with public gatherings than expected, but instead provides another example of small-scale activities.

Other than the contemporaneous comparison between units, there is a clear tendency that can be observed by comparing Figure 7.7 and 7.9: the proportional change between local lithic and exotic goods is significant. The local lithic remains dominated 50-100% of lithic goods during Phase 2. In Phase 3, only 2 out of 5 units contain more local lithic than exotic goods (53.9% of local lithic in Unit 1 and 76.9% in Unit 6). Overall, exotic material was heavily incorporated into the archaeological context from the Phase 3 occupation on.

7.1.2.3 Resource Distribution in Phase 4

The importance of lithic production and exotic goods in Phase 4 has been demonstrated in Chapter 5 and 6, and the quantity of these materials also indicates differences in the function of different spaces during this time. Table 7.7 and Figure 7.11 illustrate both continuity and dramatic change during the Phase 4 occupation, including the decline of Unit 7, dramatic increase in exotic goods in Unit 3, the high quantity of lithics in Unit 5, and an overall increase of exotic goods.

Table 7.7 Synthetic comparisons of major resources in the Phase 4 context

Context	Unit	U3	U5	U6	U7
Density	Local lithic	1.38	0.31	1.32	0.45
	Local bead	0.00	0.10	0.12	0.15
	Quartz	9.25	4.71	3.12	2.53
	Other Exotic Goods	1.18	0.31	0.36	0.59
	Total food	867.4	635.1	109.8	1063.8
Ratio	Local Debitage/Tool	2.50	2.00	0.83	0.50
	Quartz Debitage/Tool	10.75	5.43	No tool	4.67
Z score	Z_local lithic	0.914	-0.985	0.807	-0.737
	Z_quartz	1.430	-0.063	-0.586	-0.780
	Z_subsistence total	0.482	-0.082	-1.358	0.958

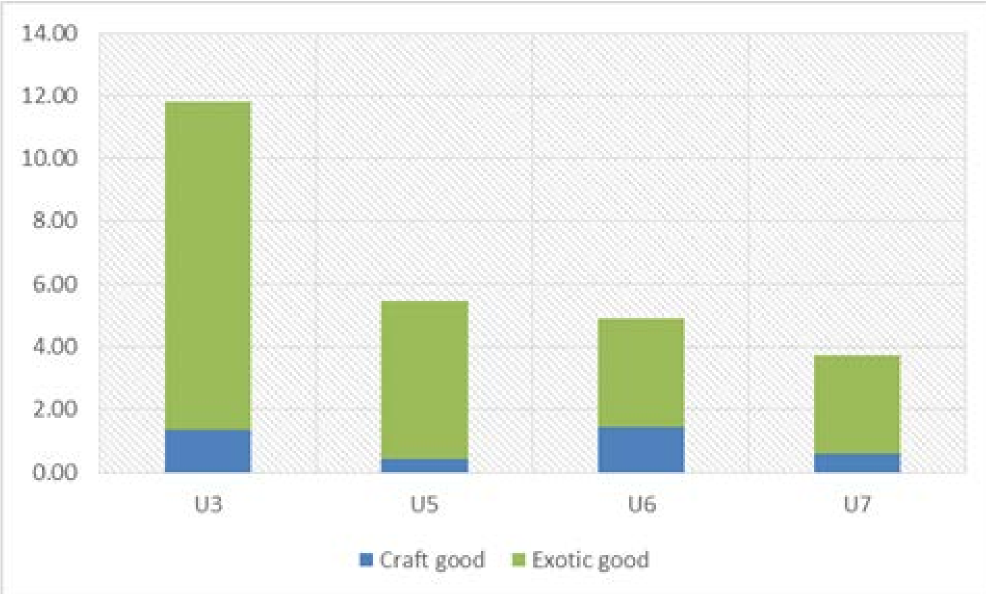

Figure 7.11 Cumulative density of craft and exotic goods in Phase 4

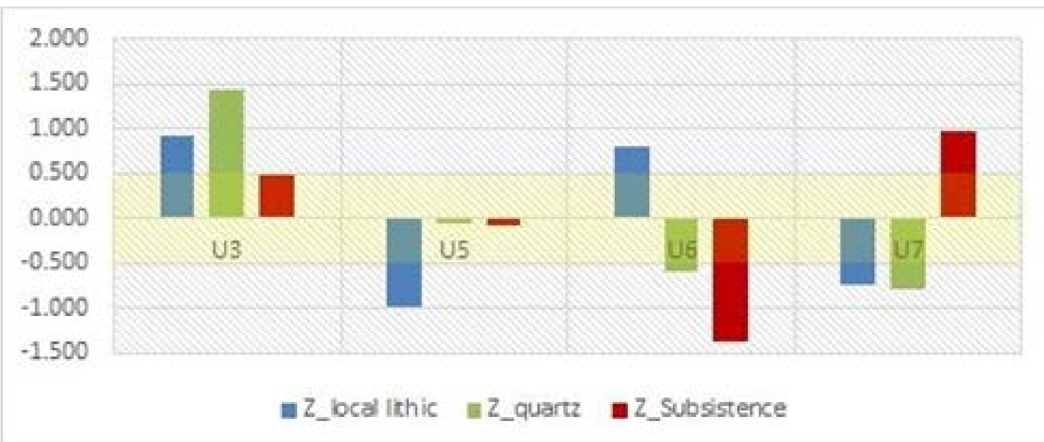

Figure 7.12 Z-score of resources in the Phase 4 contexts

Based on the overall quantity, Unit 5, the summit of the mound, is not outstanding regarding the cumulative density of lithic and exotic good remains (Figure 7.11). Although food remains and exotic goods were present here in moderate levels during the post-mound occupation, Figure 7.12 suggests Unit 5 is a place where lithic tools and debitage were relatively scarce on top of the mound. The relatively high debitage/ lithic tool ratio also implies less usage of lithics at this location, while other small-scale food consumption and exotic good distribution activities were still going on.

In contrast to Unit 5, Unit 6 has similar cumulative density the proportions differ from Unit 5. In fact, Unit 6 represents the most striking similarity between Phase 3 and 4 in that the majority of local lithics were concentrated here (and in Unit 3) while the scarcity of exotic goods and food remains is similar to the preceding phases (Figure 7.12). Albeit the cumulative density is slightly higher than the preceding period, the debitage/ tool ratio in Unit 6 also remained similar to Phase 3 (Table 7.6), all of which suggests a stable utilization of space at this spot.

Unit 3 and Unit 7 keep illustrating a vivid scenario of human activities throughout Phase 2 to Phase 4, and the two units persisted in being the units with the most abundant food remains in Phase 4 (Figure 7.12). However, unlike the preceding phases where Unit 7 is associated with abundant quartz remains, food consumption became the sole focus of activity in Unit 7 during the last occupation period. The total amount of local lithic and exotic goods is the lowest among the four discussed units, implying that the activities held at Unit 7 mainly focused on food consumption.

Unlike Unit 7, Unit 3 becomes the place where the most abundant local lithic and exotic goods are both concentrated. The quantity of subsistence remains is also high, although slightly less than Unit 7. In general, Unit 3 represents a spot where all three categories of material and related activities happened. This could be a result of more frequent human activity, albeit still on a small scale.

Although the nature of activities held within the two units might be slightly different, Unit 3 and 7 can both be identified as domestic spheres. This is based on not only material remains but also associated archaeological features such as hearths and domestic trash piles. Similar to this, Unit 5 is another case that had events on a similar scale but focused on only two of the three activities. Hearths and piles of trash are also identified in Unit 5. Thus, the nature of this unit cannot be differentiated from Unit 3 and 7.

Besides the individual unit, it is noteworthy that the weight of exotic goods keeps increasing from Phase 3 to Phase 4. Not only did the total quantity (as learned from the previous chapter) increase, exotic goods also dominate 84-92% of the discussed material in the three domestic contexts (Unit 3, 5, and 7) and 70% in Unit 6. The constant increase of exotic goods indicates continuous inter-community interaction whose importance also increases over time.

7.1.2.4 Summary of Synthetic Comparisons

Incorporating three categories of material for the synthetic comparison produces insightful patterns that shed light on resource distribution. Overall, the normalized comparison suggests the three kinds of remains were unevenly distributed between units, and the pattern and usage of space changed over time. It is clear that Unit 3 and 7 were always two important loci producing abundant archaeological remains, of one kind or another. In contrast to Unit 3 and 7, Unit 6 represents a space that was not associated with food consumption throughout the occupation history. Instead, it contained most of the local lithic remains unearthed during the 2015 excavation, especially for the latter part of its occupation. This tendency makes Unit 6 strongly associated with activities related to tool making or tool usage. It is also in Unit 6 that a cluster of foreign beads was registered, another event that has nothing to do with food consumption.

With only two occupation phases discussed here, the interpretation for Unit 1 and 5 is less conclusive. Both Unit 1 and 5 contain artifacts in quantities close to the average, even though one unit is on top of the mound and another is on the peripheral area. As will be seen in the following section, associating the results of comparison with archaeological context presented in chapter 3 helps to reach a more solid interpretation.

Table 7.8 The proportion of exotic lithic

	Unit 1	Unit 3	Unit 5	Unit 6	Unit 7
Phase 2	0.0%	50.0%	.	0.0%	30.7%
Phase 3	46.2%	83.3%	55.0%	23.1%	78.6%
Phase 4	.	88.3%	92.3%	70.7%	84.0%

Another important tendency that is revealed from previous chapters is the increasing importance of exotic goods in contrast to the local lithics. The exotic materials such as quartz are closely related to local lithic production because of the evidence for in situ modification. Thus, the proportion of exotic quartz and other lithic tools reflects the change in the importance of exotic materials when considering the related behavior of production. Table 7.8 summarizes the proportion of exotic lithics out of all the lithic tools in each unit by phase. It is clear that the exotic goods gained more weight over time in the entire lithic collection, suggesting the importance of obtaining these materials increased through time.

7.2 SPACE USAGE AS AN INDEX OF COMMUNAL SOCIAL LIFE

As mentioned at the beginning of this chapter, the 2015 excavation in Huaca Negra was unable to reveal an area with sufficient architectural information for a thorough interpretation of spatial function and usage. However, as demonstrated in the previous sections, it is still possible to decipher the nature of human activities at different corners of the site by putting material remains and archaeological context together.

Although it was a fishing village, Huaca Negra offers a rather more complex picture of life than one would expect. In many other Andean cases, a clear distinction can be made between domestic and public realms, mostly based on the nature of architecture. However, this is not the case for Huaca Negra, which reveals a mixed scenario in that activities with both public and domestic natures exist within the site area. This section aims to highlight the observed patterns from the three discussed occupation phases in Huaca Negra.

7.2.1 Back to the Archaeological Context: A Summary of the Usage of Space

The evident long-term occupation and space modification at Huaca Negra make it unrealistic to expect a constant, unchanged function in various parts of the site throughout its occupation. With different archaeological contexts, the following sections summarize the observed patterns in temporal order.

7.2.1.1 The scenario in Phase 2

Among the four units with Phase 2 strata, Unit 7 is the one with the most abundant material remains, including the highest quantity of lithic, and the mainstream food resource, fish. The highly concentrated material in Unit 7 might be less surprising when considering the fact that this is the locality with direct evidence of multiple wall construction (see Figure 3. 40 and 41). It is unclear whether the walls are associated with domestic or public architecture, because (1) the excavation didn't reveal the entire layout of architecture, and (2) the superimposed walls represent different architectural styles, with some associated with larger-scale, more elaborate constructions (the ones with adobe, white plaster, or thicker in size) while others seem simple and would usually be categorized as domestic architecture (e.g., the thinner quincha wall). Anyhow, the mixture of architecture styles can be a result of continuous remodification of the space, where the food consumption, use of local tools, and exotic goods all happened at this spot. Although a much larger quantity of food remains is registered at Unit 7, this is not a quantity that supports public feasting events. Rather, fish remains here should be considered as the remnants of household(s) consumption, as they are evenly distributed across Phase 2 deposits in Unit 7 so that no particular pattern of concentration can be observed. It is also noteworthy that the deposit of Unit 7 is a condensed one in comparison to other units: here Phase 2 strata was encountered 1.5 meters below the surface, whereas other units started at 2.2 to 3.7 meter below the surface. This perspective also indicates the food consumption here is not large-scale, but related to a condensed deposit for a relatively longer period.

With limited excavation area, Unit 1 contains food and exotic remains at lower density than average, but it has with a moderate amount of lithic tool. Unit 6 is similar to Unit 1 in that very few archaeological remains were collected. One might expect a scenario that Unit 1 and 6 were marginal spaces for human activity during the Phase 2 occupation. However, these are the two loci that yield a series of delicate burnt clay features that are not found in other contemporaneous sites (see Figure 3.11, 3.33); the clear floors and the hearths made of pebble stone in Unit 6 (Figure 3.34) also demonstrate human activities. This pattern suggests a cleaned space with only archaeological features in Unit 6, and possibly the same in Unit 1.

Also associated with a series of floors, Unit 3 shows a different nature of human activity. This is the spot where 88.4% of total registered shellfish were consumed, together with 75.9% of the total quartz from Phase 2 contexts. In contrast to abundant shellfish and exotic goods, Unit 3 yields the fewest ordinary lithic tools. The tendency that local lithic and exotic quartz are mutually exclusive can also be observed in Phase 3; this can be a result of the different function of material or a distinction between ordinary daily activities and other social events. The relatively narrow postholes (Figure 3.20), although the overall layout is not available, suggest these materials in Unit 3 were associated with small structures, most likely a household space.

Overall, the Phase 2 occupation represents a pre-mound lifestyle as a fishing village, and the contexts discussed here are most likely to be domestic ones. Although "fishing" constitutes the major subsistence activity during this time, the uneven distribution of fishery resources and other kinds of resources in the site area suggests that different social units might have different strategies and resource focuses during this time.

7.2.1.2 The scenario in Phase 3

In contrast to the Phase 2 occupation, the remnant of large adobe walls at the summit of the site (Unit 5) indicates larger scale, more public-oriented construction in the Phase 3 occupation. All other four units are located on the margin of the mound and serve for various functions. The continuity of consumption activity can be observed, as most fish remains are concentrated in Unit 7, while Unit 3 yields the densest shellfish remains. During this time, the two units were associated with not only major subsistence remains but also exotic quartz, implying many different activities are going on.

In contrast to the resource concentration in Unit 3 and 7, Unit 6 becomes a special locality that, albeit with clear floors as evidence of occupation, lacks everything but rich lithic remains. Considering Unit 6 and Unit 3 are both located in the northeast corner of the mound and are only 35 meters apart, the dramatic differences between the two units suggests a possibility that the two units could be functionally complementary to each other, and together they constitute a relatively complete scenario of daily life. The distance between the Unit 3 and 6, however, is beyond the expectation of household space. Thus, two interpretations are proposed here that await future investigation: (1) this area represents a larger-scale, supra-household complementary function; or (2) smaller-scale, specialized households with specific (specialized) activities.

Although there is no direct evidence of architecture found in the margin of the mound, the clear floors and traces of human activities suggest they were small-scale by nature, incorporating one or few households rather than the entire community. In contrast to the activity areas with a domestic nature, the body of the mound (Unit 5) contained less abundant materials than other units, which fits the expectation that the public space was kept clean in the context of the Late Preceramic Period. The interesting fact is that the density of exotic quartz in Unit 5 is low, implying this object might not be used in the context of public activity.

7.2.1.3 The scenario in Phase 4

In comparison to the preceding periods, Phase 4 is the context without any architecture registered. Clay floors are identified in all the four units discussed here and suggest human occupation and activities kept going on after the abandonment of mound. Hearths, features of domestic garbage concentration, and stains of human activity are present in all the four units, and reveal a somewhat similar scenario at different corners of the site area. The distribution of the types of material remains, however, again suggests heterogeneous natures of activity in different units.

Associated with 5 out of 7 shellfish consumption events, Unit 7 is the spot where 40% of total subsistence remains are concentrated. Unlike the preceding period where the richness of Unit 7 is also apparent in craft and exotic goods, these two kinds of resources are found in low quantity in comparison to other units. As food remains in Unit 7 are concentrated in features such as trash pits or piles of shells rather than being rich in the entire deposit, this spot might have become a locality mainly serving for occasional food consumption rather than being the focus of all kinds of activities as it was in Phase 3.

In contrast to Unit 7, Unit 3 is now the locality with the densest lithic and exotic quartz. It also yields abundant food remains, although the overall quantity is now exceeded by Unit 7. Rather than shellfish consumption events, the features in Unit 3 are mostly concentrations of garbage, mainly faunal remains associated with sherds. As none of the features is large or impressive in scale, these garbage remains again refer to a domestic scale of consumption and activity.

Located between Unit 3 and 7, Unit 6 remains a relatively empty space where no feature of food consumption is registered, and only lithic tools are abundant within this archaeological context, a pattern that continues from the Phase 3 occupation. Putting together Units 3, 6 and 7, it is clear that the space usage at this side of the site is relatively stable. Although the proportion and abundance slightly changed, Units 3 and 7 show a domestic facet of life where food consumption and other daily activities, including the usage of special exotic goods, happened all the time. In contrast, Unit 6 was constantly an “empty zone” between Unit 3 and 7 regarding material remains. As the well-made floor and soil deposits both suggest Unit 6 accommodated plenty of activities, Unit 6 should not be treated as an activity-free area but could be a spot that served a different function and might have been kept clean on purpose.

Another significant contrast can be observed between Unit 6 and Unit 5. The latter is not associated with architecture in Phase 4 but located near the summit of the mound. Unit 5 contained food remains and exotic quartz at close to the average density, albeit the yielding of lithic tool is limited. The current pattern suggests Unit 5 and 6 are distinct from each other in regards to related activities, and Unit 3 and 7 mainly served for food consumption.

7.2.2 Reconsidering the Distinction between Public and Domestic

The comparison made so far not only reveals the heterogeneous nature of space within the village but also invokes the reconsideration of the traditional dichotomy between domestic and public spheres within a society. As mentioned at the beginning of this chapter, lacking the complete architecture layout frees the interpretation of archaeological contexts from conventional preconceptions about domestic/ public dichotomy. Architecture tends to preserve well in coastal Peru and has been taken as the most important index for identifying spatial function and social context. In the Late Preceramic and Initial Period, large plazas, massive walls made of adobe, rock or shicra, and large-scale mound constructions constitute monuments that contained all kinds of public activities. On the other hand, household contexts can be easily identified at other parts of sites, with smaller rooms and cheaper construction materials. In Huaca Negra, these indices intertwined with each other from one spot to another. The tendency can be seen most clearly in Phase 2 and Phase 3 and can be summarized from various aspects. Combining the expectation of public and domestic activities, evidence for human activity and forms of architecture will be used to argue for Huaca Negra as an intersection of the two spheres.

7.2.2.1 The Three Kinds of Activities in Huaca Negra

Following the theoretical structure, the three kinds of human activities, food consumption, craft production, and usage of exotic goods have been discussed in detail. All these activities can happen in both domestic and public spheres; thus it requires the consideration of scale and archaeological context for illustrating a clearer picture. Food remains refer to the consumption that fulfills an individual’s basic needs, and most of the time they are associated with domestic activities, as it is a very fundamental daily activity. A common exception is to “level up” the food consumption to a feasting event. Feasting events have a public nature as they usually involve a much larger scale of consumption with more people being involved and more food being consumed. Anthropological and archaeological studies treat feasts as one of the power strategies through which an aggrandizer could accumulate his/her reputation and social status (e.g., Hayden 1998; Hayden and Villeneuve 2010). The two contexts can be distinguished mainly by their scale, and also by the quality or type of food depending on social background.

In Huaca Negra, most of the archaeological contexts are not associated with large-scale food consumption. The only exception would be Unit 7 in Phase 2 occupation when the cumulative density of NISP reached $3537/m^3$ (mainly fish remains, Table 7.2), while all the other contexts range between 1524 and $109/m^3$. The highly concentrated food remains in Phase 2 makes Unit 7 a unique case during this time and throughout the entire history of occupation. However, when considering the content of food, there is no significant difference between Unit 7 and other units (see chapter 4) to claim a socially meaningful feasting event. Other evidence of food consumption can be retrieved from events for shellfish consumption. Although they varied in size, none of the identified events would be large enough to support large group consumption. As demonstrated in Chapter 4, not only the scale but also the consumed shellfish species varies dramatically from one event to another. This was not a formalized event where people followed certain rules, as we would expect to see in repetitively held feasting events.

Different social contexts produce diverse forms of craft production, which constitute an entire subfield of archaeological research. In the case of Huaca Negra (and early coastal Peru), craft production can also be associated with both domestic and the public spheres, with the former smaller in scale and the latter related to a specialized workshop that produces craft goods on a larger scale. Based on current data from excavation, the overall quantity of lithic debitage and products should not be used to infer the existence of a specialized workshop due to the small quantity and the lack of evidence of standardization. Among all the discussed units in different periods, Unit 6 can be taken as the only possible locality where lithics dominate the archaeological remains, especially during its Phase 3 and 4 occupations. The debitage/ tool ratio in Unit 6, however, is consistently lower than 1, suggesting it was not a spot associated with lithic production but usage.

Exotic goods in early social contexts can be tricky for interpretation in terms of acquisition, function, and social meaning. However, it is expected that there should be a *positive correlation* between the degree of concentration and the special social meaning of an exotic object. Special exotic goods can be used for social events or serve as a prestige good. An aggrandizer would be happy to control these items because being able to monopolize usage assures its uniqueness and specialty. One would also expect exotic goods to be accumulated, demonstrated to the public, or to play roles in public events to reveal its value. This logic can be applied to examine the pattern in Huaca Negra.

Although it is unclear whether people in Huaca Negra retrieved quartz by themselves or through exchange, both the quantity and distribution of crystal quartz increased over time. It is observed that this non-local material was distributed in all the discussed units by Phase 3 and 4, and the overall proportion also increased significantly. Following this logic, the purposeful behavior of chipping exotic quartz and making a wider distribution *reduced* the specialness and rarity of crystal quartz.

The high quantity and apparent change of behavior pattern make crystal quartz the focus of the discussion of exotic goods. Current examination suggests it is less likely that crystal quartz was monopolized by a few individuals in the community, especially for the later occupation.

However, it should be kept in mind that crystal quartz is not the only exotic good, and its ubiquity does not speak for other kinds of exotic goods such as anthracite or chalcedony beads, which potentially were used as a signifier of social differences. Examining the role of other exotic goods is somewhat limited based only on the data from 2015 excavation, as the excavation strategy didn't expose an extensive, horizontal space in any discussed phase. However, two points can be made here regarding the special distribution of these exotic goods. (1) Although the total quantity is low, anthracite items were present in 3 out of 4 units in Phase 4 contexts, implying a relatively high ubiquity. As anthracite was also encountered by Strong and Evans, there seems no tendency of concentration. (2) In contrast to the crystal quartz and anthracite, exotic beads were concentrated in Unit 6 in the Phase 4 context. Moreover, the well-made beads or pendants from the Phase 3 context are associated with one specific infant burial rather than being dispersed widely. The implication here is that those items tended to concentrate in a few contexts and their ubiquity is much lower than other non-local items. But more evidence is needed for making a stronger statement.

Overall, the three kinds of activities discussed here represent nothing outside normal daily practice (except the special beads). Although there are some uncertainties for the faunal remains in Unit 7 (Phase 2) and lithic remains in Unit 6 (Phase 3 to 4), the most reasonable inference would still be to associate them with people's daily life rather than with large-scale, public activities.

7.2.2.2 Architecture as the Framework of Social Context

Albeit there is no clear information on architectural layout, the 2015 excavation demonstrates that Huaca Negra is not merely a domestic midden mound, but contains both domestic and larger scale architecture. Adobe fragments were found in all the units from Phase 2 to Phase 4, but the non-standardized format from small, baseball-size clay clod to large rectangular brick (see Chapter 3) makes adobe less reliable evidence for the nature of architecture.

Significant architecture was revealed in Phase 2 Unit 7 and Phase 3 Unit 5. As discussed before, the large wall in Unit 7 with three lines of adobes and white plaster can be treated as possible public architecture for its more massive scale and a finer finish. However, the other walls next to this large wall show diverse building techniques that blur this scenario, as the quincha wall tends to be associated with domestic architecture. The nature of other small, single-line adobe walls are also hard to determine at this point, but the combination of various styles of architecture complicates the interpretation of the space, and there is no clear line to draw here between public and domestic spheres.

Unlike Unit 7 in Phase 2, the massive wall revealed in Unit 5 is a public-oriented one. The behaviors discerned here also correspond more with this impression, including relatively clean space inside the architecture, larger adobe as the building material, and a well-made thick floor. More significantly, the female burial is placed below a hearth right before the construction of the floor and walls, which makes the burial a probable sacrifice event. The central location of Unit 5 (on top of the mound) also assures the potential for being a public space. All three kinds of material remains, however, are not substantially different from other units and do not correspond to the expectation of public activities as mentioned in the previous section.

Although the material remains and architectural evidence seem to provide ambiguous pictures for distinguishing domestic and public realms within the community, abandoning the implicit assumption that public and domestic activities are mutually exclusive helps to illustrate a clearer picture: Huaca Negra could be an intersection that incorporated ordinary domestic activities in a constructed public environment. The continuous site occupation also suggests that the mound could be initially a result of the accumulation of long-term occupation, even though the community construction project was conducted by Phase 3.

7.3 SUMMARY

In this chapter, the three kinds of archaeological remains are compared by units within each occupation phase to illustrate the heterogeneous nature of space use. Both change and continuity in resource distribution and behavior pattern can be discerned from one period to another. The interpretation of space usage and differences between units can be made based on the results of the comparison in terms of actual quantity (cumulative density) and z-score as an index for the diversity of distribution.

As the most abundant archaeological remains, marine resources are concentrated in Unit 7 during Phase 2, and the difference of quantity between units becomes less significant over time. Although different units shift their focus from fish to shellfish with a different pace, the overall tendency of this transition can be seen in all the discussed units.

Quartz is chosen here to represent exotic goods for its significant quantity and a clear pattern of distribution. As its quantity increased from Period 2 to 4, people in Huaca Negra were able to access this resource more often rather than being restricted from using it. This tendency implies a possible utilitarian rather than ideological function. It also rules out the scenario that an aggrandizer controlled and accumulated the exotic material for his/ her own purpose.

Although all the units contain a certain amount of lithic products, it is Unit 6 that constantly yielded a high quantity of lithic while lacking food resources throughout its occupation. This tendency makes Unit 6 an area clearly with a different focus of activities. From Phase 2 to 4, Unit

3 and 7 are the loci with the most abundant evidence of ordinary human activities related to daily domestic life. While they vary slightly in details, Unit 1 and 5 represent a less dense, average amount of material remains and moderate human activities falling between Unit 6, and Unit 3 and 7.

Considering the overall quantity, composition of artifacts, and the implication of human activity, current data suggests that the diversity observed between units can be treated as the internal heterogeneity between different groups in this community. By comparing the artifact remains and making the inference of architecture, it is clear that Huaca Negra represents a community where public and domestic space were intertwined rather than separated from one another. Here in Huaca Negra, people constructed "public," larger-scale architecture, but then used these spaces sometimes in quite "domestic" ways. It is the similarity and dissimilarity of artifact remains between units that shed light on the nature of the activities, with architecture taken as supplemental evidence.

8.0 CONCLUSIONS, REFLECTIONS, AND PERSPECTIVES

Focusing on the data unearthed from the 2015 excavation in Huaca Negra, this dissertation aims to illustrate early human occupation in the Virú Valley from various angles. First of all, the dating results and detailed study of stratigraphy enable the reconstruction of occupation history, which then becomes the foundation for a series of diachronic comparisons. Secondly, three interconvertible forms of capital, economic, cultural, and social capital, constitute the framework for assessing daily activities in Huaca Negra. Current data suggests that economic capital, in the form of the subsistence system in this dissertation, witnessed the most dramatic change throughout the occupation history, while subtle changes in the other two categories can also be discerned. Although the limited horizontal extent of excavation prevented us from revealing complete architecture layouts, a thorough examination of material remains and archaeological contexts suggest that activities in both community and household levels were present in the site area. Thus, two traditionally dichotomized social spheres, the public and the domestic, were juxtaposed in the same spatial contexts in Huaca Negra. This means that a "community" scope encompassing the two spheres is better suited for assessing overall lifeways in this fishing village.

To conclude this dissertation, the following sections will address (1) how we can augment our knowledge of the Late Preceramic Period and its transition to the Initial Period in the north coast of Peru, mainly in the Virú Valley and neighboring valleys. (2) Diachronic changes in the three economic activities and their social implications. Finally, (3) how does the community scope help to address overlap between public and domestic ends of social life, and enable a better understanding of early Andean societies. The prospects for future research directions in the Virú Valley area and on early Andean societies will also be proposed at the end of this chapter.

8.1 EARLY HUMAN OCCUPATION IN THE COASTAL ANDES

The excavation at Huaca Negra enables the reconstruction of a 2000-year-long occupation history. On the one hand, the new data makes necessary some revision of local cultural history; on the other hand, what has been learned from Huaca Negra contributes to a broader understanding of the Late Preceramic Period, its diversity, and the transition to the Initial Period. This section discusses the significance of the archaeological contexts reconstructed by this research.

8.1.1 Revising Our Knowledge of the Early Virú Valley

Before this research, our knowledge of the Late Preceramic human occupation in the Virú Valley (locally known as Cerro Prieto Period) came from the Virú Valley Project in the 1940s. Willey's survey identified three Late Preceramic midden hills, with the other two being 500 meters away from Huaca Negra (Willey 1953:38-42). According to Willey, Collier's excavation at V-171 and V-302 close to Hacienda Santa Elena also revealed non-pottery strata, possibly belonging to the inland Late Preceramic occupation (ibid: 42).

The way to distinguish the Preceramic from Initial Period is by the presence and absence of ceramic, and in the Virú Valley, there are no sites with occupations before Late Preceramic at this point. The excavations conducted by Bird and by Strong and Evans in Huaca Negra produced the first generation radiocarbon results (Kulp et al. 1952:410), suggesting an occupation history between 3150 and 5300 uncalibrated BP (but the early date comes from shell samples and was doubted by Collier, see Collier 1955), falling into the Late Preceramic and Initial Period. This was the only available absolute dating of the early human occupation in the coastal Virú Valley in the past seventy years.

Augmenting this earlier limited data on the Preceramic occupation, and the transition to the Initial Period, my current research produced fourteen AMS dates. Although there was no dramatic change to our existing understanding of the range of occupation history, the updated AMS analysis provides much more accurate dating results, which enabled a finer resolution to slice the long-term continuous occupation of Huaca Negra into four phases. The four-phase division then sheds light on one of the most significant results of Huaca Negra: rather than being occupied mainly in the Initial Period, it is now demonstrated that most of the site's occupational history took place in the Late Preceramic Period.

Huaca Negra was the type site of the Initial Period culture (Guañape) in the north coast of Peru. This made sense because Strong and Evans' early work suggested the majority of occupation happened in the Initial Period, and the unearthed ceramics were used to establish the cultural sequence that distinguishes Early and Middle Guañape Period (Strong and Evans 1952). The updated excavation in Huaca Negra, however, demonstrates that human activity and occupation in the Initial Period were only patchy in extent and mainly concentrated on the mound top, and north and east of the mound. In fact, the Initial Period stratum is merely one meter or less in all the four test pits, suggesting its minor place in the occupation history. In addition, this project has shown that Huaca Negra is not merely a domestic midden mound as previously suggested, but includes some purposefully constructed architecture at a larger scale. Furthermore, the patchy distribution of various kinds of decoration on Guañape ceramic does not seem appropriate for creating a chronological sequence as previously expected.

Other than revising our understanding of the Guañape type site, new research at Huaca Negra also provides a rare chance to assess change *within* the Late Preceramic occupation, as the more than 1400-year-long occupation produced strata with distinct characteristics. Two remarkable transitions can be discerned from the archaeological sequence: the transition from a non-sedentary, sporadic activity area to settled village life; and from early village life to the beginning of community-level, larger scale construction. Both transitions mark important changes in the nature of the site and associated lifestyles that can be considered as a developmental trajectory of this local community. As will be discussed in the following sections, this trajectory sheds light on the nature of the Late Preceramic Period in the Andean coast from a perspective that differs from the traditional focus on monument construction.

8.1.2 Implications for Societal Developmental Trajectory and Social Organization

The emergence of Andean Civilization is strongly correlated with the presence of early monument construction. However, as reviewed in Chapter 1 and 2, there are diverse opinions regarding the nature of monumental construction and its social implications: traditionally dominant perspectives consider monumental construction to have been associated with the rise of social hierarchy and permanent leadership, while dissenting opinions argue that early Andean monuments could have been constructed slowly and collaboratively by groups with little formal hierarchy. Meanwhile, less focus has been placed on households or changes in daily life. One of the few exceptions comes from Bandurria, where Chu discerns changes of household structure, differentiation in subsistence resources, and the onset of privatization of ritual. These factors lead Chu to conclude Bandurria witnessed the onset of social inequality and fits Hayden's model of transegalitarian society (Chu 2011). The overall developmental trajectory at Bandurria fits archaeologists' expectations about the correlation between the emergence of aggrandizers and larger scale construction, evidenced in this case from a household perspective.

Although Huaca Negra has a similar trajectory in which “non-domestic” architecture was built later in the occupation history, data from Huaca Negra so far *does not* support the expected correlation between larger scale construction and aggrandizers and social inequality. Drawing on Hayden’s work on transegalitarian society (e.g., 1995, 1996, 2001), two lines of evidence can be used to infer the existence of aggrandizers in a community: aggrandizers tend to create surplus and privatize ownership, and aggrandizers tend to be marked by prestige goods (Hayden 2001:43). The two lines of evidence from Huaca Negra reveal a different pattern than the one presented in Bandurria and seem to *contravene* the archaeological expectation of aggrandizers in a traditional societal developmental trajectory. More specifically, evidence from Huaca Negra doesn’t show the emergence of aggrandizers or social inequality at the time when the larger “public” architecture was constructed and used.

The first line of evidence comes from the possible prestige goods. As has been argued in Chapter 7, one of the most significant patterns found in Huaca Negra is the usage of exotic (non-local) crystal quartz, which may have had ritual significance. On the one hand, the relatively large quantity of this material suggests its importance to this local community. On the other hand, the in situ modification of crystal quartz created more chips for intra-village distribution, and the ubiquity of crystal quartz is higher in the later occupation. This trend contradicts the idea that aggrandizers monopolized this prestige good to fulfill their ambitions and to ensure their special status. The frequency of exotic good usage, both quartz and other kinds of goods, remains stable from Phase 2 (settled village life) to Phase 3 (contemporaneous with the larger community project of construction). If there were aggrandizers in the Huaca Negra community, there is no good evidence that they consolidated their status by monopolizing or privatizing treasured goods.

Another line of evidence comes from the subsistence system, where one might expect aggrandizers' efforts to create surplus. Three arguments can be made with the data from Huaca Negra. First of all, the transition from fishery exploitation to shellfish collection does not fit with a strategy for efficiently creating surplus. When considering resource storability, it is much easier to preserve and accumulate surplus fish than shellfish; thus the latter does not provide an adequate base for building wealth. Moreover, collecting shellfish is a much lower-skill, lower-technology strategy with few "barriers to entry." By its nature, it would be harder to monopolize shellfish gathering, and would tend to decrease the potential for inequality between households.

Secondly, the most intense food consumption scenario comes from Unit 7 in the Phase 2 occupation, not in Phase 3 when public construction began. The evidence from the Phase 2 context suggests larger scale food consumption happened *before* the construction. Thus, the accumulation of food resources for larger-scale consumption can be disconnected from mound construction based on current data. Thirdly, comparison suggests the heterogeneous nature of consumed food between units, but there is no direct evidence of monopolization of resources.

Although the evidence provided so far corresponds well to the expectation of egalitarian society, it is also important to emphasize the strikingly different mortuary treatment of individuals in the community. There are two distinct occasions where human remains were located within Phase 3 contexts: the infant burial in Unit 1, and the middle-age female offering in Unit 5.

The infant burial is associated with by far the most delicate craft products in the Late Preceramic context, the two pendants with serpent design and red pigment (Figure 3.9). Together with these two and other pendants is a cluster of 20 complete pieces of huge *Choromytilus Chorus* atop the burial as offerings. Other than grave goods, the presence of a basket (interpreted as the burial receptacle), and the spatial delimitation of the grave (lined by adobes) both suggest a delicate and careful mortuary practice applied to this 4-month old. All these factors make it clear this infant was an extraordinary individual in the community.

In contrast to the 4-month-old, the female at her mid-forties in Unit 5 did not receive a special or respectful mortuary treatment despite her (relatively) long-life in the community. Instead, the postmortem burn marks on the bones, the fact that a pebble and a clay hearth was placed right above her body, and the subsequent adobe wall construction, all suggest her role as an offering for the community construction project, placing her at the other end of the spectrum. The limited sample size makes it impossible to reconstruct "normal" mortuary practice and burial patterns and it is hard to estimate how "deviant" the two individuals are. The two burials strongly contrast with each other, suggesting different treatments derived from diverse social roles.

Other than these burial contexts, disarticulated human remains were also encountered from the Initial Period trash pit in Unit 7 (Figure 3.42 and 43). Strong and Evans found a similar pattern in their earlier excavation. They suggest these might be lower status individuals in the community. Overall, current evidence from burial data presents *a slightly different picture* than what is discerned from subsistence and exotic goods. Possibly, there were diverse social statuses at Huaca Negra at the time of mound construction and use (and afterward), signaled in burial treatment, but these statuses were not accompanied by economic differences in subsistence resources or access to exotic goods. This tendency may imply different paces of development in different social realms, but more data is needed to provide a thorough picture.

8.2 FORMS OF CAPITAL, THEIR MANIPULATION, AND IMPLICATIONS

This research places significant effort in deciphering the three kinds of economic activities associated with three interconvertible forms of capital. Under this scheme, the attempt is to categorize the unearthed archaeological materials and to discern possible strategies for gaining social capital (social status) or, conversely, for keeping the community relatively egalitarian. Following this schema, I suggest Huaca Negra was closer to an egalitarian society over its two-thousand-year-long history, albeit with internal heterogeneity, and in particular there was no clear tendency for resource accumulation. The analysis also helps to reveal diachronic changes that might be related to lifestyle. This section summarizes the results of analysis from chapter 4-7, with emphasis on subsistence and exotic goods. Several possible scenarios that might account for the pattern will also be presented.

8.2.1 Shifting Focus of Resource Exploitation

In total, twenty-five fish, sixteen bivalves, thirteen limpet, and twenty snail species were identified from faunal remains in this project. These species constituted the majority of ecofacts related to subsistence activity. Mammals and seabirds, while present, never played significant roles in food consumption throughout the occupation history. Botanical remains are also limited, and the majority of the sample is cottonseeds, categorized as industrial plants.

As has been discussed in Chapter 4, the abundant subsistence remains enable detailed comparison between contemporaneous units as well as overall diachronic changes between occupation phases. In discussing the broader picture, this section addresses the environmental background, the dramatic change during the Late Preceramic occupation, the unique patterns seen in Huaca Negra that contrast with other contemporaneous sites, and the implications for the Maritime Hypothesis.

8.2.1.1 El Niño as the Crucial Environmental Variable

Before treating the changing pattern of subsistence activity, it is necessary to control for variables that might affect the interpretation. Overall, the availability of marine resources is primarily affected by environmental factors. For a Peruvian fishing village on the coast, the concern comes from El Niño events, a recurring phenomenon whose frequency settled to a modern standard by around 5000 BP (e.g., Richardson and Sandweiss 2008).

Huaca Negra encountered multiple El Niño events during the 2000-year-long occupation history. The presence of salitre deposit can be considered as direct evidence of El Niño events, as the thick layers of salitre encountered across several contexts resulted from heavy rain events. While slightly beyond the scope of current research, the fact that Huaca Negra produces a rare stratigraphic sequence spanning the Late Preceramic to Initial Period with evidence of El Niño events makes the site also significant regarding early human-environment relationships. The fluctuation of climate would have affected the available resources and people´s coping strategy.

In Huaca Negra, the evident deposits of El Niño rainfall are mainly present within the Phase 4 context. As can be seen from Figure 3.47, several El Niño events can be associated with absolute dating results, including: (1) the latest salitre deposit at 3,160 CalBP as dated in Unit 7; (2) the second salitre layer, slightly earlier than 3,260 CalBP as dated in Unit 5; (3) 3,560 CalBP from a date in Unit 3, in the early part of the Initial Period; and (4) the thick salitres in Unit 1 and 5 corresponding to the later part of Phase 3, which falls between 3,600 and 3,770 CalBP. In recent work in the Moche Valley, Nesbitt identified a El Niño event at Huaca Cortada dated as early as

3582 CalBP (Nesbitt 2016, calibrated by the author with OxCal 4.3.2), which may be the same as the third event mentioned above.

With the data from Huaca Cortada, Nesbitt also suggests that the renewal and expansion of temple architecture was a way people responded to El Niño events or climate flux. In addition, the final abandonment of the site was also associated with El Niño (ibid). While sound in the case of inland Moche Valley, this inference is not applicable at Huaca Negra. As illustrated in Figure 3.47, all the significant El Niño events happened *after* the main construction event, and three out of the four El Niño events are associated with the Initial Period. In Huaca Negra, there is also evidence of human activity such as the cluster of shells *embedded* in the salitre deposit, suggesting people were still living at the site while the event was going on.

Other than possible social changes, consideration should be given to El Niño influence on subsistence activity. Although it is expected that El Niño events would significantly affect people´s daily life in the short term, there is no direct evidence of this at Huaca Negra. The continuous occupation shown in the stratigraphy suggests that people remodified their living space, a pattern seen from the multiple walls and repetitive behavior of floor-building and space filling. Thus, most traces of short-term, El Niño events might have been removed by human agents during the modification process. Moreover, the scale of the comparison made so far compares changes between hundreds of years of occupation. Thus, short-term fluctuations would be evened out in this larger temporal scale.

Other than the long duration of periods for comparison, there is another line of evidence suggesting that the influence of El Niño can be excluded from the following discussion. When scrutinizing the composition of subsistence remains, there is *only change in quantity but not the composition of species*. Discussing the effects of El Niño on the shellfish community, Moore suggests the *absence* of species such as *Aulacomya ater, Semimytilus algosus, Perumytilus chorus,* and *Semele corruga* can be taken as an indicator of El Niño events (Moore 1991:34–35). However, these species are consistently present in all the strata in Huaca Negra, even in Phase 2 when people consumed less shellfish. A possible explanation is that recent work suggests that it was the early- and mid-Holocene that witnessed the most dynamic environmental fluctuation, and the modern pattern is settled by around 5700 CalBP (Richardson and Sandweiss 2008; Reitz et al. 2019). Since Huaca Negra falls well within this timeframe, with traces of El Niño events eliminated by remodeling, one would expect a relatively stable composition of exploited marine resources, which is supported by the evidence in both fish and shellfish category.

Overall, there are no significant changes in shellfish composition as presented in Chapter 4, and the prevalence of El Nino-affected species implies the short-term effect of El Niño might have been diluted by the very long time frames represented in each phase of occupation. However, it is worth keeping in mind that, while both stratigraphy and the shellfish remains suggest a minimal effect caused by El Niño, and my current interpretation of the subsistence system does not place weight on this environmental factor, the records of El Niño retrieved from Huaca Negra can be an essential source for future discussion related to this issue.

8.2.1.2 The Dramatic Change and Its Implications

Based on the unearthed data, Huaca Negra was a fishing village that heavily relied on marine resources throughout its occupation history. Figure 4.31 summarizes the overall density of all the faunal remains, and it is the shift from a focus on fishing toward the collection of shellfish that constitutes the most dramatic change in coping strategies in this community.

When analyzing the subsistence remains, density was the primary proxy to compare both diachronic changes in one unit, and synchronic diversity between different units (discussed in

Chapter 7). Combining the two kinds of information, Figure 8.1 summarizes the faunal analysis and illustrates the proportions of fish and shellfish collected from the rocky or sandy environment in both temporal and spatial axes. As can be seen, while diversity exists between units in each phase, the diachronic changes remain salient. Fish resources dominated the Phase 2 collection, and sandy and rocky shellfish resources dominated in Phase 3. In the Phase 4 occupation, the proportion of fish keeps waning, and so do the resources from rocky habitat. In addition, within the category of fish, the importance of oceanic shoal fish (anchovy and sardine) also waned over time. While people did not stop ocean fishing for shoal fish, over time they placed more emphasis on near-shore fish that could have been caught without building and maintaining boats and going on longer fishing trips.

This pattern suggests the significant shift happened *within* the broader timeframe of the Late Preceramic Period. Thus, Huaca Negra demonstrates that not only were there diverse ways to utilize local resources between different Late Preceramic sites, but these strategies varied over time in one locality.

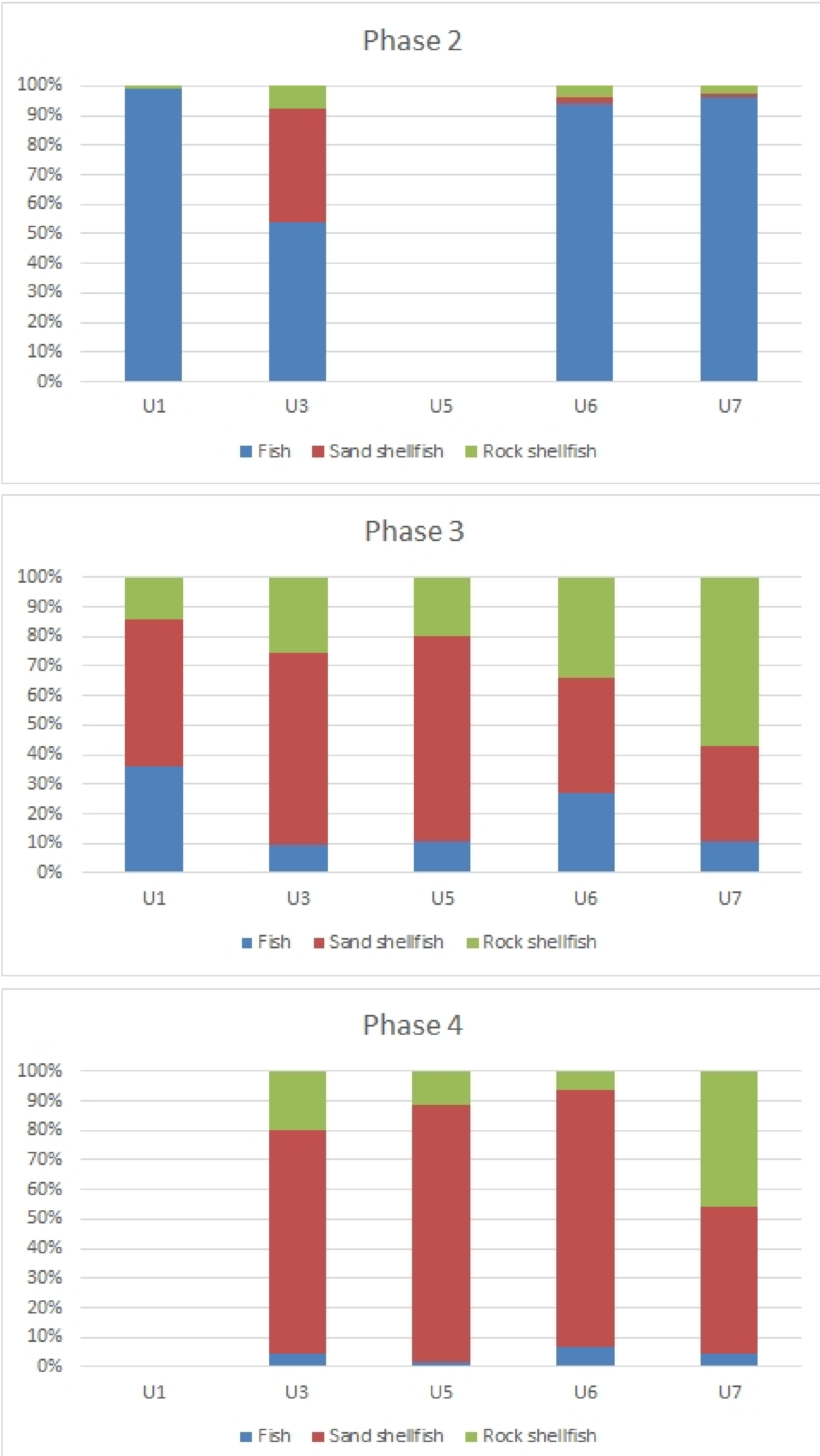

Figure 8.1 Diachronic change in resource consumption, and the diversity between units

The transition from Phase 3 to Phase 4, the Late Preceramic to Initial Period, is also significant. To Willey, the regional settlement pattern suggested a definite shift in the location of sites from the coastal area and lower valley toward the inland area. Willey proposed that this shift from an early fishing dependency to a more agriculturally based economy was the onset of more civilized cultures (Willey 1953). Echoing Willey's observation, the abandonment of the mound and the patchy Initial Period activities observed in Huaca Negra could fit with a shifting focus toward exploiting inland resources, with the importance of the coastal site(s) decreasing. Also, it is during this time that shellfish collection reached its peak, which can be interpreted as lower investment of expertise. More thorough scenarios about Huaca Negra will be addressed in section 8.2.3.

8.2.1.3 Implications for the Maritime Hypothesis, and Contrasts with Other Andean Examples

Huaca Negra constitutes a case that helps reassess the Maritime Hypothesis. It also forms an interesting contrast to contemporaneous sites in neighboring valleys regarding the exploitation of marine resources. Both aspects will be addressed in the following sections.

A. Huaca Negra and the Maritime Hypothesis

Based on the idea that the stable and abundant fishery enables efficient and massive capture along the Peruvian coast, Moseley argued that shoal fish (such as anchovy) was an important element supporting the establishment of Andean Civilization (Moseley 1975, 1992). The main critiques of his theory have centered on whether marine resources are nutritionally sufficient or stable enough to fulfill the needs of the population (e.g., Osburn 1977, Wilson 1981, Raymond 1981). Others argue for a more complex scenario in which agricultural products also played roles in the early subsistence system (Osborn 1977, Quilter and Stocker 1983; Raymond 1981). Recent work in southern Peru suggests that the development of fishing technology should also be considered (Beresford-Jones et al. 2017).

These arguments, however, center on the question of what kind of resource fostered Late Preceramic Andean Civilization, represented in the form of monument construction. In the Virú Valley, Huaca Negra reveals a somewhat different picture, because it is not the abundant fishery resources that supported the larger scale community construction in Phase 3. It is noteworthy that the size of the mound in Huaca Negra is relatively small (100 x 90 x 5 m), especially when compared to the principal sites Moseley used such as Aspero and El Paraiso. This is not a magnificent monumental construction on the scale of those more famous centers. However, the female sacrifice, massive wall construction, and formally made clay floors also cannot be interpreted as household scale architecture.

The most appropriate interpretation for the mound of Huaca Negra would be as a community level construction with the possible purpose of handling supra-household events and consolidating a sense of community. However, the changing patterns of subsistence activity suggests that collective goal in Huaca Negra was *not to create a surplus* and support a larger population or civilization. Instead, this is a kind of capital that people do not look for ways to accumulate but only to meeting basic subsistence needs.

In contradiction to the Maritime Hypothesis and other theories focusing on the strategy of amassing surplus in order to sponsor large-scale construction, people in Huaca Negra took another strategy that conserved labor with less laborious resource strategies. This could be a strategy appropriate for smaller scale mound construction achieved by a smaller group of people. As a consequence, this might also be the reason why Huaca Negra remained small in scale, as the subsistence foundation was limited. What has been observed in Huaca Negra represents rather different trajectory that contrasts with the Maritime Hypothesis and other Late Preceramic examples in the Coast of Peru.

B. The Role of Sharks

Other than the dramatic change from fish to shellfish, Huaca Negra can also be compared with other sites where quite different subsistence resources were targeted. One point of comparison is the utilization of shark. Recent work in Huaca Prieta, the Preceramic site in the Chicama Valley, and in Gramalote, the Initial Period site in the Moche Valley, both reveal abundant shark remains. The abundance of shark not only suggests it was an essential part of the local diet, but also, as proposed by Prieto, one of the crucial exchange goods with inland populations, and additionally an animal that might have played significant roles in ideological or ritual activities (Prieto 2015).

Unlike Huaca Prieta and Gramalote, only a few shark remains are registered in Alto Salaverry (Pozorski and Pozorski 1979a), and it also played a very insignificant role in the Late Preceramic sites in the Chao Valley (Mauricio 2015). The limited amount of shark remains at Huaca Negra corresponds to the pattern observed in Alto Salaverry and early sites in the Chao Valley. Based on the evidence from Huaca Prieta and Gramalote, Prieto advocates for a general importance of shark in the north coast that lasted for more than three millennia (Prieto 2018b:1123). However, this pattern seems not to have applied to the area south of the Moche River, although the reason for this remains unknown.

C. The Absence of Sea Lion

Sea lion is another species that is commonly seen in early Peruvian coastal sites. In nearby sites with Late Preceramic occupation, there are 641 specimens identified as sea lion in Los

Moteros, which constitutes more than 60% of total marine mammals (Mauricion 2015:258). In Huaca Prieta, sea lion was also present in all the occupation phases (Dillehay 2017: 360). While less significant, Alto Salaverry also yielded six pieces of sea lion remains (Pozorski and Pozorski 1979a). In the Initial Period occupation, Gramalote produced by far the most abundant sea lion collection as 1417 out of 1674 marine mammal remains belonged to this species.

It was expected that Huaca Negra would also produce another significant collection of sea lion remains. On the one hand, the previous excavation suggests sea lion remains are common from the surface down to 3.75 meters below the surface (Strong and Evans 1952:40). On the other hand, a modern sea lion habitat, the Isla de Guañape, is only 15 km southwest of Huaca Negra and could easily be accessed by inhabitants of Huaca Negra. Cerro Prieto, the rocky habitat 4 km west of Huaca Negra, is another natural habitat where Strong and Evans reported “sea lions are still abundant” at the time they conducted their excavation (ibid: 41).

Surprisingly, the 2015 excavations only retrieved 24 sea lion remains, a number only surpassing the case of Alto Salaverry. This result is surprising because evidence suggests that people did go to Cerro Prieto for shellfish collection, but there was no attempt to exploit this other kind of resource. There is no further information about faunal remains from Strong and Evans’ excavation that can serve for making comparisons or explaining the sharp contrast between the two excavations. However, two plausible interpretations can be made regarding the limited sea lion remains. (1) In keeping with the low labor investment for subsistence activity, those who went for shellfish collection might not have been equipped with the tools, expertise, ability, and ambition to hunt sea lion. (2) As suggested by Prieto (2015), sea lion could be a product for exchanging with the inland communities. Huaca Negra could be a site exporting sea lion to inland communities, or to their coastal neighbors such as Gramalote, explaining why only a few sea lion remains were found in Huaca Negra.

There is one thing in common for these two seemingly opposed scenarios: sea lion was not a primary food resource consumed *in* Huaca Negra. This species was either being excluded from the subsistence activity or being exchanged rather than serving for consumption purposes. The two scenarios should remain open as current data from Huaca Negra is not sufficient to reach a conclusive answer. Regional data, such as stable isotope analysis on the diet of inland populations, may eventually shed light on this issue. In any case, the lack of sea lion remains at Huaca Negra shows an instance of distinct preferences and strategies that contrast with other early coastal sites.

D. The Collection and Consumption of Shellfish

Shellfish sheds light on the diverse behavior patterns in the two different catchment zones. After shellfish became the primary food resource, species collected from the nearby sandy beach continually dominated the assemblage (Figure 8.1), and the shellfish collectors had clear targets in mind within the sandy environment. This statement is supported by the low value of Simpson's Index of Diversity, especially when comparing with shellfish collected from rocky Cerro Prieto. The lower proportion and higher diversity of rocky species suggest that resources from this habitat played a supplemental role.

The nature of shellfish enables the identification of specific shellfish consumption events. In Huaca Negra, there is only one sporadic consumption event dated back to Phase 1. Among the remaining twenty-two events, fifteen are associated with Phase 3 and seven with Phase 4. Although the twenty-two events yielded a high density of shellfish remains, none of them are significant enough in scale to claim a community-level feasting event (Table 4.49, 4.50). It is also noteworthy that there was no preferred *event food*; common species from sandy and rocky environments are present and vary in proportion from one event to another. There is no evidence that people in one locale consumed only a certain kind of shellfish, which would have implied food preference and a possible monopoly over the specific catchment area.

Although it is in the context of the presence and use of larger-scale public architecture (Phase 3) that the consumption events were held most frequently, their small scale would not incorporate many consumers. In contrast to animals such as shark or sea lion that would be ideal feasting food for their large quantity of meat per individual, shellfish consumption here indicates a more ordinary daily consumption, and again, no attempt to accumulate surplus. Following Phase 3, the reduced number of identified consumption events in Phase 4 strata echoes the interpretation that the importance, intensity of usage of the site, and overall population may have declined during this time. Overall, all these events present here may have taken place within a household or between a few households.

In addition to this pattern, no worked shell was registered after examining more than thirty-eight thousand specimens. The purpose of collecting shellfish at Huaca Negra seems very simple and straightforward: shellfish was for consumption only.

8.2.2 Craft Goods, Exotic Resources and Local Production

8.2.2.1 Craft Production in Huaca Negra

Similar to many other Late Preceramic sites, many fewer artifacts were registered than subsistence remains in Huaca Negra. The limited data prevents a thorough investigation of the craft production system. However, evidence from Huaca Negra does suggest that several local craft activities happened in situ, including bone bead making, textile weaving, lithic tools, and ceramic production.

Local production of lithics is evident in Huaca Negra. Unit 6 is identified as a location for lithic production during Phase 3 and Phase 4, but the overall high proportion of lithic debitage suggests lithic making was not restricted to Unit 6. Evidence for local bone bead making is another remarkable discovery from Huaca Negra. The worked bone, semi-finished products, and final products reveal a somewhat standardized working process (Figure 5.10, 5.11). While few textiles are preserved, the weaving toolkits suggest this was another locally produced item in Huaca Negra.

Ceramic analysis is not the focus of this research, but a preliminary comparison was made between two Initial Period sub-phases to shed light on the cultural sequence. The result of this comparison suggests that other than a gradual changing pattern of firing technique and preferred decoration, ceramic form assemblage and manufacture technique remained relatively stable without dramatic change within the four-hundred-year-long Initial Period occupation. The stable pattern of craft production also applies to the other kinds of goods mentioned above.

Other than the infant burial in Phase 3 and the cluster of beads (including the ones made of exotic materials) in Phase 4, only fifteen beads were retrieved from other contexts. While the number is limited, only one of these beads is from a Phase 4 context, which implies a possible decline in the importance of bone bead making, replaced by beads made of exotic materials.

8.2.2.2 External Connections and Local Modification

In Huaca Negra, exotic materials are mainly constituted by non-local mineral and rock, with four exceptions of spondylus shell beads found in Unit 6, Phase 4. Unlike the dramatic change of subsistence activity, exotic goods in Huaca Negra increased gradually in quantity and diversity, indicating a growing emphasis on external social networks. Examining the type of exotic objects also indicates that 84% of exotic goods are from the inland Virú Valley, suggesting the inter-valley network was less emphasized. This scenario also fits the regional background that settlement pattern focus shifted toward the inland area, and reinforces the idea that the connection between coastal and inland communities could be important.

Another interesting pattern that can be discerned from Huaca Negra is a relatively stable exchange network. Although the types of exotic materials slightly changed through time, Figures 6.7-6.9 illustrate the distribution of six major provenance localities that are important throughout Phase 2 to Phase 4. It is only in Phase 4 that there are materials from further north (Spondylus) and further south (chrysocolla) registered. In general, these few instances point to much more extensive networks chained together in the Initial Period than before. However, the very limited examples of more distant goods also suggest sporadic longer distance interaction, most likely in an indirect form, getting these materials through other neighboring sites.

The nature and the intra-community distribution of the primary type of exotic material, crystal quartz, is more intriguing. In Huaca Negra, more debris than finished tools of crystal quartz were imported, and in fact most of the quartz did not have a clear utilitarian function. Thus, it was the nature of the raw material (such as the crystal clear color) that people aimed for. The quantity of crystal quartz is also unusually high: the 2-item per cubic meter yield is 250 times higher than Huaca Prieta (ca. 0.008/m^3) and 1,000 times higher than Gramalote (ca. 0.002/m^3), indicating its crucial role in this community.

Both the quantity and the ubiquity of crystal quartz dramatically increased over time (Table 6.3, 6.4). The total imported quantity increased, and the high quantity of quartz debitage indicates local modification. In addition, there was a tendency to diversify the ways of using this material. The increasing ubiquity also suggests that crystal quartz was *not a kind of resource that is monopolized by certain individuals in the community*. Instead, modification and chipping behavior facilitated the (re)distribution of this preferred exotic material, a unique pattern that has not been seen in other sites.

8.2.3 Two Interpretive Scenarios for Diachronic Change in Huaca Negra

The previous discussion demonstrates that (1) economic capital, in the form of subsistence resources, was not a resource that inhabitants of Huaca Negra aimed to accumulate. The shift from fishing to shellfish collecting, together with decreasing cotton cultivation, suggests lower labor investment for lower-threshold but less storable subsistence resources. (2) Overall, local craft production, categorized as cultural capital, remained relatively stable throughout the occupation history. The goal seems to have been to fulfill the needs of daily life rather than purposefully creating outstanding items for other social goals. (3) The trend of increasing exotic goods implies the increasing importance of inter-community connections. However, rather than accumulating non-local resources, people in Huaca Negra modified these exotic materials, incorporated them into a local context, and (re)distributed the products. Thus, increasing ubiquity rather than monopoly was the pattern observed in Huaca Negra. Overall, the examination of these three kinds of capital does not support a tendency of capital accumulation in any form. Instead, it reveals a unique pattern illustrating the developmental trajectory of Huaca Negra.

The most intriguing question remains why people shifted their focus from fish to shellfish, especially when the subsistence system and culinary practice tend to be a conservative aspect of human behavior. Although one would expect a dramatic shift in the subsistence system to be caused by significant factors such as environmental change or change in political power, this is not the case in Huaca Negra. The early time period and the material evidence both indicate an egalitarian society. In addition, the species composition, especially for shellfish, remains similar between phases, which can be taken as an indicator of a relatively stable coastal environment. In this section, two scenarios, one focused on internal processes, and the other on external factors, are proposed to explain this transition, and the overall nature of Huaca Negra.

8.2.3.1 The Manipulation of Labor as an Internal Process

It is considered as an internal process if the shift in subsistence focus was a result of positive choices made by the inhabitants in Huaca Negra. Table 4.73 summarizes the primary subsistence activities in Huaca Negra and compares the required expertise, time, tool preparation, and labor. Fishing requires a lot of beforehand preparation of tools, time investment on the sea, and expertise. The massive capture per trip and storable fishery resources are the rewards for the investment.

In contrast, the requirements of expertise and preparation for conducting shellfish collection are much lower, and *anyone* in the community could go to the beach and collect food resources for *daily consumption*. Although a serious gatherer can collect sufficient food for consumption, the quantity is not comparable to fish, especially shoal fish such as anchovy. Shellfish is also a less storable resource. Although it can be salted and preserved for a couple of days (e.g., Pozorski 1976), both the limited quantity per trip and the limited duration of preservation prevent shellfish from being a reliable resource for a large population.

Thus, one direct result of this transition is that the Huaca Negra community would not need as many experts, who presumably were capable of many other duties, to work on subsistence activity. As the available labor in this early fishing village might be limited, shifting the emphasized activities freed up manpower, which could be re-allocated to other activities in the community, including (but not limited to) mound construction. The simultaneously decreasing cottonseed suggests a decline not only in tool preparation (net making) but also in generating the raw material for tool making (cotton cultivation).

From this internal perspective, the scenario in Huaca Negra is significantly different from other Late Preceramic sites on the Peruvian coast. It is a common expectation that people tended to maximize the return of food resources, which then supported a large population and initiated the process of collectively constructing large-scale public architecture and other public activities. The trajectory in Huaca Negra, however, moved in the reverse direction, and sheds light on the Maritime Hypothesis: A more sophisticated approach (fishing) was abandoned, while a lower threshold one (shellfish gathering) was adopted as the community developed. The practice of shellfish gathering possibly fulfilled the short-term needs of the community, but also prevented the community from reaching a scale as significant as that observed in other Late Preceramic sites in the Peruvian coast.

8.2.3.2 Coastal-Inland Interaction as an External Factor

The population outside Huaca Negra could be an external factor accounting for the observed transition in Huaca Negra. Ethnographic records indicate that, in the southern coast of Peru, herders and farmers visit the coast seasonally, mainly between August and December (Masuda 1986). Since these people are not professional fishermen, they collect seaweed and clams for consumption and exchange (ibid). Prieto’s informant from Huanchaco also indicates that, until the 1950s, a few highlanders would come down and stay with fishermen between July and November. Here, these highlanders also gathered seaweed and, to a lesser extent, shellfish during their stay (Prieto 2015: 840).

Although one can’t assume the same pattern existed four thousand years ago, visitors from outside the community can still be considered a possible factor affecting the archaeological phenomena, especially for the Phase 3 and Phase 4 occupation when there were more non-local materials brought into the site. In this scenario, Huaca Negra could be a coastal locus that attracted inland or even highland people for transhumance or exchange purposes. During their stay, low-threshold shellfish gathering became their major subsistence activity. Thus, the observed transition might not be the result of local people reducing the weight of fishing activity. Instead, it could be an external population increasing the weight of shellfish remains.

Another possible scenario related to external population and exchange can be that fish resources were underrepresented at Huaca Negra in the later occupation because they were exchanged with inland communities. In this case, it was the movement of goods (fish) rather than people that skewed the proportion between fish and shellfish, a more popular interpretation in archaeological discourses (e.g., Pozorski and Pozorski 1979b; Shady 2006).

However, both possibilities addressed above would require more evidence for support, especially during the transition in the Late Preceramic Period. There is no inland or high altitude site dated back to such early occupation so far, which makes these stories less persuasive. In addition, for the hypothetisis involving population movement, it would require a considerable number of people or long stays to have such an effect that shellfish constantly outnumbered fish in *all* the contexts excavated. One would also expect much more evidence associated with inland material culture if a significant population regularly visited Huaca Negra, which is not evident from previous and current excavations. For the latter picture of exporting fishery resources, it would be hard to imagine that exchange played such a crucial role that local people changed their foodways and had almost *all* fish exported. Moreover, not only fish but also cotton declined in Phase 3 and 4, illustrating a scenario of decreasing fishing activity rather than simply exporting fish products.

Although it seems logical to exclude these explanations, especially for the Late Preceramic Period, they remain to possibilities and await more evidence from a regional scale. In addition, these two scenarios could still be valid for the Initial Period, as one would expect more significant coastal-inland interaction when there are more inland sites registered. During the Initial Period, people in Huaca Negra might have had stronger bonds with inland communities if some community members moved out, or if coastal inhabitants desired inland resources. The linear increment of crystal quartz and other exotic goods found in Phase 3 and Phase 4 occupation can be taken as supporting evidence for the existence of external factors here. Furthermore, while lacking absolute dates, the llama remains in the Templo de las Llamas found by Strong and Evans might be evidence of inland people visiting Huaca Negra.

While the current work focuses on an intra-site scale thus producing stronger evidence for internal processes focused on labor allocation, these internal and external explanations are not mutually exclusive. Instead, they might function differently at different phases of occupation. In any case, Huaca Negra is an example of a different trajectory in that we *do not* see a successful power strategy that leads to a salient leader standing out. Rather, we are seeing a more corporative kind of group-oriented organization (Blanton et al. 1996; Feinman 2000, Renfrew 1974) coping with the community-level project(s) in Phase 3. Here, group-oriented decision processes had a different approach toward capitals: the focus would be *allocation* rather than *accumulation*. This tendency might continue even when other populations were incorporated into play, mainly in Phase 4 and possibly Phase 3 as well. Overall, Huaca Negra presents evidence about allocation in all the discussed aspects: the economic, cultural, social capitals, and labor in the community.

8.3 A RECONSIDERATION OF THE PUBLIC/ DOMESTIC BINARY

The synthetic comparisons of economic capitals suggest that there is no clear evidence indicating possible aggrandizers in Huaca Negra. Instead, the focus was placed on capital *allocation* rather than *accumulation*, evidence which advocates for group-oriented social organization, and emphasizes collective rather than individual goals. This argument leads to the last topic of this research: the reconsideration of the domestic/ public dichotomy.

For Andean archaeologists, it is a common practice to categorize an excavated area as either public or domestic based on the nature of architecture. This procedure facilitates the interpretation of archaeological findings, but eventually creates a binary division of archaeological contexts. Huaca Negra, however, represents an example where various contexts are juxtaposed. Therefore, dividing space into the domestic/ public dichotomy would prevent a thorough understanding of the site.

Due to the long-term occupation, the nature of Huaca Negra changed over time. In Phase 2, there is no doubt that the accumulation of hundreds-year-long occupation constitutes the foundation of the mound. The scenario became more complex in Phase 3 than before. On the one hand, larger-scale architecture at a supra-household level indicates its public nature. On the other hand, the omnipresent debris, mainly subsistence remains from daily consumption more related to household activities. More specifically, I suggest that *people in Huaca Negra constructed "public," larger-scale architecture, but then used these spaces sometimes in quite "domestic" ways*.

In particular, the shellfish consumption events associated with the architecture are small in scale. In the revealed archaeological contexts in Phase 3, there is no clear-cut division to claim they are either public or domestic areas. Rather, the activities and nature of space might shift back and forth between the two ends of the spectrum. The scenario in Huaca Negra stimulates a reconsideration of the classification of space, and argues for a more flexible rather than rigid nature of space. This might be especially true in a small-scale village.

As a case that combines both long-term diachronic change and internal heterogeneity (mainly in Phase 3), Huaca Negra cannot be easily defined as a domestic or a monumental (public) site. Instead, moving beyond this dichotomy and considering the nature of this community, which incorporated household, supra-household, and public aspects, helps to reveal the nature of the occupation history.

A community approach can be a more neutral perspective that helps in addressing: (1) a longer-term occupation where the nature of the site might change from one period to another. (2) A group-oriented society where social hierarchy or leadership is less visible. (3) Archaeological contexts that lack architectural structures or layout for inferring spatial function. Nevertheless, this approach should also apply to contexts with more explicit spatial information, as it synthesizes diverse contexts for a better archaeological interpretation.

8.4 SITE, REGION, AND BEYOND

To sum up, this dissertation contributes to revising our knowledge of the early part of cultural history in the Virú Valley, which then sheds light on a broader comprehension of the Late Preceramic occupation in the coastal Andes. The investigation of three kinds of economic activities reveals the lifestyle in Huaca Negra and its diachronic changes. The most significant result of current work is the transition in subsistence activity, which enabled the accomplishment of the community-level construction project while keeping the community small in scale and relatively egalitarian. Huaca Negra started as a gradual accumulation of living debris and household floors, a “tell,” but eventually it became reworked, and large-scale architecture with “public” aspects was added. Examining the archaeological materials suggests Huaca Negra represents an intersection between the domestic and public spheres, which can be best understood from a neutral, community perspective.

The 2015 excavation is a dissertation project. On the one hand, it contributes important information to improving our understanding of the Late Preceramic society. On the other hand, the project was small in scale, and further investigation could make the picture complete. The fruitful results of current research lay the foundation for further investigation of Huaca Negra, and its place in a regional-scale discussion. Perspectives for future research are three-fold, as proposed in the following sections.

8.4.1 Further into Huaca Negra

There are several possible directions for further understandings of Huaca Negra, including:

(1) **Micro-botanical analysis:** the preservation of macro-botanical remain is not ideal. As it is commonly argued that both marine resources and plant products played roles in the coastal community, it is worth investigating micro-botanical remains from soil samples, or by conducting residue analysis. A thorough understanding of the role of cultigens would also helps clarify whether there was more labor invested in plant cultivation in this community.

(2) **Petrographic analysis of ceramics**: This research focused on the long-term change, and put less attention on ceramic analysis. However, ceramic could help compare with communities from inland and neighbor valleys, or with later cultures.

(3) **Architectural layout**: The excavation was designed to investigation domestic midden deposits and diachronic change in the first place. Although the excavation produced abundant

information about the occupation history, the trade-off was less information on architectural layout, which would provide a better archaeological context for interpretation. However, massive resources would be needed for running an excavation to reveal the horizontal layout in depth.

8.4.2 The Inland Virú Valley

It is known that Huaca Negra played a crucial role in early human occupation in the Virú Valley. Our understanding of Huaca Negra can be a starting point to investigate inter-community relationships and interaction, including:

(1) **The micro-regional relationship between communities**: A village rarely exists alone. Other than Huaca Negra, Willey registered two Preceramic sites (V314 and V315) that are close to Huaca Negra (Willey 1953). Before the 2015 field season, a preliminary survey was conducted. Although V315 was not identified, V314, 500 meters south of Huaca Negra, is confirmed as a site at a smaller scale and remains intact. During the fieldwork, other activity areas near Huaca Negra and along the coast were also noticed.

Current research establishes a fundamental understanding for the intra-community scenario. Starting from this and investigating other sites nearby would shed light on inter-village relationships, which can clarify social organization, and illuminate decisions about resource allocation and manipulation. Furthermore, as a "community" is not restricted to a single village, but can be formed between villages (e.g., Yaeger and Canuto 2000), studying the set of sites within a micro-regional scale could also enable the assessment of the community.

(2) **Coastal-Inland Relationships in the Virú Valley**: Echoing Willey's observation that populations started exploiting inland resources from the Initial Period, Huaca Negra also

witnessed an increasing focus on the inland network, represented by exotic goods. One question from this work would be: can we trace this network of interaction back to earlier periods and see external populations as the reason for the observed subsistence transition? A regional scale investigation would help to solve the questions left from section 3.23. Other concerns would be: what was, if any, the product exchanged to inland communities? Was fish exploited for exporting to inland communities? Moreover, were the trajectories of societal development similar or different between the two areas? These are questions that cannot be answered with only the data from Huaca Negra, but Huaca Negra is now a clear piece of the bigger picture for future study.

8.4.3 The Broader Scope of the Andean Late Preceramic, and Small Scale Community

Ideas gained from Huaca Negra generate new questions to be answered in future research. First of all, the case of Huaca Negra suggests that finer resolution on the Late Preceramic can be insightful. More study of long-term change over the Late Preceramic and the transition from the Later Preceramic to Initial Period is needed. More specifically, is the change in subsistence activity a unique strategy applied by inhabitants in Huaca Negra? Or, is this a pattern present at other communities on a similar scale? These are questions that cannot be answered by a synchronic snapshot at an archaeological site. Diachronic comparisons within sites are scarce but crucial and needed for assessing the issue of social change, especially for the Late Preceramic Period in the coast of Peru.

Archaeologists also need to reconsider how diverse the trajectories were of communities participating in the broader horizon of large-scale architectural construction in the Late Preceramic, the body of the Maritime Hypothesis. The case of Huaca Negra implies that people may have been engaging with larger scale construction in quite different ways, including ways that did not allow much space for aggrandizers to emerge. Thus, monument construction should not be taken as an indicator of complex society unconditionally.

The investigation in Huaca Negra also advocates for the reconsideration of the dichotomy of the public and domestic spheres. Ancient people did not work only with monument construction or domestic life. In the Late Preceramic, both aspects could be important aspects of people's social life, and archaeologists should incorporate both when investigating past culture. Huaca Negra is a rare case in that the two aspects are juxtaposed and can be studied together. In many cases, the focus on monuments could bias our understanding and interpretation of the Late Preceramic. On the one hand, more study on domestic life is needed, including at sites with significant monument construction. On the other hand, archaeologists should avoid the preconception of the public or domestic nature of space beforehand, as there might not always be a clear cut division between the two. More importantly, it is time to work more on incorporating both ends of the spectrum for archaeological investigation and thorough interpretation.

Last but not least, current research calls for attention to smaller scale society. The developmental trajectory towards complex society is a topic that has fascinated archaeologists for a long time. For this topic, large communities and monument construction are the evidence for arguing there was potential social hierarchy or the presence of leadership. Thus, they are the main focus of study. This tendency is especially true in the early coast of Peru, as the fundamental arguments of Maritime Hypothesis are based on large, monumental sites. The case of Huaca Negra demonstrates that *getting bigger and more complex is not the only trajectory* that archaeologists should expect to see when studying early social complexity. Instead, remaining small was an option. However, why does a sedentary community stay small? Is egalitarian social organization or group-oriented leadership itself the reason for the “holding back”, as a deliberate choice? Alternatively, is “being small” a consequence of factors such as strategies for resource exploitation, limited resources, or limited labor? Archaeologists can learn a great deal from something small, and more focus on communities at a smaller scale will provide the basis for comparative study to shed light on these questions.

APPENDIX A THE FOCUSED SHELLFISH AND SNAILS

The discussion of this dissertation is mainly based on the quantity of material remains. For the faunal remains, NISP is taken as the proxy of quantity, which then constituted the foundation for calculating density. Although most of faunal remains from 2015 excavation are already presented in the body of this dissertation, thus would not be repetitively showed in the appendix, I find the weight of shellfish can in an important information for further analysis and discussion. In this section, the weight of focused shellfish and snails (shown in Table 4.47) are provided, along with the provenance level and finer resolution for the sub-phases of occupation.

Table A.1 Aulacomya ater

Aulacomya ater							
Unit	Level	Context	Phase	Valve_L	Valve_R	Fragment	Weight
1	2	General	3b	1	3	5	1.1
1	3	General	3b	1	4	15	3.4
1	5	General	3b	1		3	1
1	12	General	3b		1	4	2.3
1	13	General	3b		1		0.4
1	14	General	3b			2	0.2
1	15	General	3b		1		1.2
1	1-4	Feature 1	3b	7	4	50	11.5
1	5	Feature 3	3b	1		3	2
1	13	Feature 6	3b	2	2	2	1.5
1		Feature 8	3b	2			0.5
3	2	General	4b	2	1	3	2.3
3	3	General	4b	7	8	34	19.7
3	4	General	4b	29	32	50	51.2
3	5	General	4a	13	10	36	25.4
3	6	General	4a		3	31	10.1
3	7	General	4a	1		6	3.3
3	8	General	4a	1		8	2.2
3	9	General	4a			5	1.6

Aulacomya ater							
Unit	Level	Context	Phase	Valve_L	Valve_R	Fragment	Weight
3	12	General	3b		1	4	0.7
3	13	General	3b	18	10	157	63.3
3	14	General	3b	9	15	175	53.2
3	15	General	3b	3	4	83	26.1
3	16	General	3b	2		8	2.7
3	19	General	3a		1	6	1.5
3	5	Feature 1	4a	6	3	11	9.2
3	13	Feature 7	3b	2	1	7	2.1
3	14	Feature 8	3b	18	20	185	56.8
5	2	General	4b	1		3	0.8
5	3	General	4b	2	4	51	14.7
5	4	General	4b	10	11	141	54.1
5	5	General	4b	1	4	32	7.9
5	6	General	4b	10	3	21	17.8
5	7	General	4b	1	3	3	4.1
5	8	General	4b	1	1		1.3
5	19	General	3b	2		3	1.3
5	20	General	3b	3	3	11	3.4
5	21	General	3b	4	6	18	7.7
5	22-23	General	3b	6	7	90	22.1
5	24	General	3b	1	2	12	3.4
5	27	General	3b	1	2	20	4.8
5	28	General	3b	9	6	42	13
5	30	General	3b	2	2	18	2.5
5	31	General	3b		1	31	3.8
5	32	General	3b	15	12	87	12
5	4-5	Feature 1	4b	6	8	45	17.5
6	8	General	4a	2			0.4
7	2	General	4b	2	1	1	0.8
7	3	General	4b	2	2	13	4.4
7	4	General	4b	12	9	17	10.4
7	5	General	4b	11	6	20	15.6
7	6	General	4b		2	9	5.7
7	7	General	4b	2	4	13	21.3
7	8	General	4a	5	8	76	24.2
7	9	General	4a	12	9	80	46.4
7	10	General	3b	4	8	43	21.1
7	11	General	3b	2		32	6.5
7	12	General	3b		1	24	2.8
7	16	General	2a	1			1.4
7	18	General	2a		1		0.4

Aulacomya ater							
Unit	Level	Context	Phase	Valve_L	Valve_R	Fragment	Weight
7	3	Feature 1	4b		1		0.3
7	7	Feature 4	4b	20	17	92	27.4
7	8	Feature 5	4a		1	2	1.7
7	7-13	Feature 6	4b	3	2	54	18
7	9	Feature 8	4a	193	185	685	374
7	12	Feature 9	3b	34	27	205	128.9

Table A.2 Choromytilus chorus

Choromytilus chorus							
Unit	Level	Context	Phase	Valve_L	Valve_R	Fragmented	Weight
1	2	General	3b	1		1	1
1	3	General	3b	2		2	15.1
1	15	General	3b	8	11	9	328.1
1	17	General	3a		1	17	72
1	18	General	3a	1		6	32
1	19	General	3a	2		20	109.3
1	20	General	3a	4	5	56	290.9
1	21	General	3a	1	2	20	144.4
1	22	General	3a	1		22	63.2
1	1-4	Feature 1	3b	2	1	8	28.7
1	4	Feature 2	3b		1	3	11.9
3	2	General	4b	1		5	17.3
3	3	General	4b		1	28	52.1
3	5	General	4a	1	1	57	133.4
3	6	General	4a	2	2	76	139
3	7	General	4a	1		26	53.6
3	12	General	3b	2	1	40	114.4
3	13	General	3b	1		18	68.9
3	14	General	3b	3	2	22	80.3
3	15	General	3b		1	21	87.1
3	16	General	3b	2	1	26	91.4
3	17	General	3a		1	33	119.2
3	18	General	3a	1		26	66.7
3	19	General	3a	1		28	102.8
3	20	General	3a		1	20	45.3
3	30	General	2a	1			1.2
3	5	Feature 1	4b		1	8	17.5
5	8	General	4b	1		18	88.3
5	9	General	4a	1	3	2	28
5	19	General	3b	1		27	114.8

Choromytilus chorus							
Unit	Level	Context	Phase	Valve_L	Valve_R	Fragmented	Weight
5	20	General	3b	3		51	169.7
5	21	General	3b	2	1	20	83.1
5	22	General	3b	1		19	69
5	23	General	3b		1	4	27.6
5	24	General	3b	2		4	42.2
5	27	General	3b	1	3	12	59.6
5	28	General	3b	2	1	22	29.2
5	30	General	3b	1		11	59.4
5	31	General	3a		1	4	26.2
6	9	General	4a	1		2	19.7
6	16	General	3b	1		21	58.7
7	4	General	4b		1	4	16.7
7	8	General	4a	6	6	40	64.1
7	9	General	4a	5	4	75	119.6
7	10	General	3b	6	12	96	161.4
7	11	General	3b	4	3	102	185.4
7	12	General	3b	1	1	46	147
7	13	General	3b	1		42	191.3
7	17	General	2a	1		1	37.1
7	18	General	2a		1		0.3
7	7	Feature 4	4b	1			1.1
7	9	Feature 5	4a		1		10.2
7	7-13	Feature 6	4b	12	12	107	158.6
7	8-9	Feature 7	4a	1		9	12.9
7	9	Feature 8	4a	47	39	79	108.7
7	12	Feature 9	3b	127	117	591	1135

Table A.3 Semimytilus algosus

Semimytilus algosus							
Unit	Level	Context	Phase	Valve_L	Valve_R	Fragmented	Weight
1	2	General	3b		1		0.1
1	5	General	3b	1			0.3
1	6	General	3b		1		0.2
1	7	General	3b		1		0.5
1	12	General	3b	1		1	0.6
1	13	General	3b	4		3	1.5
1	18	General	3a	1		2	0.5
1	19	General	3a	1			0.5
1	20	General	3a	2	2	2	1.5
1	25	General	3a			1	0.7

Semimytilus algosus							
Unit	Level	Context	Phase	Valve_L	Valve_R	Fragmented	Weight
1	4	Feature 1	3b	4	4	1	1
1	3-4	Feature 2	3b	1	4		0.8
1	18	Feature 10	3a	1			0.4
3	2	General	4b	1			0.4
3	3	General	4b	11	3	1	4.4
3	4	General	4b		3		0.6
3	5	General	4a	6	5	4	6
3	6	General	4a		4		0.8
3	8	General	4a		2	1	1
3	9	General	4a		1		0.1
3	13	General	3b	2	1		1
3	14	General	3b	1		1	0.4
3	15	General	3b	1	3	2	1.9
3	16	General	3b	3	2		1.4
3	17	General	3a	3	4	5	4.7
3	18	General	3a	1	6	4	3.8
3	19	General	3a	6	10	6	7.8
3	20	General	3a	5	7	10	6.2
3	21	General	3a	4	8	8	6.4
3	22	General	2b	5	2	8	4.5
3	23	General	2b	3	1	6	2.2
3	25	General	2b	1	2		0.9
3	26	General	2b	2		2	1.1
3	27	General	2b	1	3	3	1.9
3	28	General	2b	1	1	1	1.2
3	32	General	2a			1	0.3
3	14	Feature 8	3b	1			0.3
3	21	Feature 10	3a		1	1	0.9
5	2	General	4b	2	1		1.4
5	3	General	4b	4	5	2	2.7
5	4	General	4b	3	4		2.6
5	5	General	4b	8	6	1	5.7
5	6	General	4b		2		1.8
5	7	General	4b	1			1.1
5	10	General	4a			1	0.4
5	11	General	4a	1	1		1.4
5	12	General	4a		1	1	2.1
5	17	General	3b	1	1		1.4
5	18	General	3b	3	5	3	4.8
5	20	General	3b	1	2	1	1
5	21	General	3b	1		1	1

Semimytilus algosus							
Unit	Level	Context	Phase	Valve_L	Valve_R	Fragmented	Weight
5	22	General	3b		1		0.4
5	27	General	3b		1		0.3
5	28	General	3b	1		1	0.5
5	30	General	3b	2			1
5	32	General	3a	1	1		1.2
5	4	Feature 1	4b	2	2	2	1.9
5	5	Feature 3	4b	1			0.3
6	8	General	4b	1	2	1	1.3
6	40	General	1	77	86	167	138
6	41	General	1	50	50	98	15
6	42	General	1	8	4	17	2.6
7	3	General	4b	2	1	1	0.9
7	4	General	4b	3	1	1	1.1
7	5	General	4b	2	6		3
7	6	General	4b	2	2		2.1
7	8	General	4a		7	3.7	3.5
7	9	General	4a	2	5	3	3.1
7	10	General	3b	4	3		2.2
7	11	General	3b	4	2	7	4.4
7	14	General	2-3		1		0.5
7	7	Feature 4	4b	7	3		4.3
7	9	Feature 5	4a	1			0.5
7	7-13	Feature 6	4b	3	1	3	3.3
7	9	Feature 8	4a	75	76	19	54.4
7	12	Feature 9	3b		1		0.5

Table A.4 Semele corrugata

Semele corrugata							
Unit	Level	Context	Phase	Valve_L	Valve_R	Fragmented	Weight
1	1	General	3b	7	6	8	4.2
1	2	General	3b	26	18	32	20.7
1	3	General	3b	24	28	36	16.6
1	4	General	3b	1			0.3
1	5	General	3b	15	17	10	10.2
1	6	General	3b	6	8	9	5.2
1	7	General	3b	10	8	15	7.8
1	8	General	3b	1	2	2	1.6
1	9	General	3b			1	0.4
1	10	General	3b		1	2	0.8
1	11	General	3b	1	1	2	0.5

Semele corrugata							
Unit	Level	Context	Phase	Valve_L	Valve_R	Fragmented	Weight
1	12	General	3b	17	18	22	12.5
1	13	General	3b	14	9	7	6.9
1	14	General	3b	4	3	4	1.4
1	15	General	3b	4	7	4	4.3
1	16	General	3b	2			0.4
1	17	General	3a	61	56	24	26.2
1	18	General	3a	58	50	52	83.6
1	19	General	3a	139	117	152	78.9
1	20	General	3a	1	3	4	3.6
1	20	General	3a	24	24	24	17.8
1	21	General	3a	2	3	9	2.8
1	22	General	3a	3	4	3	1.3
1	23	General	3a	2	2	5	1.3
1	24	General	3a		1		0.3
1	25	General	3a	1		3	1.3
1	27	General	3a	1		2	0.5
1	30	General	3a		1	1	1
1	34	General	3a		1		0.5
1	36	General	3a	1			0.2
1	51	General	1	1		2	0.1
1	1-4	Feature 1	3b	17	25	20	75.3
1	2-5	Feature 2	3b	18	19	14	10.8
1	4-7	Feature 3	3b	10	11	22	10.3
1	11	Feature 5	3b	1	1	2	1.5
1	13	Feature 6	3b	2	3	8	2.9
1	16	Feature 8	3b	22	31	33	15.5
1	18	Feature 10	3a	50	64	54	28.6
3	1	General	4b	5	11	11	11.2
3	2	General	4b	26	28	25	37.4
3	3	General	4b	75	51	29	65.5
3	4	General	4b	58	60	23	55.2
3	5	General	4a	49	47	31	58.6
3	6	General	4a	25	21	18	16.4
3	7	General	4a	26	27	12	17.7
3	8	General	4a	26	22	21	33.7
3	9	General	4a	22	7	30	30.5
3	10	General	3b	1	1	15	27
3	11	General	3b	2	4	10	11.6
3	12	General	3b	28	31	57	116.4
3	13	General	3b	51	60	52	93
3	14	General	3b	49	65	44	47.5

Semele corrugata							
Unit	Level	Context	Phase	Valve_L	Valve_R	Fragmented	Weight
3	15	General	3b	36	58	48	32.6
3	16	General	3b	41	39	32	43.8
3	17	General	3a	20	26	32	38.1
3	18	General	3a	71	69	65	58.5
3	19	General	3a	87	78	55	47.7
3	20	General	3a	51	57	34	30.4
3	21	General	3a	65	68	56	52.1
3	22	General	2b	52	41	55	30.9
3	23	General	2b	53	53	56	35.6
3	24	General	2b	27	36	26	27.4
3	25	General	2b	13	13	23	14
3	26	General	2b	19	15	16	8.8
3	27	General	2b	35	20	53	22.6
3	28	General	2b	15	16	32	12.7
3	29	General	2b	3	4	2	2.4
3	30	General	2a			1	0.2
3	5	Feature 1	4a	13	8	5	10.6
3	12	Feature 4	3b	1			0.1
3	13	Feature 7	3b	1	4	3	1.4
3	14	Feature 8	3b	17	19	20	9.9
3	21	Feature 11	3a	21	26	38	23
5	1	General	4b	22	39	32	20.4
5	2	General	4b	137	123	92	83.7
5	3	General	4b	218	222	172	134.5
5	4	General	4b	165	173	133	111.1
5	5	General	4b	583	529	475	374.1
5	6	General	4b	69	59	57	85.3
5	7	General	4b	10	13	14	19.5
5	8	General	4b	9	7	5	5.8
5	9	General	4a	31	16	36	24.7
5	10	General	4a	16	11	22	18.3
5	11	General	4a	4	7	16	14.2
5	12	General	4a	3	3	8	7
5	14	General	3b	6	5	5	5.6
5	15	General	3b	2	3	3	1.8
5	16	General	3b	17	8	23	49.8
5	17	General	3b	23	27	77	25.3
5	18	General	3b	65	57	82	66.2
5	19	General	3b	6	9	11	7.1
5	20	General	3b	15	17	21	17.1
5	21	General	3b	13	9	15	9.8

Semele corrugata							
Unit	Level	Context	Phase	Valve_L	Valve_R	Fragmented	Weight
5	22	General	3b	8	11	34	14.5
5	23	General	3b	16	14	8	4.8
5	24	General	3b	12	8	5	5.3
5	27	General	3b	26	19	27	9.3
5	28	General	3b	18	19	29	12.6
5	30	General	3b	14	19	14	8.5
5	31	General	3a	9	8	10	5.7
5	32	General	3a	16	13	19	8.6
5	4-5	Feature 1	4b	150	168	130	97.7
5	5	Feature 3	4b	1	2	1	2.1
5	17-19	Feature 5	3b	490	394	348	203.4
5	17	Feature 5	3b	89	65	97	42.7
5	19	Feature 5	3b	17	14	26	8.4
6	1	General	4b	1		4	27.9
6	2	General	4b	13	11	13	39.4
6	3	General	4b	3	3	13	33.5
6	4	General	4b	1	1	2	71.5
6	5	General	4a	4	2	4	15.5
6	6	General	4a	6	8	6	67.6
6	7	General	4a	1	1	3	31.4
6	8	General	4a	1		2	22.4
6	9	General	4a	6	6	12	73.3
6	10	General	4a	2	2	2	2.5
6	11	General	4a		2	1	1.7
6	12	General	4a	4	2	6	5.4
6	13	General	3b			2	1.1
6	14	General	3b	12	18	16	12.1
6	15	General	3b	9	4	8	7.2
6	16	General	3b	2	3	14	2.8
6	18	General	3a	2		3	2.1
6	23	General	2b	1			0.6
6	40	General	1	1	1	5	1.9
6	45	General	1		1	1	12.9
6	47	General	1		1		16.8
6	7	Feature 1	4a	1			16.7
6	17	Feature 7	3a		1	1	1.1
7	1	General	4b	6	5	6	3.4
7	2	General	4b	17	19	17	13.4
7	3	General	4b	91	90	81	66.3
7	4	General	4b	96	86	70	77.6
7	5	General	4b	133	137	85	127

Semele corrugata							
Unit	Level	Context	Phase	Valve_L	Valve_R	Fragmented	Weight
7	6	General	4b	91	103	109	110.8
7	7	General	4b	105	125	114	65.4
7	8	General	4a	80	68	57	44.9
7	9	General	4a	21	28	46	22
7	10	General	3b	17	24	18	14.6
7	11	General	3b	11	9	22	8.9
7	12	General	3b	5	3	5	3.3
7	13	General	3b	6	6	13	5
7	14	General	2-3	1	5	8	5.2
7	15	General	2-3		1	2	2
7	16	General	2a	3	3	8	3.5
7	19	General	2a		1		0.5
7	3	Feature 1	4b		2	1	0.4
7	6	Feature 2	4b	4	1	2	1.3
7	6-9	Feature 3	4b	6	9	9	6.5
7	7	Feature 4	4b	42	30	17	25.8
7	8-11	Feature 5	4a	18	22	24	14.4
7	7-13	Feature 6	4b	41	50	52	25.3
7	8-9	Feature 7	4a	8	8	13	6.8
7	9	Feature 8	4a	30	40	27	18.2
7	12	Feature 9	3b	27	29	14	8.1
7	13	Feature 10	3b	1	3	11	3.5

Table A.5 Donax obesulus

Donax obesulus							
Unit	Level	Context	Phase	Valve_L	Valve_R	Fragmented	Weight
1	1	General	3b	1			0.8
1	2	General	3b	2	2	1	2.9
1	3	General	3b	9	8	1	16.7
1	5	General	3b	4	2	1	8
1	6	General	3b	5	1	2	8.5
1	7	General	3b	3	10	1	17.8
1	8	General	3b	4	4	2	19
1	9	General	3b	5	5	1	21.4
1	10	General	3b	1	3	4	13.4
1	11	General	3b	3	1		4.8
1	12	General	3b	19	18	5	42.1
1	13	General	3b	11	8	3	17.8
1	14	General	3b	1	2		2.5
1	15	General	3b	3	1		2.7

Donax obesulus							
Unit	Level	Context	Phase	Valve_L	Valve_R	Fragmented	Weight
1	17	General	3a	7	7	3	17.9
1	18	General	3a	3	4	2	8.6
1	19	General	3a	8	18	5	32.8
1	20	General	3a	32	34	8	77.8
1	21	General	3a	9	10	1	24.3
1	22	General	3a	7	5	3	13.6
1	23	General	3a	1		3	1.8
1	25	General	3a	3	2	1	3.1
1	26	General	3a	1	1	1	1.1
1	27	General	3a	3	1	6	3.7
1	31	General	3a		1		2.1
1	38	General	2b		1		1.3
1	1	Feature 1	3b	26	21	27	69.1
1	3	Feature 2	3b	7	7	2	11.9
1	4	Feature 3	3b	6	7		16.2
1	11	Feature 5	3b	5	6		23.8
1	13	Feature 6	3b	6	9	1	15.2
1	16	Feature 8	3b	9	10	2	19.7
1	18	Feature 10	3a	4	2	2	4.3
3	1	General	4b	9	12	6	20
3	2	General	4b	13	11	4	24.9
3	3	General	4b	38	53	5	97.3
3	4	General	4b	58	60	6	120.5
3	5	General	4a	53	59	13	116.9
3	6	General	4a	65	66	15	139.1
3	7	General	4a	44	49	11	81.7
3	8	General	4a	282	296	98	371.5
3	9	General	4a	159	185	84	271.3
3	10	General	3b	71	68	35	168.5
3	11	General	3b	40	34	23	95.5
3	12	General	3b	108	121	42	290.3
3	13	General	3b	39	50	28	117.8
3	14	General	3b	20	26	13	61.3
3	15	General	3b	26	28	14	65.5
3	16	General	3b	32	35	21	88
3	17	General	3a	82	87	38	171.2
3	18	General	3a	87	79	18	199.1
3	19	General	3a	69	69	11	162.2
3	20	General	3a	32	29	7	71.8
3	21	General	3a	19	20	6	46.2
3	22	General	2b	12	11	6	31.8

Donax obesulus							
Unit	Level	Context	Phase	Valve_L	Valve_R	Fragmented	Weight
3	23	General	2b	2	1		1.8
3	23	General	2b	15	12	7	34.9
3	24	General	2b	12	7	1	18.4
3	25	General	2b	3	8		11.8
3	26	General	2b	7	5	3	14.4
3	27	General	2b	11	12	2	25.9
3	28	General	2b	1	1	1	1.4
3	28	General	2b	4	3	2	7.9
3	29	General	2b		1		1.4
3	30	General	2a	1	1		2.6
3	33	General	2a	2			2.6
3	42	General	1	1			0.7
3	5	Feature 1	4a	14	7		21
3	14	Feature 8	3b	3	1		6.1
3	21	Feature 11	3a	1	1	1	2.3
5	1	General	4b	2	6	2	7.6
5	2	General	4b	12	13	2	24.2
5	3	General	4b	19	17	16	39
5	4	General	4b	12	15	9	31.9
5	5	General	4b	15	15	7	27.95.3
5	6	General	4b	11	11	2	28.5
5	7	General	4b	11	16		31.7
5	8	General	4b	14	20	4	35.1
5	9	General	4a	13	20	3	41.7
5	10	General	4a	11	20		33.2
5	11	General	4a	30	37	9	86.5
5	12	General	4a	5	2	4	10.1
5	14	General	3b	5	9	2	19.8
5	15	General	3b	21	19	3	42.9
5	16	General	3b	23	25	5	10
5	17	General	3b	23	26	8	52
5	18	General	3b	32	50	9	85.6
5	19	General	3b	16	13	4	34.1
5	20	General	3b	131	118	41	219.4
5	21	General	3b	63	62	19	110.6
5	22	General	3b	16	17	2	32.2
5	23	General	3b	26	25	6	62
5	24	General	3b	39	33	3	89.5
5	27	General	3b	2	1	1	2.2
5	28	General	3b	1	1	2	4.6
5	30	General	3b	1	1	2	3.6

Donax obesulus							
Unit	Level	Context	Phase	Valve_L	Valve_R	Fragmented	Weight
5	31	General	3a	2	2	1	3.7
5	32	General	3a	4			4.5
5	4	Feature 1	4b	9	12	3	21.8
5	5	Feature 3	4b		1	2	3.4
5	17	Feature 5	3b	28	17	5	46.6
6	1	General	4b	5	5	2	8.1
6	2	General	4b	13	12	2	18.3
6	3	General	4b	3	7	2	10.8
6	4	General	4b	9	4	2	15.1
6	5	General	4a	2			1.7
6	6	General	4a	2		1	1.1
6	7	General	4a	1	2	1	2
6	8	General	4a	2	3		5.2
6	9	General	4a	21	21	17	55.9
6	9	General	4a	8	10	6	25.3
6	10	General	4a	6	9	2	13
6	11	General	4a	10	5	3	14.2
6	12	General	4a		6	6	6.8
6	13	General	3b				4.6
6	14	General	3b			4	1.9
6	15	General	3b	4	3	5	8.7
6	16	General	3b	1	1	2	3.2
6	19	General	3a	1	1	1	3.9
6	20	General	3a			2	1.2
6	21	General	2b		1		1.5
6	23	General	2b	1			0.7
6	13	Feature 4	3b			2	0.7
6	16	Feature 6	3b		1		0.8
7	1	General	4b	1	2	2	4.3
7	2	General	4b	3	5	2	6.5
7	3	General	4b	11	8	2	16.4
7	4	General	4b	19	15	2	35.7
7	5	General	4b	14	21	3	36.8
7	6	General	4b	26	34	7	51.1
7	7	General	4b	10	14	1	21.8
7	8	General	4a	9	10	2	19.7
7	9	General	4a	5	6	1	9.1
7	10	General	3b	2	3		5.1
7	11	General	3b	3	1	1	4.3
7	13	General	3b		1		0.6
7	14	General	2-3		2		2.4

Donax obesulus							
Unit	Level	Context	Phase	Valve_L	Valve_R	Fragmented	Weight
7	15	General	2-3	2	3		2.7
7	6	Feature 2	4b	1			1
7	6-9	Feature 3	4b		3		2.3
7	7	Feature 4	4b	5	1		7
7	8-10	Feature 5	4a	3	6	1	12.2
7	7-13	Feature 6	4b	6	7	2	14.4
7	8-9	Feature 7	4a	3	2	1	8.3
7	9	Feature 8	4a	1	2		3.5
7	13	Feature 10	3b	1			0.8

Table A.6 Prisogaster niger

Prisogaster niger					
Unit	Level	Context	Phase	NISP	Weight
1	3	General	3b	4	5.7
1	5	General	3b	5	3.5
1	6	General	3b	2	2.9
1	7	General	3b	3	2.4
1	8	General	3b	4	1.6
1	10	General	3b	3	1
1	11	General	3b	2	2.2
1	12	General	3b	4	6.5
1	13	General	3b	6	7
1	15	General	3b	1	1.2
1	17	General	3a	1	0.4
1	18	General	3a	4	2.1
1	19	General	3a	8	9
1	19	General	3a	4	4.2
1	19	General	3a	1	0.4
1	20	General	3a	12	13.3
1	21	General	3a	1	3
1	22	General	3a	5	5.4
1	23	General	3a	1	0.2
1	25	General	3a	6	5.4
1	27	General	3a	1	3.1
1	4	Feature 1	3b		0.2
1	3	Feature 2	3b	4	1.9
1	4-6	Feature 3	3b	5	5
1	11	Feature 5	3b	5	12.9
1	13	Feature 6	3b	1	1.5
1	16	Feature 8	3b	10	14.7

Prisogaster niger					
Unit	Level	Context	Phase	NISP	Weight
1	18	Feature 10	3a	4	5.1
3	1	General	4b	2	0.7
3	2	General	4b	2	0.8
3	3	General	4b	13	13.8
3	4	General	4b	9	11.1
3	5	General	4a	14	15.5
3	6	General	4a	16	16.6
3	7	General	4a	13	17.8
3	8	General	4a	14	12.8
3	9	General	4a	16	9.2
3	10	General	3b	3	1.6
3	11	General	3b	4	6.4
3	12	General	3b	21	29.5
3	13	General	3b	52	47.2
3	14	General	3b	30	33.4
3	15	General	3b	40	40.5
3	16	General	3b	27	26.6
3	17	General	3a	24	24.8
3	18	General	3a	20	30
3	19	General	3a	28	22.2
3	20	General	3a	14	8.8
3	21	General	3a	15	12.1
3	22	General	2b	4	3.7
3	23	General	2b	16	19.5
3	24	General	2b	4	6.3
3	25	General	2b	8	6.5
3	26	General	2b	5	11.6
3	27	General	2b	13	10.1
3	28	General	2b	8	7.8
3	29	General	2b	7	3.1
3	5	Feature 1	4a	3	3
3	13	Feature 7	3b	1	0.1
3	14	Feature 8	3b	10	5.8
3	21	Feature 11	3a	7	4.9
5	1	General	4b	1	1.2
5	2	General	4b	10	15.1
5	3	General	4b	21	25.3
5	4	General	4b	12	16.4
5	5	General	4b	11	8.4
5	6	General	4b	9	12
5	7	General	4b	5	6.9

Prisogaster niger					
Unit	Level	Context	Phase	NISP	Weight
5	8	General	4b	2	5
5	9	General	4a	13	15.7
5	10	General	4a	3	6.8
5	11	General	4a	8	10
5	12	General	4a	4	6.4
5	14	General	3b	1	2.4
5	15	General	3b	1	1.5
5	16	General	3b	3	2.7
5	17	General	3b	6	12
5	18	General	3b	16	20.7
5	19	General	3b	2	1.6
5	20	General	3b	6	6.2
5	21	General	3b	4	6.7
5	22	General	3b	4	3.5
5	23	General	3b	1	1.6
5	27	General	3b	3	2.1
5	28	General	3b	8	12.9
5	30	General	3b	2	3.4
5	31	General	3a	1	1.1
5	32	General	3a	3	1.5
5	5	Feature 3	4b	2	3.5
5	4	Feature 1	4b	6	7.5
5	18-19	Feature 5	3b	4	5.9
6	2	General	4b	1	0.5
6	9	General	4a	6	5.3
6	10	General	4a	3	7.1
6	11	General	4a	1	1.1
6	12	General	4a	12	16.3
6	13	General	3b	3	3.4
6	14	General	3b	5	5.9
6	15	General	3b	11	12.7
6	16	General	3b	6	3.2
6	17	General	3a	5	13.2
6	20	General	3a	3	4.5
6	21	General	2b	1	0.8
6	29	General	2a	1	1.4
6	31	General	2a	3	1.4
6	32	General	2a	1	0.7
6	40	General	1	1	0.2
6	13	Feature 4	3b	1	1
6	16	Feature 6	3b	1	2.4

Prisogaster niger					
Unit	Level	Context	Phase	NISP	Weight
6	18	Feature 8	3a	1	2
7	2	General	4b	3	3.5
7	3	General	4b	17	16.2
7	4	General	4b	25	20.9
7	5	General	4b	25	25
7	6	General	4b	26	23.4
7	7	General	4b	5	8.4
7	8	General	4a	14	14.6
7	9	General	4a	12	9.6
7	10	General	3b	12	14.9
7	11	General	3b	10	12.1
7	12	General	3b	11	8.7
7	13	General	3b	2	2.4
7	14	General	2-3	8	9.6
7	15	General	2-3	6	5.6
7	18	General	2a	1	2.7
7	6	Feature 2	4b	2	1.2
7	6	Feature 3	4b	2	1
7	7	Feature 4	4b	43	33.9
7	8-10	Feature 5	4a	31	60.2
7	7-13	Feature 6	4b	15	22.2
7	8-9	Feature 7	4a	1	1
7	9	Feature 8	4a	8	5.9
7	12	Feature 9	3b	13	14.5
7	14	Feature 10	2-3	2	0.8
7	14	Feature 11	2-3	1	0.4

Table A.7 Polinices uber

Polinices uber					
Unit	Level	Context	Phase	NISP	Weight
1	1	General	3b	13	9.5
1	2	General	3b	11	13.7
1	3	General	3b	7	16.9
1	5	General	3b	1	0.7
1	7	General	3b	1	1.9
1	9	General	3b	1	0.3
1	12	General	3b	6	18.4
1	13	General	3b	5	8.6
1	14	General	3b	1	0.1
1	15	General	3b	1	0.1

Polinices uber					
Unit	Level	Context	Phase	NISP	Weight
1	16	General	3b	1	0.6
1	17	General	3a	5	4.4
1	18	General	3a	1	0.1
1	19	General	3a	5	4.1
1	20	General	3a	6	11.9
1	21	General	3a	1	2.7
1	22	General	3a	8	16.2
1	27	General	3a	1	2
1	30	General	3a	1	1.9
1	1-4	Feature 1	3b	3	4.8
1	2-3	Feature 2	3b	2	3.1
1	5-6	Feature 3	3b	4	5.6
1	16	Feature 8	3b	3	3.6
1	18	Feature 10	3a	3	6.3
3	1	General	4b	16	15.3
3	2	General	4b	25	20
3	3	General	4b	19	28.5
3	4	General	4b	17	32.7
3	5	General	4a	24	58.8
3	6	General	4a	22	63.2
3	7	General	4a	10	17.6
3	8	General	4a	19	46.5
3	9	General	4a	15	29.6
3	10	General	3b	16	22.2
3	11	General	3b	12	25
3	12	General	3b	36	64.2
3	13	General	3b	52	52
3	14	General	3b	38	37.3
3	15	General	3b	29	19.7
3	16	General	3b	33	45.2
3	17	General	3a	79	148.7
3	18	General	3a	62	133.2
3	19	General	3a	34	59.9
3	20	General	3a	35	65.1
3	21	General	3a	26	39.7
3	22	General	2b	25	43.1
3	23	General	2b	25	42.1
3	24	General	2b	8	14.7
3	25	General	2b	10	20.1
3	26	General	2b	12	15.9
3	27	General	2b	8	8.4

Polinices uber					
Unit	Level	Context	Phase	NISP	Weight
3	28	General	2b	4	5
3	29	General	2b	3	1.8
3	5	Feature 1	4a	4	5.4
3	12	Feature 6	3b	1	0.5
3	13	Feature 7	3b	2	2
3	14	Feature 8	3b	7	7.8
3	21	Feature 11	3a	3	3
5	1	General	4b	5	4.4
5	2	General	4b	14	27.5
5	3	General	4b	14	17.2
5	4	General	4b	4	2.5
5	5	General	4b	19	30.9
5	6	General	4b	9	20.8
5	7	General	4b	10	20.6
5	8	General	4b	11	25.7
5	9	General	4a	13	23.5
5	10	General	4a	27	77.1
5	11	General	4a	34	73.1
5	12	General	4a	18	40.7
5	15	General	3b	4	8.5
5	16	General	3b	4	12.4
5	17	General	3b	14	26.2
5	18	General	3b	25	40.5
5	19	General	3b	12	15.2
5	20	General	3b	11	16.3
5	21	General	3b	5	7.6
5	22	General	3b	6	8
5	23	General	3b	8	17.5
5	27	General	3b	4	2.6
5	28	General	3b	3	4.3
5	30	General	3b	2	2.6
5	31	General	3a	1	1.2
5	5	General	4b	2	2.6
5	19	General	3b	3	4.5
6	1	General	4b	9	13.1
6	2	General	4b	3	2.5
6	3	General	4b	9	12.5
6	4	General	4b	2	4.2
6	6	General	4a	2	2.3
6	7	General	4a	6	4.5
6	8	General	4a	1	1.9

Polinices uber					
Unit	Level	Context	Phase	NISP	Weight
6	9	General	4a	19	40.9
6	10	General	4a	12	19.4
6	11	General	4a	15	23.2
6	12	General	4a	25	45.5
6	13	General	3b	3	6
6	14	General	3b	5	3.6
6	15	General	3b	4	3.9
6	19	General	3a	1	1.8
6	20	General	3a	1	6.8
6	25	General	2b	1	4
6	26	General	2a	2	1.3
6	29	General	2a	1	1.3
7	1	General	4b	14	16
7	2	General	4b	14	22.3
7	3	General	4b	30	40.2
7	4	General	4b	19	25.4
7	5	General	4b	20	41.2
7	6	General	4b	25	50.1
7	7	General	4b	14	17.1
7	8	General	4a	6	12.6
7	9	General	4a	9	20
7	10	General	3b	2	3.4
7	11	General	3b	4	6.3
7	12	General	3b	1	0.3
7	13	General	3b	1	1.4
7	14	General	2-3	4	3.1
7	15	General	2-3	5	3.2
7	6	Feature 2	4b	1	7.5
7	6	Feature 3	4b	2	1.1
7	7	Feature 4	4b	12	15.4
7	8	Feature 5	4a	73	188.6
7	7-13	Feature 6	4b	12	15.7
7	13	Feature 10	3b	1	0.5

Table A.8 Nassarius dentifer

Nassarius dentifer					
Unit	Level	Context	Phase	NISP	Weight
1	1	General	3b	17	7
1	2	General	3b	25	13
1	3	General	3b	6	1.6
1	5	General	3b	5	1.1
1	6	General	3b	1	0.1
1	7	General	3b	3	0.8
1	8	General	3b	2	5.1
1	9	General	3b	1	0.2
1	10	General	3b	1	0.4
1	11	General	3b	2	0.5
1	12	General	3b	10	3
1	13	General	3b	7	1.6
1	14	General	3b	4	1.3
1	15	General	3b	4	0.9
1	17	General	3a	8	2.3
1	18	General	3a	4	0.8
1	19	General	3a	32	6.9
1	20	General	3a	29	7.5
1	21	General	3a	7	2.2
1	22	General	3a	9	1.4
1	23	General	3a	4	0.5
1	24	General	3a	2	0.2
1	25	General	3a	4	1.8
1	26	General	3a	1	0.2
1	31	General	3a	1	0.8
1	33	General	3a	1	0.1
1	48	General		1	0.5
1	4	Feature 1	3b	3	1
1	3-4	Feature 2	3b	2	0.6
1	5-7	Feature 3	3b	5	2.6
1	11	Feature 5	3b	1	0.3
1	13	Feature 6	3b	5	1.2
1	16	Feature 8	3b	27	6.9
1	18	Feature 10	3a	18	4
3	1	General	4b	31	15.5
3	2	General	4b	14	5.1
3	3	General	4b	11	3.7
3	4	General	4b	17	4.3
3	5	General	4a	18	5.3
3	6	General	4a	28	8.3

Nassarius dentifer					
Unit	Level	Context	Phase	NISP	Weight
3	7	General	4a	32	9.6
3	8	General	4a	22	5.9
3	9	General	4a	34	13.1
3	10	General	3b	17	7.8
3	11	General	3b	13	4.5
3	12	General	3b	77	23.1
3	13	General	3b	556	144.1
3	14	General	3b	389	91.1
3	15	General	3b	355	83.5
3	16	General	3b	193	54.4
3	17	General	3a	52	21.3
3	18	General	3a	51	16.6
3	19	General	3a	44	13.2
3	20	General	3a	29	9.5
3	21	General	3a	11	3.6
3	22	General	2b	5	2.3
3	23	General	2b	8	3.2
3	24	General	2b	3	1
3	25	General	2b	4	0.7
3	26	General	2b	3	0.8
3	27	General	2b	9	1.9
3	28	General	2b	6	2.2
3	29	General	2b	3	0.5
3	30	General	2a	1	0.1
3	12	Feature 4	3b	1	0.2
3	13	Feature 7	3b	15	2.9
3	14	Feature 8	3b	171	33.9
3	21	Feature 11	2a	5	1.9
5	1	General	4b	9	3.9
5	2	General	4b	39	15.4
5	3	General	4b	49	16.4
5	4	General	4b	20	7.4
5	5	General	4b	42	11.4
5	6	General	4b	14	4.3
5	7	General	4b	6	1.9
5	8	General	4b	3	0.9
5	9	General	4a	15	5.5
5	10	General	4a	11	5.2
5	11	General	4a	8	4.2
5	12	General	4a	9	4.2
5	14	General	3b	4	2.5

Nassarius dentifer					
Unit	Level	Context	Phase	NISP	Weight
5	15	General	3b	4	1.3
5	16	General	3b	6	2.3
5	17	General	3b	6	2.2
5	18	General	3b	11	4.3
5	19	General	3b	6	2.4
5	20	General	3b	10	4
5	21	General	3b	6	3.1
5	22	General	3b	4	1.1
5	23	General	3b	2	1.2
5	24	General	3b	2	0.9
5	27	General	3b	4	1.5
5	28	General	3b	4	2
5	30	General	3b	2	1
5	31	General	3a	2	1.2
5	4-5	Feature 1	4b	10	3.2
5	17-18	Feature 5	3b	11	3.8
6	1	General	4b	17	9
6	2	General	4b	7	3.5
6	3	General	4b	1	0.6
6	4	General	4b	6	4.1
6	5	General	4a	3	1.3
6	6	General	4a	2	1.4
6	7	General	4a	9	3.7
6	8	General	4a	1	1
6	9	General	4a	11	4.2
6	10	General	4a	7	2.6
6	11	General	4a	8	2.7
6	12	General	4a	12	5.3
6	13	General	3b	5	2.2
6	14	General	3b	2	0.4
6	15	General	3b	16	5.5
6	16	General	3b	1	1
6	18	General	3a	1	1.1
6	25	General	2b	1	0.4
6	13	Feature 4	3b	1	1
7	1	General	4b	22	11.2
7	2	General	4b	38	16.1
7	3	General	4b	60	20.1
7	4	General	4b	72	23.3
7	5	General	4b	78	29
7	6	General	4b	61	24.4

Nassarius dentifer					
Unit	Level	Context	Phase	NISP	Weight
7	7	General	4b	46	14.9
7	8	General	4a	18	2.3
7	9	General	4a	24	7.1
7	10	General	3b	5	1.7
7	11	General	3b	4	1.4
7	12	General	3b	2	1.2
7	13	General	3b	6	2.3
7	14	General	2-3	6	2.4
7	15	General	2-3	1	0.4
7	16	General	2a	1	0.3
7	17	General	2a	1	0.8
7	3	Feature 1	4b	2	0.8
7	6	Feature 2	4b	3	1.1
7	6	Feature 3	4b	3	0.5
7	7	Feature 4	4b	70	18.5
7	8-10	Feature 5	4a	30	11.7
7	7-13	Feature 6	4b	28	9.9
7	8-9	Feature 7	4a	7	2.2
7	9	Feature 8	4a	1	0.7
7	13	Feature 10	3b	3	1

APPENDIX B FIBER REMAINS

Information of unearthed fibers from the 2015 excavation in Huaca Negra is provided in the following table.

Table A.9 Fibers from the 2015 excavation

Unit	Level	Phase	Context	Category	Material	fiber	
						retorsion	diameter (mm)
1	2	3b		Fiber	cotton	right	0.71
1	2	3b		Fiber	cotton	left	1.28
1	2	3b		Fiber	cotton	right	3.21
1	3	3b		Basketry	other fiber	left	2.15
1	3	3b		Fiber	cotton	left	1.44
1	3	3b	Feature 2	Basketry	other fiber	right	6.05
1	3	3b		Fiber	cotton	left	0.97
1	3	3b		Fiber	cotton	left	1.69
1	3	3b		Basketry	other fiber	right	1.96
1	3	3b	Feature 3	Fiber	cotton	left	0.92
1	4	3b		Textile	cotton	.	.
1	4	3b	Feature 1	Fiber	cotton	left	1.3
1	5	3b		Fiber	cotton	left	0.87
1	5	3b		Fiber	Lana	left	1.08
1	5	3b	Feature 2	Fiber	cotton	left	1.08
1	5	3b	Feature 2	Fiber	cotton	left	1.62
1	6	3b		Textile	cotton	.	.
1	6	3b		Fiber	cotton	left	1.36
1	6	3b		Fiber	cotton	right	1.09
1	6	3b		Fiber	cotton	left	0.9
1	7	3b		Fiber	cotton	left	1.45
1	8	3b		Fiber	cotton	left	0.91
1	8	3b		Fiber	cotton	right	1.36
1	8	3b		Basketry	other fiber	right	13.16
1	10	3b		Fiber	cotton	left	0.99
1	14	3b	Feature 7	Fiber	cotton	right	1.27
1	14	3b	Feature 7	Fiber	cotton	left	0.66
1	15	3b		Fiber	cotton	right	0.99
1	15	3b		Fiber	cotton	left	1.23
3	3	4b		Textile	cotton	.	.
3	4	4b		Fiber	cotton	left	1.3
3	4	4b		Fiber	cotton	left	1.4

Unit	Level	Phase	Context	Category	Material	fiber	
						retorsion	diameter (mm)
3	4	4b		Fiber	cotton	left	1.7
3	4	4b		Fiber	cotton	left	2.25
3	4	4b		Fiber	cotton	right	1.7
3	4	4b		Textile	cotton	.	.
3	4	4b		Textile	cotton	.	.
3	5	4a		Textile	cotton	.	.
3	5	4a		Textile	cotton	.	.
3	5	4a		Textile	cotton	.	.
3	5	4a	Feature 1	Textile	cotton	.	.
3	5	4a	Feature 1	Textile	cotton	.	.
3	6	4a		Fiber	cotton	left	0.97
3	6	4a		Fiber	cotton	left	2.51
3	6	4a		Fiber	cotton	right	1.95
3	6	4a		Fiber	cotton	left	1.55
3	6	4a		Fiber	cotton	right	2.19
3	7	4a		Fiber	cotton	left	0.97
3	7	4a		Fiber	cotton	left	2.26
3	8	4a		Fiber	cotton	right	1.68
3	15	3b		Fiber	cotton	left	0.98
3	25	2b		Fiber	cotton	right	1.12
3	25	2b		Fiber	cotton	left	0.83
3	27	2b		Fiber	cotton	right	1.54
3	27	2b		Fiber	cotton	right	0.85
3	29	2b		Fiber	cotton	right	1.12
3	30	2a		Fiber	cotton	left	0.88
3	31	2a		Fiber	cotton	right	1.88
3	36	1	Feature 17	Fiber	cotton	left	1.7
5	3	4b		Raw material	wool	.	.
5	4	4b		Fiber	cotton	left	1.16
5	4	4b	Feature 1	Textile	cotton	.	.
5	5	4b		Fiber	cotton	left	1.13
5	5	4b		Fiber	cotton	left	0.88
5	5	4b	Feature 1	Fiber	cotton	right	1.23
5	5	4b	Feature 1	Fiber	cotton	left	2.22
5	5	4b		Textile	cotton	.	.
5	6	4b		Fiber	cotton	left	1.81
5	6	4b		Fiber	cotton	left	0.74
5	7	4b		Fiber	other fiber	.	.
5	7	4b		Textile	cotton	.	.
5	7	4b		Textile	cotton	.	.
5	7	4b		Textile	cotton	.	.
5	7	4b		Textile	cotton	.	.

Unit	Level	Phase	Context	Category	Material	fiber	
						retorsion	diameter (mm)
5	8	4b		Fiber	cotton	left	1
5	8	4b	Feature 2	Fiber	cotton	left	1.5
5	9	4a		Fiber	cotton	left	1
5	9	4a		Fiber	cotton	left	2.19
5	9	4a		Fiber	cotton	left	1.39
5	10	4a		Fiber	cotton	left	2.03
5	10	4a		Fiber	cotton	left	1.37
5	10	4a		Fiber	cotton	left	1.1
5	12	4a		Fiber	cotton	left	0.49
5	12	4a		Fiber	cotton	right	0.83
5	12	4a		Fiber	cotton	right	1.69
5	30	3b	Burial	Fiber	cotton	left	0.66
5	31	3a		Fiber	cotton	left	1.08
5	32	3a		Fiber	cotton	left	2.48
5	Profile	4		Fiber	cotton	right	1.6
5	Profile	4		Fiber	cotton	left	2.39
6	7	4a		Textile	cotton	.	.
7	16	2a		Fiber	cotton	left	0.86
7	12-13	4b	Feature 6	Textile	cotton	.	.

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