CALIFORNIA STATE UNIVERSITY, NORTHRIDGE

# DIFFERENTIAL ACCESS TO RESOURCES AND THE EMERGING ELITE: OBSIDIAN AT LA BLANCA

A thesis submitted in partial fulfillment of the requirements

For the degree of Master of Arts in Anthropology,

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By

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# Abstract


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This thesis presents the results of a comparative analysis of obsidian artifacts recovered from five household contexts at La Blanca. Although situated in the shadow of Guatemala’s volcanic mountains, the inhabitants of La Blanca had limited access to obsidian; this presents a unique opportunity to examine differences in access to this valuable resource. The distribution of obsidian at La Blanca reflects the emerging dominance of the elite as well as the resistance of non-elites to the loss of household autonomy. This paper explores this dichotomy and its effects on the development of regional complex social systems.

# Chapter 1. Introduction and Theoretical Framework

The archaeological site of La Blanca is located on the Pacific Coast of southern Mesoamerica, in the Municipio of Ocós, San Marcos, Guatemala. In the Middle Formative Period (1100-400 cal. B.C.), La Blanca was the seat of a complex chiefdom and a large, important regional center. Middle Formative La Blanca society was characterized by a significant level of social complexity and notable differences among elite and non-elite households. However, the degree of control that La Blanca elites were able to assert over various aspects of the economy, including access to imported goods such as obsidian, is uncertain. In this thesis, I examine the degree of control La Blanca elites had over access to obsidian, by looking at variation in the density of obsidian present in elite versus non-elite households. My results will increase our understanding of the development of social complexity in Middle Formative Mesoamerica.

The development of social inequality and complex society is an enduring subject among anthropologists. Many theorists have focused on the origins of social and economic inequality and how it came to be that a few individuals were able to consolidate wealth, status, and power, and to pass these things onto the next generation (see Bogoucki 1999 for a good overview on the subject). Hayden (2001) provides an excellent summary of many of the most commonly espoused models of the origins of social complexity, which propose different causal conditions for the development of social complexity. These models present a wide array of underlying conditions and causes of the beginnings of social complexity, including functional models that stress that elites increase power by working for the greater good of the community; relativistic models that argue that social complexity develops purely by chance; and political models that put forward the notion that burgeoning elites are self-interested aggrandizers who trick the rest of the population into surrendering wealth, power, or status to them (Hayden 2001).

Although they vary considerably in explaining how social and economic inequality took root, all of these models attempt to answer the question of how some members of society were able to gain power over others and, as a result, accumulate wealth. Theories of social evolution commonly address the question of how a few individuals were able to gain increased status, wealth, and power at the expense of other individuals' status, wealth, and power. After this first step, the next logical question is: how were the emerging elites able to consolidate their position (Mann 2003)? To answer this question, some scholars (e.g. Earle 1991, 1997) have moved beyond the discussion of the origins of social complexity, and have focused on the social and political processes through which some early complex societies evolve into more complex chiefdoms and, eventually states.

The idea that it is possible to better understand how emerging elites were able to consolidate control through they study of political cycling – periods of increased centralization and elite control alternating with periods of political collapse – is a unique approach to the problem. Flannery (1972:421) was an early proponent of the notion of political cycling and state formation, though at the time he was primarily focused on the notion of creating a "generative model for the state." Marcus (1992, 1998) developed the notion of cycling in early states, tracing periods of increased centralization followed by collapse in the Maya region during the Classic Period. Her "Dynamic Model" can, she contends, be applied more broadly to other areas of the world where early states formed, including Mexico, Mesopotamia, the Andes, Egypt, and the Aegean.

More recently, Anderson's (1994) study of Mississippian chiefdoms provides a comprehensive examination of political cycling in chiefdoms. Anderson argues that cycling is inherently characteristic of chiefdoms, and that both stabilizing and destabilizing elements are present in societies with chiefdom-level sociopolitical organization. Among these, a primary destabilizing factor is competition among the elite in chiefdoms for status, wealth, and power. He further asserts that an established ideology legitimizing elite control is the most significant stabilizing factor in chiefdoms. Chiefdoms without such an ideology of power will have to rely on coercion through force or incentives such as redistribution of wealth in order to maintain their status. Thus, he contends, cycling between simple (i.e., with two-level administrative hierarchies) and complex (i.e., with one level of administrative hierarchy) is to be expected.

Wright (1986) and others (e.g. Anderson 1994, Junker 1999) argue that long periods of political cycling between simple and complex chiefdoms precede state formation in many areas of the world, including the Mesopotamia, Mesoamerica, Mexico, and South America. Cycling is thus closely tied to early state formation, and, as illustrated by Marcus (1988), periods of increased centralization continues to be followed by sociopolitical collapse in early states. It seems logical to conclude that political cycling can produce increasingly complex forms of social organization, that elites of each successive polity have increased wealth, power, and status, and that the expected outcome of the process is state formation.

However, this does not seem to be the consensus at all; rather, many archaeologists argue that political cycling in chiefdoms does not result in increased sociopolitical complexity, and that state formation occurs rather abruptly (Anderson 1994; Junker 1999; Marcus 1998; Wright 1986). To further investigate whether political cycling produces chiefdoms that are increasingly complex, it is helpful to study elite wealth, power, and status in multiple contexts in the same region. Such a comparative analysis will help us better understand if social inequality gradually increased over a long period of political cycling.

It is equally important to consider the corresponding development to increased sociopolitical centralization: the decrease in the autonomy of non-elites. Love (1991:48) argues that too often archaeologists discuss inequality in the functional evolutionary sense, which "produces the opinion that inequality originates and is perpetuated because it serves the needs of the social system through facilitating decision making, resolving conflict, or distributing goods." This viewpoint, he contends, assumes that people make decisions based on what is good for the system, rather than what is in their own interest. Because the system implicitly serves the interests of elites rather than non-elites, such a perspective discounts non-elites as active participants in society.

It is more reasonable to conclude that the individual actors and small intra-society groups will be more likely to make decisions based on their own self-interests. Thus, "in order to account for the formation of inequality, it is necessary to address the motivations and actions of individuals and groups within society, and, in particular, the way in which individuals and groups interact with other individuals and groups" (Love 1991:49). This means that, in order to understand a system of social inequality, we must take into account the viewpoint of non-elites as well as elites and try to understand how the two interact. Material culture presents a means of studying the interactions archaeologically; through studying differences between households' artifact assemblages we can better understand the role of material culture in social negotiation and elite strategies of dominance (Love 1991:49).

Mann (2003) identifies four sources of elite power: economic control, ideological control, militaristic control, and control of political resources. While it is likely that elites at La Blanca attempted to assert control in all four spheres, the current project is focused on the potential for elite economic control in Middle Formative La Blanca. This project examines one artifact type, obsidian, for evidence of elite control over access to this resource, as well as evidence of non-elite resistance to elite control. La Blanca presents a valuable opportunity to examine a society that has developed some degree of social inequality but in which the emerging elites have not consolidated their power over others. In addition, the research presented herein will contribute to the greater body of archaeological evidence Love and others are compiling on the region, and help us to better understand the development of social complexity in Mesoamerica.

## Household Archaeology

Settlement pattern studies, the study of the distribution of archaeological artifacts and features, were pioneered by Gordon R. Willey in 1953. Willey's research brought the notion that settlement patterns are shaped by human being's use of the landscape and thus reflect the behavior patterns of societies (Sabloff and Ashmore 2001). Willey's innovative approach inspired archaeologists to expand their view to include complete settlements in their investigations. Soon after, archaeologists began to move beyond functional studies of settlement patterns to attempt to explain the human behavior behind the settlements.

Household archaeology, the study of an ancient society through the comparative analysis of data from household contexts, developed from settlement patterns studies in the late twentieth century. Scholars began to turn to the study of households as they "realized that the totality of ancient communities could not be fully understood without companion studies of the smaller but more numerous places where people lived, worked, and died," (Ashmore and Wilk 1988:7). Hirth (1993) describes three reasons the household approach is a useful means of studying social organization: first, households are the fundamental unit of social organization; second, they can be identified archaeologically; and third, the data collected can be used to make cross-cultural comparative analysis. Household studies began to be understood as a useful framework to study the organization of prehistoric societies.

The household approach has been continually evolving since its inception, and continues to develop in many ways, including by incorporating insights from other subfields such as feminist archaeology (Robin 2003). Robin (2003) asserts that household archaeology has benefited from three methodological innovations in Maya household archaeology, including the expansion of household studies to include the area outside of the physical domicile. This "house-lot" model was conceived by Killion (1992), and has inspired many Mayanists in their research (Robin 2003). In his recent edited volume on household production, Hirth (2009) cautions that household archaeological studies too often view households as static entities, and ignore the dynamic nature of household production; the development of a dynamic theoretical model, he argues, is key to the field of household archaeology.

In part because of its continued development, household archaeology remains a popular and useful approach to studying ancient societies. Carballo (2012) contends that household archaeology has enabled us to understand the lives of regular people in ways that were not possible through the study of Mesoamerican art and writing. Differences among households are an excellent source of "information about the variation among families" including access to resources and social status (Flannery 1976:16). Carballo (2012:687) notes that "investigations of domestic units permit assessment of how the lives of commoners differed from the lives of elites, as well as how the spectrum of status varied by region, time, degree of urbanization, and other factors." Data recovered from discrete households in the same village can indicate the degree of differentiation among them, and thus shed light on the degree of social stratification of the subject society. At the same time, differences among households can also provide clues to ways in which production strategies differ among households in the same village, and shed light on ways through which non-elites sought to maintain autonomy (Hirth 2009). Comparative analysis of household data from sites in the same region but separated temporally provides an excellent opportunity to study the development of, and the resistance to, social stratification,

The focus on household research at La Blanca has resulted in an ideal dataset through which to study these social and economic relationships. The distribution of goods among households, including utilitarian and prestige items, may indicate differential access to resources. Following the household approach of the larger La Blanca project, the current project endeavors to gain an understanding of the interactions among social groups and the development of social inequality through the study of one material type, obsidian, in five household contexts.

**La Blanca**

The archaeological site of La Blanca (Figure 1) lies adjacent to the lower Río Naranjo approximately 15 kilometers (km) north of the Pacific Coast. La Blanca is considered the center of dramatic social and political changes during the Middle Formative Period (ca. 900 – 600 B.C.) (Love and Guernsey 2011). The site began as a small village or hamlet site in the beginning of the Formative Period, although to date no Formative Period undisturbed archaeological deposits have been identified (Love and Guernsey 2011). During the Middle Formative, it rose in importance, and was by far the largest center in the area (Love 2002c). At the height of its prominence, La Blanca was one of the largest regional centers of Mesoamerica (Love and Guernsey 2011). Recent investigations at La Blanca have yielded valuable data to help understand the development of social complexity in Mesoamerica (Love and Guernsey 2011).

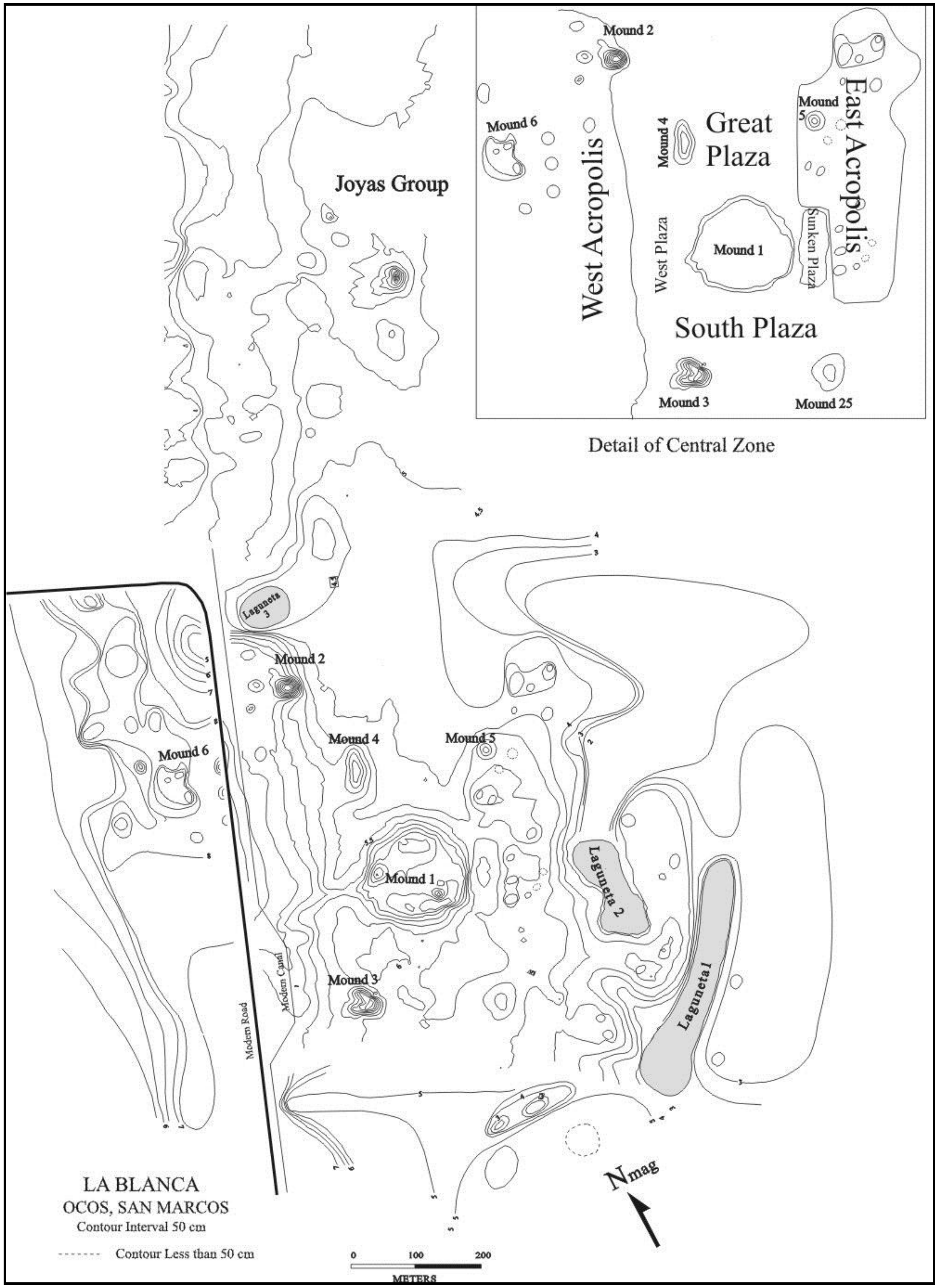


**Figure 1. The central zone of the archaeological site of La Blanca (from Love and Guernsey 2011).**

At its peak, La Blanca covered at least 200 hectares (ha), with a ceremonial center measuring approximately 100 ha. The site was bounded on the west by what was likely the bank of the Río Naranjo during the Middle Formative, and on the east by a series of small lakes and seasonally inundated pampas. The northern and southern boundaries are less well defined, but the northern region of the site was the location of the highest occupational concentration. The site contains over 45 known residential mounds, and five other mounds that are large enough to be the remains of public constructions (Love 2002c; Love and Guernsey 2011).

Currently, M. W. Love is directing an archaeological research project centered at the La Blanca site. This project builds upon previous research by Love at the Late Formative (ca. 600 B.C. - A.D. 100) site of El Ujuxte, located southeast of La Blanca. Combined, the La Blanca and El Ujuxte projects seek to understand the development of social complexity as a process of alternating periods of increased centralization of power and the disintegration of elite control, rather than a linear progression (Love 2004). The research designs of the two projects address the development of social complexity in the Middle and Early Formative Periods, and a comparative analysis of the two regional centers addressed several research questions. The La Blanca and El Ujuxte projects investigate the temporal parameters of El Ujuxte's regional dominance in relation to the decline of the La Blanca polity; compare the relative size, complexity, and longevity of the two polities; and explore the basis of power of elites at both La Blanca and El Ujuxte, as well as the degree of autonomy retained by households in the two polities.

The El Ujuxte project yielded a wealth of information on the site that directly addresses the research questions posed by Love (2011a). The La Blanca project has recovered a rich collection of data from household assemblages, allowing for the study of the relationship between the household and centralized political authority of the local elite (Love 2004). After the initial analysis is complete for data from La Blanca, including that presented herein, future researchers can use the results to compare the social, political, and ideological organization of La Blanca and El Ujuxte, and better understand the development of social complexity in the region (Love 2004). The current research contributes to the larger La Blanca and El Ujuxte projects by examining distribution patterns of obsidian recovered from La Blanca.

**Obsidian at La Blanca**

As social and economic inequality developed, elites may have sought to control access to resources to increase their wealth and power. At the same time, non-elites likely resisted the attempts of elites to consolidate control. This dichotomy should be reflected in the archaeological record, and the current project is aimed at discovering whether elites succeeded in asserting control over access to a valuable, imported resource, and perhaps to other goods traveling along the same trade routes, or if non-elites had so far thwarted those efforts. Obsidian artifacts recovered from La Blanca are a valuable source of information and can increase our understanding of societal relationships in an early complex society. In this study, I utilize several methods of analysis to discern whether elites maintained control over access to obsidian, access to prismatic blades, and possibly access to products imported through three different regional trade networks.

Obsidian is a useful means by which to measure the amount of control elites had for several reasons. First, although situated in the shadow of Guatemala's volcanic mountains, the La Blanca polity is not located near a source of high-quality obsidian. Thus, any obsidian recovered from La Blanca must have been imported, which may have provided elites with the opportunity to control access to this resource (Love 2011a; Nance and Kirk 1991). Obsidian found at La Blanca comes from four volcanic sources, all of which are located in the Guatemalan highlands (Figure 1). La Blanca is about 75 km from Tajumulco, the nearby volcano and closest source of obsidian. The obsidian from this source is poor quality and in many respects does not compare to that which comes from the other three sources (M. W. Love, personal communication 2007). There are two sources of high quality obsidian slightly farther southeast, San Martin Jilotepeque and El Chayal, which are approximately 150 and 200 km away, respectively. Ixtepeque, the fourth source of high quality obsidian found at La Blanca, is located approximately 270 km east of La Blanca, considerably farther away. All obsidian found at La Blanca was imported to the site and thus must have traveled through ancient trade networks to reach its final destination (Love 2011a; Nance and Kirk 1991).

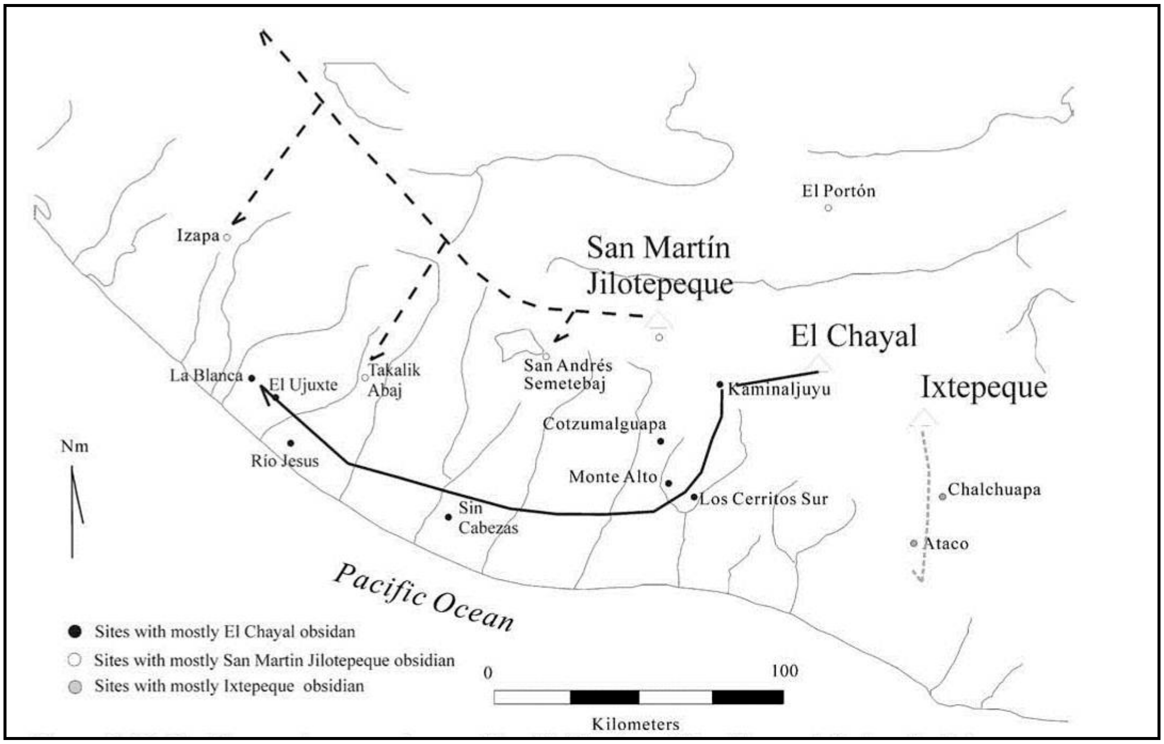

**Figure 2. South Pacific Coast trade routes (source: M. W. Love).**

Archaeological evidence suggests that there were at least three, possibly four, trade networks through which high-quality obsidian traveled in ancient Mesoamerica (Love and Guernsey 2011) (Figure 1). Obsidian from El Chayal was transported south from Kaminaljuyu through the piedmont to the coastal plain, then northwest to La Blanca. San Martin Jilotepeque obsidian was transported northwest from the source through both highlands and piedmont before reaching La Blanca (Love 2011a).

Another reason why obsidian is a good means by which to measure elite control is that tools produced from obsidian were valuable cutting implements. Nance and Kirk's (1991) study of 431 prismatic blades recovered from Middle Formative contexts at La Blanca indicate that no other lithic raw materials were available in significant amounts to inhabitants of La Blanca. In addition, the small size of obsidian blades present coupled with the absence of large fragments of obsidian at the site indicate that obsidian was in short supply (Nance and Kirk 1991). Since lithic tools, such as obsidian blades and flake tools, were the source of all cutting edges on composite tools at La Blanca, they were essential to numerous daily subsistence activities including hunting, processing both plant and animal products, and for making wood implements (Clark 1989) . It is thus reasonable to conclude that it would be desirable commodity for elites to control access and thus increase their wealth and power.

As they sought to consolidate their power and prestige, La Blanca elites may have sought to control access to obsidian, as Mesoamerican elites did later in prehistory (Santley 1989); they may also have sought to control access to other items that were transported along the same exchange routes. However, non-elites may have resisted attempts to reduce household autonomy. Obsidian recovered from La Blanca presents an opportunity to examine whether elites had been able to consolidate control over access to imported goods, or if non-elite households had so far successfully resisted the loss of autonomy.

Fowler et al (1987:151) argue that obsidian is "an excellent indicator of long-distance exchange contacts" because it is an archaeologically durable material that comes from a small number of sources that can be identified through chemical analysis. Thus, analysis of the source of obsidian used to make flakes and blades at La Blanca can produce valuable data on which aspects of society elites at La Blanca had successfully gained some control. Because obsidian from each source was transported through a specific trade network, if assemblages recovered from elite and non-elite households have different relative amounts of obsidian from each source, it may indicate that elites had control over access to goods imported through a particular trade network. Another possibility is that elites controlled access to obsidian imported through multiple trade networks, yet redistributed obsidian from specific sources to elite and non-elite households.

**Prismatic Blades**

The obsidian artifact assemblage recovered from La Blanca can be generally categorized into two types: prismatic blades and the flake industry, consisting of flake tools and debitage. Janet Kerley (1989:165) defines prismatic blades as "specialized flakes that are twice as long as they are wide, usually having parallel sides and at least one dorsal ridge." Don Crabtree (1968:455) asserts that "prismatic blades have two main types of transverse section; those that are triangulate and, the more common, those which are trapezoidal in section. The sides of the blades are characterized by their very acute angles." Although technically blades are at least twice as long as they are wide, Kerley (1989:165) notes that "it is possible to identify some fragmentary artifacts as blades without the entire length or width being present;" this is certainly true of the assemblage from La Blanca. Obsidian prismatic blades like those found at La Blanca required a high degree of skill to manufacture. In later periods in Mesoamerica, such were often produced by craft specialists (Clark 1989; Darras 2009). In contrast, informal flakes and flake tools can be produced with much less skill.

Prismatic blades are more desirable than simple flake tools for numerous reasons. Prismatic blades are extremely sharp, which made them very valuable (Clark 1989; Fowler et al 1987). In addition, prismatic blades have an increased amount of cutting edge per gram (g) of material compared to flake tools. Fowler et al (1987:154) contend that "the potential in prismatic blade technology to maximize the amount of cutting edge produced from a given amount of raw material," made it a desirable technology and product. Prismatic blades can also be produced efficiently (Clark 1987). Clark (1987:260) asserts that:

> From a core 10 cm in diameter one can make about 200 blades of standard size and shape in less than 2 hours. This represents a miserly use of raw material in terms of the length of usable cutting edge per gram obtained…In short, with blade technology many more tools could be made from a given amount of obsidian in less time, and these tools were of a standard size and shape, convenient for using in the hand or hafted.

Another reason they are valuable is because they are generalized tools and can easily be adapted for any task, be it cutting and scraping, hafting onto wood to make composite tools, or for further reducing to more specialized tools, such as needles, drills, gravers, and burins (Clark 1987; Fowler et al 1987; Hirth and Andrews 2002).

Valuable prismatic blades may have been prestige goods in the Middle Formative, although there is not solid evidence of this. Clark (1987:262) contends that the spread of blade technology in Mesoamerica was connected to the emergence of complex chiefdoms; he argues that because prismatic blades are found in relatively low densities and were imported (either as cores or finished products) from a considerable distance, they "were most likely sumptuary goods used by the elite." He also argues that, although blades were superior to flake technology in every way, they spread slowly across Mesoamerica, likely because their production and trade was controlled by elites (Clark 1987). It is likely that La Blanca elites would have sought to control access to prismatic blades if they were in fact prestige items, in order to enhance their status. In contrast, because prismatic blades were extremely useful, it is likely that non-elites would have resisted such control. Obsidian from La Blanca thus presents an opportunity to investigate whether elites were able to control access to prismatic blades, in addition to overall access to obsidian.

**Project Goals and Research Questions**

This project closely examines the obsidian artifact assemblage recovered from household sites at La Blanca and analyzes the data recovered, paying particular attention to evidence of elite economic hegemony and non-elite resistance to the aspirations of the emerging dominant group. Study of changes in the social and political systems of La Blanca can contribute to our understanding of the emergence and subsequent development of social complexity at La Blanca, as well as to our understanding of the process from a greater theoretical standpoint. The current project proposes to analyze obsidian artifacts recovered from five household contexts at La Blanca in order to better understand in what ways the elites of La Blanca were able to assert control, and in which ways they were not. The goal of this project is to address the following research questions:

1. Did La Blanca elites have some control over access to obsidian, a utilitarian good that had to be imported?
2. Were La Blanca elites were able to control access to prismatic blades, possibly prestige items?
3. Did La Blanca elites have more control over access to obsidian exchanged along one of the three major trade networks described herein as opposed to the other two trade routes?

Evidence to answer the first question presented above may be discerned through a straightforward analysis of the total amount of obsidian recovered from each household in the study. Similarly, data to answer the second question can be discovered through a straightforward analysis of the total number and weight of prismatic blades present in each household in the study. If elites did have control over access to obsidian in general and to prismatic blades in particular, there are two possible expected outcomes from the analysis of the data. First, elite households may have a higher quantity of total obsidian artifacts and prismatic blades than non-elite households. It stands to reason that, if elites were able to control access to obsidian and to prismatic blades, those households may keep more of the valuable resource for themselves. In contrast, however, a relatively even distribution of obsidian and prismatic blades in both elite and non-elite households may indicate that elites were controlling access to obsidian and redistributing it to other households in the community. Thus, if La Blanca elites had consolidated control over access to obsidian in the Middle Formative, one should expect either elites to have significantly more total obsidian and prismatic blades, or for the distribution of the artifacts to be relatively even throughout all households.

Evidence in support of the final question requires more in-depth analysis. If elites had more control over one particular trade network, this would be reflected in the artifact assemblage as more obsidian from one source present in elite households, and a more obsidian from a different source present in non-elite households. To determine this, each obsidian artifact must be attributed to a specific source. If different amounts of obsidian from the three sources are present in elite versus non-elite households, this may be an indication that elites were able to assert some control over a particular trade network.

# Chapter 2. Environmental and Cultural Context

## Environmental Setting: The Soconusco and South Coast Region

La Blanca is located on the Pacific Coast of Guatemala in Southern Mesoamerica. This area, although divided today by the borders of the modern nation-states of Mexico, Guatemala, and El Salvador, forms a distinct geographical and cultural zone (Figure 3). The region is physically defined by the coastal plain and piedmont that extends from the southern part of Chiapas, Mexico to the northern region of El Salvador, and is bordered on the West by the Pacific Ocean and inland by steep volcanic mountains. The northern area of this region is broadly defined as the Soconusco. This term is most often used to describe the Mexican segment of the area, while the Guatemalan portion is dubbed simply the South Coast. It is likely that in ancient Mesoamerica the people inhabiting the Soconusco and South Coast region represented a distinct culture area, much as is true today (Love 2002c, 2007; Rosenswig 2006; Voorhies 2001).

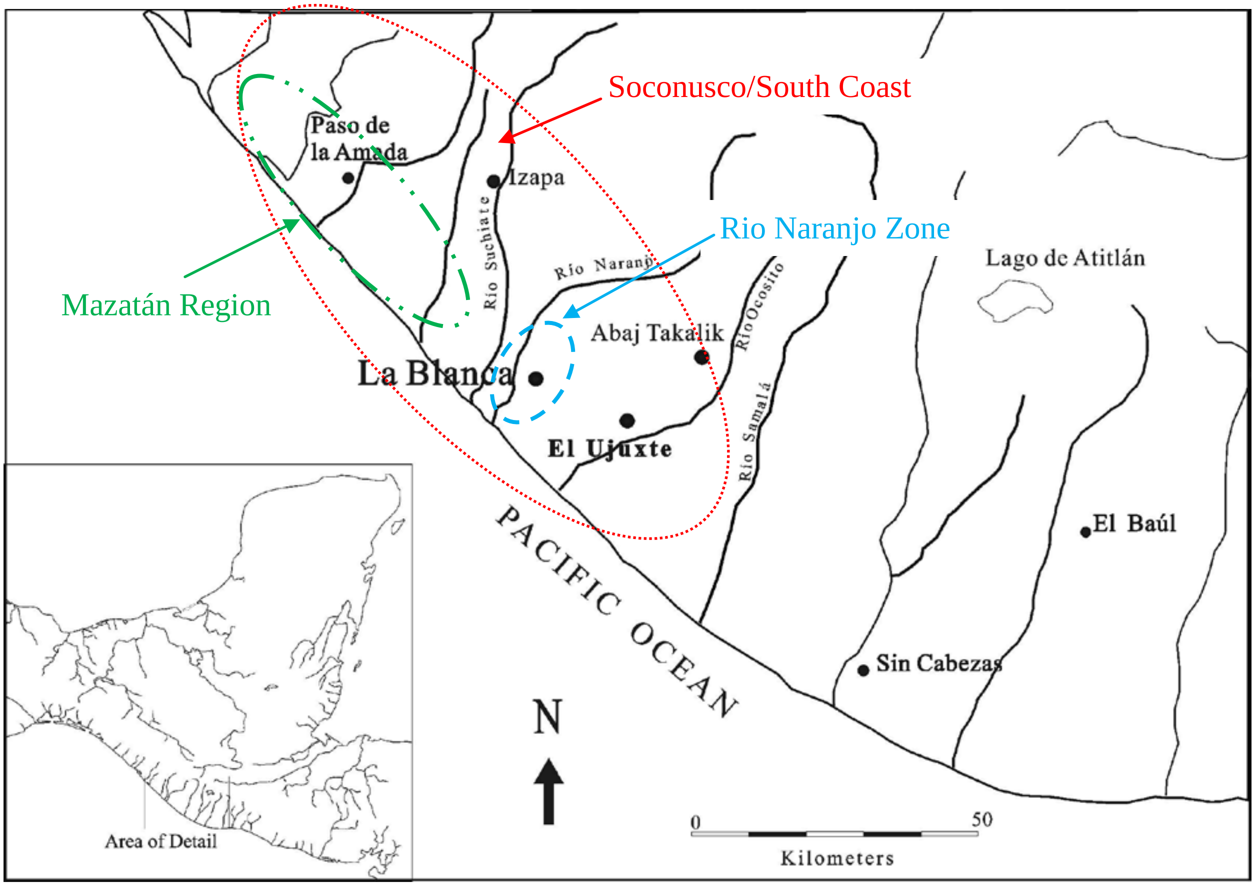


**Figure 3. The Soconusco and South Coast, including the Mazatán Region and the Río Naranjo zone (adapted from Love and Guernsey 2011).**

The Soconusco/South Coast plains begin at the Pacific with high barrier beaches from which they slope gently upwards for about 50 km to an elevation of 100 meters (m), where the border between the plains and the piedmont zone is arbitrarily set. Beaches lining the Pacific give way to Mangrove swamps before transitioning to the open vegetation of the plains. The piedmont, with its narrow ridges, continues to rise in elevation up to nearly 1000 m above sea level, although it does so much more steeply than the plain, reaching this height in only about 20 km. Beyond the piedmont, the Sierra Madre Mountains climb dramatically up to incredible heights; Tajumulco, located approximately 60 km northeast of La Blanca, is the highest peak in Central America at 4,220 m above mean sea level. These volcanic mountains are geologically young, and many remain active today. Numerous rivers and streams, including the Río Naranjo, run through the deep gorges of the mountains to the Pacific Ocean, forming estuaries and lagoons near the coast. The dramatic changes in geography in a relatively small area create a considerable amount of variation in adjacent ecological zones. This proximity has fostered economic interdependence among inhabitants of the different zones (Love 2002c; 2007; McBryde 1945; Rosenswig 2006; Voorhies 2001).

The temperature remains relatively stable and warm throughout the year, although it can vary quite a bit from day to day. Rainfall in the region is significant and increases with the distance from the coast, averaging between 1,500 mm along the Pacific to 3,000 mm near the inland boundary of the piedmont. Almost all of the region's precipitation occurs between April and October; this fact, coupled with the consistent temperatures, has led to the delineation of the year into two seasons defined simply as "wet" and "dry." The abundant rainfall feeds the many waterways that flow from the mountains and the piedmont through the plains to the coast, and the rich alluvial soils deposited there, together with the ample precipitation, have created one of the most fertile regions in Mesoamerica (Love 2002c, 2007; Voorhies 2001).

Today, much of the region is cultivated either for commercial or subsistence purposes. Corn (maize), cotton, manioc, beans, squash, tomatoes, and tobacco are among the many crops grown in the Soconusco and South Coast, and cattle are raised here as well. In the project area, plantains are the most commonly grown crop; trees cover most of the site of La Blanca. The natural, prehistoric environment was likely much more verdant and varied than that of today, and included mangrove swamps and tropical forests and park-like savannas on the plains as well as thick forests on the piedmont and highlands. Similarly, the prehistoric local fauna were more abundant in variety and number. Deer, river and sea turtles, many types of fish, iguana, shellfish, jaguars, and numerous bird species were among the creatures that inhabited the area. Generally, the environment was richest in wild subsistence resources toward the coast, while conditions most favorable for agriculture were located somewhat away from the shore (Love 2002c; Voorhies 2001).

**Cultural Setting**

The cultural chronology of the Soconusco and Guatemalan South Coast regions of the Pacific Coast of Mesoamerica is well-established, and the ceramic sequences of the region are generally well-understood; numerous scholars have described them in detail and established diagnostic artifact types for most phases and regions (e.g., Arroyo et al 2002; Coe 1961; Love 2002a, 2002c, 2007). There remains some dispute about the exact limits of certain phases and subphases, and certainly not all authors agree on every point (Arroyo et al 2002; Love 2002; Shook and Hatch 1979). Fitting local variants in the greater Pacific Coastal region into the established ceramic chronology has been the source of some contention (Arroyo et al 2002; Blake et al 1995). However, recent work has increased our temporal and spatial understanding of the ceramic sequences in the Soconusco and South Coast region, as well as how these sequences relate to ceramic sequences in other regions of Mesoamerica. In particular, Love's (1993, 2002a, 2002c, 2007, Love and Guernsey 2007, 2011) work at La Blanca has provided a detailed ceramic chronology that is tied to well-documented, reliable radiocarbon dates. Thus, the cultural chronologies of the region are reliably datable, making it relatively easy to establish a chronology of the entire region.

What follows is an overview of the chronology and corresponding development of social complexity for Archaic, Early Formative, Middle Formative, and Late Formative Periods of the Pacific Coast, with special attention paid to the Soconusco and Guatemalan South Coast. This overview illustrates where La Blanca stands in the development of social complexity in the region, as well as the region's political cycling between periods of increased centralization and decentralization. Because it is the focus of this study, Middle Formative La Blanca is given special attention. See Table 1 for an overview of prehistoric periods and sub-periods for the South Coast and Soconusco.

**Table 1. Approximate date ranges for pre-historic Periods and Sub-periods in the South Coast and Soconusco (adapted from Love 2007)**

| **Period** | **Archaic** | **Formative** | | |
|---|---|---|---|---|
| **Sub-period** | | **Early** | **Middle** | **Late** |
| **Date (cal.)** | Before 4000 – 1700 B.C. | 1700 – 1000 B.C. | 1000 – 400 B.C. | 400 B.C. – A.D. 300 |
| **Date (uncal.)** | Before 3500 – 1550 B.C. | 1550 – 900 B.C. | 900 – 400 B.C. | 400 B.C. - A.D. 200 |

*The Archaic Period (ca. 4000 – 1700 cal. B.C.)*

The earliest concrete evidence for human occupation of the Soconusco dates to the Archaic Period, although it is possible that the area was inhabited prior to that time. The only site that has been reliably dated to the early archaic (before 3000 cal. B.C.) is Cerro de las Conchas, a large shell midden with a long sequence of occupation (Clark et al 1987, 1990). The later Archaic (after 3000 cal. B.C.) is represented by more and better understood archaeological sites (Voorhies 1976; Voorhies and Michaels 1989). All but one of these are, like Cerro de las Conchas, large shell middens located in the coastal wetlands. The remaining late Archaic site is located inland (Voorhies 2001).

Evidence indicates that the people who inhabited the Soconusco region in the Archaic Period were semi-sedentary hunter-gatherer-fishers who exploited the natural resources of the area and had not yet developed the technique of making pottery. They most likely had broadspectrum diet that included maritime resources such as fish and shellfish that they dried for storage. There is some evidence that by later in the Archaic, people had begun to cultivate several plants, including maize. Evidence indicates that Archaic Period peoples were mobile hunters and gatherers who occupied several seasonal camps, likely with egalitarian social organization. It is possible that an occupation gap occurs on the South Coast between the end of the Archaic and the Early Formative, although the evidence is inconclusive. This may indicate a period of political decentralization at the end of the Archaic, prior to the increased centralization of the Early Formative (Blake and Clark 1999; Love 2007; Rosenswig 2006; Voohries 2001; Voorhies and Kennett 1995).

*The Early Formative Period (ca. 1700 – 1000 cal. B.C.)*

The Early Formative in the South Coast and Soconusco is characterized by an increase in population and village size, the appearance of ceramics, the development of at least a two-tiered settlement system, evidence of feasting, and the earliest known ballcourt in Mesoamerica. Although there is some evidence that La Blanca was occupied in the Early Formative, the data from this period was recovered from secondary contexts, and no intact deposits have been identified (Love and Guernsey 2011). There are five phases of the Early Formative: Barra (1700-1600 cal. B.C.), Locona (1600-1500 B.C.), Ocós (1500-1400 cal. B.C.), Cherla (1400-1300 cal. B.C.), and Jocotal (1200-1000 cal. B.C.) (Table 2). The Early Formative people that inhabited the Mazatán region are known as the Mokaya (Blake 2001a; Rosenswig 2000).

**Table 2. Early Formative Phases.**

| Phase | Barra | Locona | Ocós | Cherla | Jocotal |
|---|---|---|---|---|---|
| **Date (cal. B.C.)** | 1700-1600 | 1600-1500 | 1500-1400 | 1400-1300 | 1200-1000 |

In the southern area of the Soconusco is the Río Naranjo zone, where the site of La Blanca is located (Figure 2). Here the population was relatively small and dispersed in the Early Formative (Love 2002c). This region lacked the larger villages that existed to the north in Mazatán; most Río Naranjo sites that date to this period consist of a single residence, although a few show evidence of comprising more than one household (Love 2002c). Sites in this area are scattered across the landscape, and evidence indicates that the inhabitants exploited all available ecological zones (Love 2002c). No undisturbed Early Formative archeological deposits have been identified at La Blanca, although evidence recovered from secondary contexts indicates that the site was occupied in this period (Love and Guernsey 2011). Michael Coe and Kent Flannery (1967) excavated the site of Salinas La Blanca, a small village in the Río Naranjo zone, in 1962. Evidence from this site supports the view that the occupants exploited both domesticated and wild resources such as maize, avocados, deer, and turtle (Coe and Flannery 1967; Flannery 2001). There is currently no evidence that larger sites in this area had any authority, political or otherwise, over any other nearby site (Love 2002c).

Much of the data recovered from the Early Formative is from the Mazatán region (Figure 2), just north of the  Río Naranjo zone. The Mazatán region is located along the Pacific Coast in the southeastern part of Chiapas, Mexico, within the Soconusco. It lies just north of the study area, relatively close to what was the La Blanca polity during the Middle Formative. Although there is not much evidence of earlier occupation, during the Early Formative this area was occupied by some of the first sedentary groups in Mesoamerica, and some of the earliest evidence of the development of social ranking is found here. Several Barra Phase sites are known to exist in Mazatán, and some have been excavated. These have not been as thoroughly investigated as later sites, but they do provide evidence that the Barra Mokaya peoples were sedentary, ceramic-producing villagers who used a range of domesticated plants, including maize, and who likely interacted often with other regional groups. Although Barra Phase peoples were not stratified, the ceramic evidence for feasting indicates that there may have been some degree of social ranking, or at least some inter-group competition for prestige (Arroyo et al 2002; Blake 2001; Blake et al 1995; Rosenswig 2006).

Mazatán region sites that date to the slightly more recent Locona Phase are more numerous and better understood. These sites indicate that the number of settlements grew in both number and in size during this period (Blake 2001a; Blake et al 1995; Clark 1991). Data also indicate a regional two- or three-tiered settlement hierarchy, with some sites possibly the locations of specialized subsistence activities (Clark 1991). Human bone collagen samples and archaeological data pertaining to this phase indicate that people occupying these villages consumed some maize and other cultigens; however, they relied on a variety of other, non – domesticated foods as well, including aquatic and terrestrial fauna and at this point, maize had not yet assumed the primacy of importance in the region that it did later (Blake et al 1992, 1995; Clark 1994).

Archaeological investigations in the region have also revealed evidence of the development of social ranking during the Locona and later Cherla phases of the Early Formative (Blake 2001a; Blake 2001b; Clark 1991). Near El Silencio, a Jocotal phase site located in the Mazatán region, several Olmec-style stone sculptures were recovered (Blake et al 1995). Such monumental architecture may indicate the presence of some form of craft specialization (Blake et al 1995). Clark (1996:190) contends that “the most convincing indicators of rank societies [in the Mazatán region in Early Formative period] are the two-tiered settlement pattern and construction of special residences.” There is evidence of this two-tiered settlement hierarchy as early as the beginning of the Early Formative and continuing through approximately 1300 cal. B.C. (Rosenswig 2000).

The majority of evidence for this significant development comes from Paso de la Amada, one of the largest Early Formative centers in the region. Ceramics recovered from Mound 6 at Paso de la Amada date it to the Locona and Ocos phases, while ceramics from Mound 1 place it in the Cherla phase, indicating that this site remained important throughout the early Formative (Blake et al 1995). There is evidence of a ceramic shift from tecomate vessels to deep plates and other dishes often associated with public feasting, which may indicate social inequality (Clark 2001; Clark 1991). Elites at this site had differential access to luxury goods such as stone bowls, clay earspools, jade, and iron-ore mirrors (Clark 1991). A few individuals were buried with a greater amount of goods or unusual luxury items such as mica mirrors, which may indicate their high status (Blake et al 1995; Clark 1991). Several portly male figurines were also recovered from the site; some figurines were depicted as wearing mica mirrors and may represent shamans or chiefs, (Clark 1991, 1997, 2001).

Blake (1991) investigated a large mound at Paso de la Amada and discovered the remains of a large building, which he interpreted as a local chief’s residence. The building increased in size and quality of construction over time, indicating that the status of the individuals living there increased over time as well. Vessels associated with feasting that were recovered from the structural remains are additional evidence of the high status of the residents (Blake 1991).

Lesure's (1998) comprehensive study of vessel forms and their possible functions indicate the existence of three types of especially large vessels at Paso de la Amada. He concludes that they were most likely used to prepare and serve food at feasts.

Other evidence for the development of social complexity is less reliable. There is some evidence for craft specialization in the Mazatán region during the Locona Phase, although it is inconclusive at best. The excellent craftsmanship and high cost of raw materials needed to make the high quality ceramics, figurines, stone bowls, Olmec-style stone sculptures, and jade beads recovered may indicate that these goods were produced by artisans who were supported by patrons (Clark 1991). In addition, obsidian data from the area suggests that there was some local mechanism of redistribution, since the two types of obsidian found in the area were evenly distributed throughout regional villages. It is likely that there was some political mechanism that ensured equal access to each type, but not overall quantity, of obsidian (Clark 1991:18). Finally, although there is little conclusive evidence for other public buildings at Paso de la Amada, one notable public construction, the earliest known ballcourt, is located here (Clark 1997).

Overall, the evidence from the Mazatán region indicates that the inhabitants of the region were sedentary villagers who cultivated several domesticates as well as exploited the natural resources of their environment for subsistence. They had developed some form of social ranking, and at the very least nascent social inequality existed. At the end of the Early Formative, the population in this area increased considerably. It is significant that the ceramic and other archaeological evidence indicates the local development of sociopolitical complexity and adoption of Olmec-style goods and production techniques by local elites, rather than the movement of foreign elites into the area. By the end of the Early Formative Period, complex chiefdoms existed on the Pacific Coast of Mesoamerica and were organized into a two- or possibly a three-tiered settlement system However, at the end of this period the population of the Mazatán region declined significantly, entering into a period of political decentralization (Blake 2001a, 2001b; Blake and Clark 1999; Clark 2001; Love 2002c; Love and Guernsey 2011).

*The Middle Formative Period (ca. 1000 – 400 cal. B.C.)*

The beginning of the Middle Formative marks a fundamental shift in social, political, and subsistence organization on the Pacific Coast of Mesoamerica. All three of these changes were interrelated, and indicate a significant development in social complexity and inequality. The subsistence base shifted toward an increased dependence on maize. The population of the region as a whole grew substantially, and was increasingly concentrated into fewer, larger villages. At the same time, the population shifted from surrounding areas into the Río Naranjo zone, where developed a three-, or possibly five-tiered regional settlement hierarchy centered at the site of La Blanca. During the Middle Formative, La Blanca developed into a large, regional center with a clear difference in status and wealth (and presumably power) between a small number of elites and the remainder of the population. A variety of archaeological evidence of social and economic stratification has been recovered from the site, including monumental architecture, the presence of luxury goods, and a clear settlement hierarchy (Blake and Clark 1999; Bove 1989; Love 2002c; Rosenswig 2006).

At the beginning of the Middle Formative, there was a marked increase in the amount of maize consumption in the Soconusco and the South Coast, especially within the Río Naranjo zone. Evidence of this change comes from both recovered archaeological evidence and the analysis of human bone remains from burials (Blake et al 1992; Love 2002c; Rosenswig 2006). Sites dating to this period also show a slight tendency to be located near the boundary between two types of local soils which would have allowed them to plant three crops of maize annually

(Love 2002c). However, it is important to note that while the cultivation of maize and other domesticates increased during the Middle Formative, the overall subsistence base remained diverse (Blake et al 1992; Love 2002c).

The shift towards a subsistence base that was focused more on agriculture was accompanied by an increase in regional population. This increase did not occur evenly throughout the Soconusco and Pacific coast, however; the Río Naranjo zone grew substantially, while the number of inhabitants living in the surrounding areas decreased. Many of the large Early Formative villages in the Mazaztan region were abandoned, as were a number of Soconusco sites to the north. Within the Río Naranjo zone, the number of settlements increased from 21 to 60 between the Early and Middle Formative and the number of households present in the zone increased from 26 to an estimated 129 (Blake et al 1992; Love 2002c; Rosenswig 2006).

Population estimates for the Mazatán region indicate that, following the increase during the Early Formative Jocotal Phase (ca.900 – ca. 850 B.C.), the area was virtually abandoned in the Middle Formative. At the same time, estimates for the population of the Río Naranjo zone indicate that here the population increased from approximately 130 persons at the end of the Early Formative to between 645 and 870 persons during the Middle Formative. The above evidence suggests that during the Middle Formative regional populations resettled from the surrounding areas into the Río Naranjo zone (Blake et al 1992; Love 2002c; Rosenswig 2006).

Within the Río Naranjo zone, the population became increasingly nucleated into larger settlements. During the Early Formative Period, the vast majority of sites had a single residence. There are at most 3 sites that contain two or more households, the largest of which probably did not have more than four households at the end of the Early Formative. In contrast, during the

Middle Formative, there were at least nine sites that had at least two households, the largest of which had a minimum of 45 households, and a large percentage of the population resided in these hamlets and villages (Love 1991; Love 2002c).

The Río Naranjo zone of the Pacific Coast saw a dramatic shift in political organization at the beginning of the Middle Formative. La Blanca grew to be the largest center in the region, and nearby settlements demonstrate a clear regional hierarchy. The numerous multi-household sites of the Middle Formative show convincing evidence of at least a three-tier, and possibly a five-tier settlement hierarchy, evidenced by both relative settlement size and the presence of public architecture (Figure 4). La Blanca, the regional center, is by far the largest site, with at least 45 households covering 100 ha. Its Mound 1, measuring 25 m in height, was the largest mound in the area before it was destroyed in the 1970s. La Blanca also contains three other large mounds that were likely public constructions (Love 1991; Love 2002c; Rosenswig 2006).

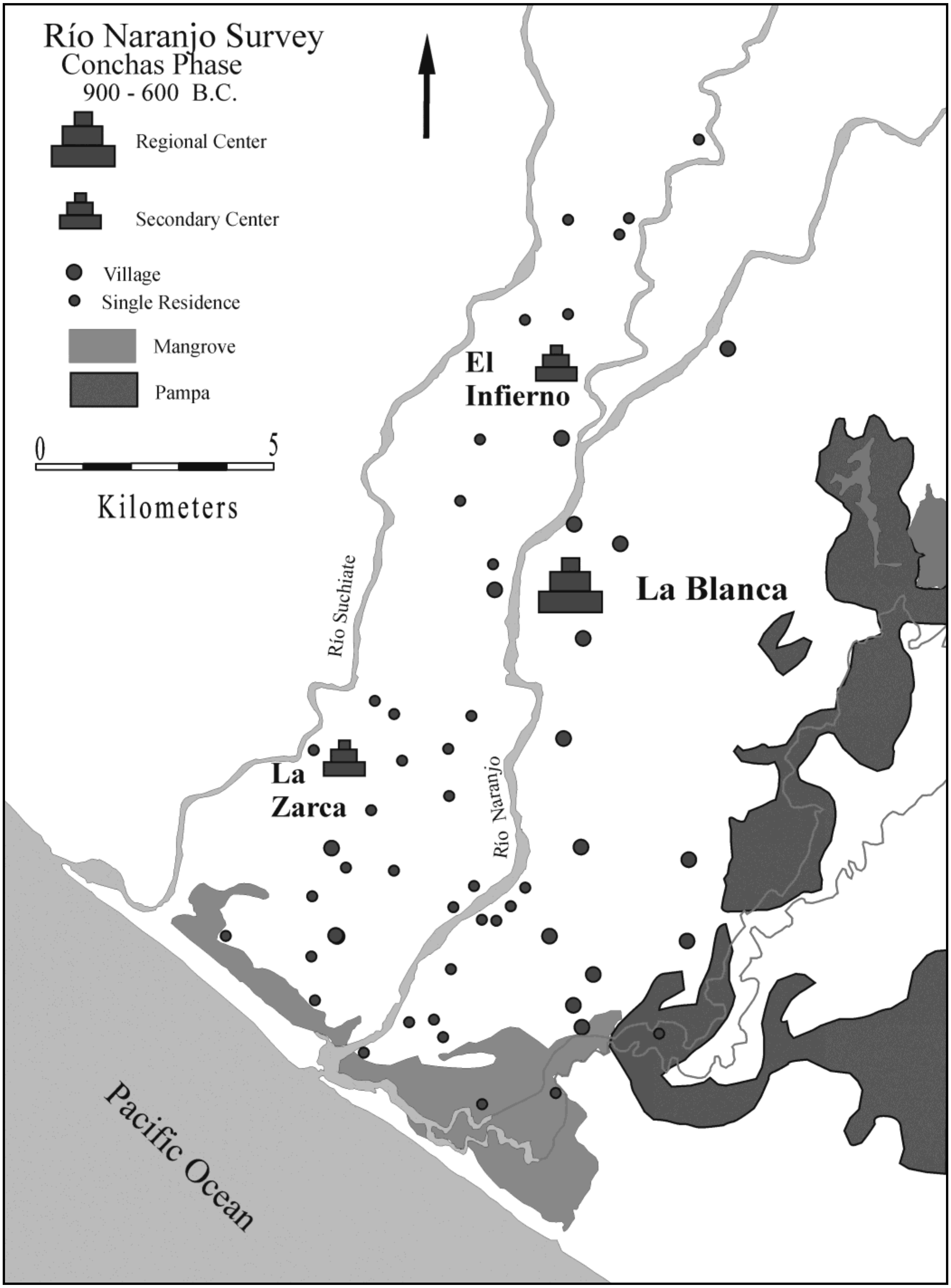


**Figure 4. The La Blanca polity in the Middle Preclassic, with secondary centers, villages, and single residences (from Love and Guernsey 2011).**

The large villages La Zarca and Infierno were minor centers, representing the second tier of the La Blanca settlement hierarchy (Figure 4). Both have large mounds indicating public construction. Cuauhtémoc represents the third tier in the hierarchy, since it contains evidence of public architecture that is noticeably smaller than those found at La Zarca and Infierno. Hamlets, the fourth tier in the settlement hierarchy, are sites with more than one residence yet lacking public construction. Single household sites make up the fifth and final tier (Love 1991; Love 2002c; Rosenswig 2006).

Five mounds at La Blanca are large enough to have been public architecture. The largest of these, Mound 1, was 120 m wide and 140 m long at its base. The immense size of this mound clearly indicates that it was a public construction, and it is one of the first such edifices in Mesoamerica. Unfortunately, in the early 1970s it was largely destroyed and used as fill for the construction of the highway; it was reduced from its soaring 25 meter height down to two. Edwin Shook undertook salvage operations prior to and during the road construction. Although he had a limited time and limited resources, he was able to record valuable information about La Blanca through his excavations, surface collections, and by purchasing artifacts from local inhabitants (Love 2002c; Love and Guernsey 2007).

In addition to Mound 1, at least four other mounds are large enough to have been public constructions, although they are not nearly as large as Mound 1 was before it was destroyed. Mounds 2 and 3 are five and six m in height, respectively. Mounds 4 and 5 are only three and two m tall, respectively, but they may have been damaged during the construction of the modern road. In addition to these five likely remains of ancient public architecture, Mound 6 and the “Stela Mound”, another mound that was destroyed during road construction, may also have been public buildings. It is quite likely that the “Stela Mound” was at least of some importance, because prior to its destruction a stela rested on top of it (Love 2002c).

Three monuments have been discovered at La Blanca (excluding the stela that sat on top of the Stela Mound, which has disappeared and was not recorded or collected), and the presence of these monuments attests to the importance of La Blanca. Monuments 1 and 2 are both fragments of andesite sculpture discovered by Shook. Monument 1 is a 40 cm tall head and Monument 2 is a leg fragment, broken at the knee and the groin. Shook found Monument 1 while carrying out salvage operations in 1973, and found Monument 2 in 1985. Monument 3 was discovered by Michael Love and Julia Guernsey during excavations at La Blanca in 2004 (Love 2002c; Love and Guernsey 2007).

Monument 3 is located on the edge of the Mound 9 residential complex near the pyramidal Mound 1. The monument was discovered while excavating Mound 9, a domestic elite complex located in close proximity to Mound 1. Monument 3 is an earthen sculpture in the shape of a quatrefoil, or flower with four petals. The compacted earth was finished by a layer of black clay and the interior was painted red. It is just over 2 m in diameter and consists of several rings and channels surrounding an interior basin. The basin-like structure of the monument most likely indicates that it was meant to contain water. In ancient Mesoamerica, the quatrefoil shape is often associated with elite power and water is associated with communication with the supernatural. Monument 3, together with the large number of figurines that were recovered from Mound 9, is clearly evidence that La Blanca elites maintained a powerful position in the ideology of their culture and in the region as a whole (Love and Guernsey 2007).

That some form of social inequality existed at the site by at least the Middle Formative Period is demonstrated by the differential distribution of high value items. There are four main types of such goods found at La Blanca, and studying their distribution throughout households at the site is a good way to identify differences among households. Jade and other greenstones are found quite rarely at Middle Formative sites on the Mesoamerican Pacific Coast, making them the most useful types of artifact for identifying elite contexts (Love and Guernsey 2011). Fine-paste pottery, such as Ramírez White, Ramírez Black, and Margarita red-on-white, is ascribed a high value because of the increase in labor necessary to process the clay and temper and to incise fine-line décor (see Love 2002c for a detailed analysis of Middle Formative ceramics). Decorated ceramic spools such as earspools, nosespools, and bracelets are another diagnostic category of artifact; although plain spools are common in all contexts, those that are incised with fine-line decoration are much more unusual and usually found in elite contexts (Love 2002c). Jewelry produced from polished mica and schist is also found only rarely at La Blanca; to date only two such artifacts have been recovered, both from elite contexts. All of the above categories of artifacts are found either exclusively or in disproportionate amounts in a limited number of households at La Blanca. When the artifact assemblage is assessed as a whole, it is clear that a few households at La Blanca had greater access to prestige goods and that members of these households had elite status (Love 1991; Love 2002c; Love and Guernsey 2011).

That La Blanca had developed a significant level of social complexity by the Middle Formative Period is undeniable (Love 2002c; Love and Guernsey 2011). La Blanca had several monumental public constructions indicating the existence of some political body able to organize labor and to the people to dedicate labor-hours to construct the immense buildings. Archaeological data excavated from residential mounds at the site indicate differences among households in access to luxury goods and items associate with elite status. A regional settlement hierarchy centered on La Blanca was clearly in existence at this time. The exact level of complexity may be arguable, but that some level of social inequality had developed is undeniable; La Blanca represents a period of centralization as elites consolidated wealth, power, and status in this complex chiefdom (Love 2002c; Love and Guernsey 2011).

*The Late Formative Period (400 cal. B.C. – cal. A.D. 300)*

Love (2011b) has described the Late Formative as the period that "represents the culmination of processes begun at the end of the Archaic Period with the transition to agriculture and sedentism." He further argues that this 1,500-year-long development of social and economic complexity climaxes in the development of state level societies in the region at this time with the development of large cities, expanded centralized authority, and the establishment of the elite (Love 2011a, 2011b). The Pacific Coast of Mesoamerica continued to develop as a more complex, socially differentiated culture area in the Late Formative.

The regional population increased throughout the Late Formative; however, La Blanca lost its position of power. Indeed, the polity of La Blanca declined and the city was largely abandoned at the beginning of the Late Formative. After the collapse of La Blanca, a new period of centralization began with the rise of other nearby centers, including El Ujuxte (Love 2007, 2011a, 2011b). The subsistence base became increasingly focused on agriculture and maize in particular continued to become increasingly important. There is evidence of increased differences in social status among individuals in the Late Formative, indicating that the social and political changes that began in the Early Formative were solidified in the Middle Formative and elaborated in the Late Formative (Love 2002a, 2002c). Data indicate that, by the Late Formative, El Ujuxte was the center of a five-tier settlement hierarchy, with at least eight primary and four secondary centers (Bove 1989:404).

While it is unclear how long after the fall of La Blanca the Late Formative the polity of El Ujuxte began its rise, it is certain that the 1,500 years leading up to the El Ujuxte's regional dominance were essential to its success. Further, the events of the Middle Formative, especially the formation of the regional polity of La Blanca and the development of a group of local elites were important steps in the events of the Late Formative. Love (2004:2) argues that "episodes of collapse presented motive and opportunity for elites seeking power to develop new strategies for dominance." As such, the political cycling of the archaic, Early, Middle, and Late Formative Periods presents a unique opportunity to study how elites improved upon previous means of control. Revealing differences between elite strategies at the Middle Formative polity of La Blanca and those of the El Ujuxte elites in the Late Formative promises to shed light on how elites were able to centralize control to create one of the first state-level societies in the world. To do so, it is necessary to first examine the means by which elites had consolidated control at both El Ujuxte and La Blanca. The current study presents the results of an analysis of one class of material culture to better understand elite control – or lack thereof – at La Blanca.

# Chapter 3. Methods

## Field Methods

Excavations at La Blanca were divided into two components, centering on two distinct lines of research: the residential archaeology component, and the ceremonial center component. The ceremonial center component focuses on Mound 1, located near the center of the site. Although much of it was destroyed in 1972, initial studies established that a substantial portion of Mound 1 remains intact, including 2.5 m of deposits extending below the modern ground surface and 2 m above the surface, excavations at Mound 1 have focused on evidence of public ritual in the vicinity of the largest mound. Materials recovered from Mound 1 provide insights into the role and importance of public ritual, and will inform the discussion of the changing role of public ritual from the Middle to the Late Formative (Love 2004; Love and Guernsey 2011).

The household archaeology component of the La Blanca project focuses on recovering data from multiple domestic contexts. The analysis of artifacts recovered from this component of the project has produced a wealth of information from ten La Blanca households, established artifact profiles for elite and non-elite households, and produced a large enough collection for comparison to the assemblage recovered from El Ujuxte (Love and Guernsey 2011). Analysis of the obsidian recovered represents a small part of the household component of the La Blanca project. In this study, I report on the analysis of obsidian recovered from five household contexts at La Blanca. The results of the current study will contribute to the objectives of the La Blanca project as it provides data that will help establish socioeconomic ranking of the households examined, and contributes to the artifact profiles developed for these households.

La Blanca comprises at least 45 known residential mounds, and the household archaeology component of the La Blanca project is centered on excavating a substantial sample of these mounds. Each mound has been defined as a housemound, with the immediate vicinity defined as a house lot. Each excavation associated with a particular house lot was designated as an Operation, and Operations were numbered sequentially. In order to maximize efficiency while ensuring an adequate sample size, a stratified random sample of 20 $m^2$ was excavated from each house lot. To accomplish this, a 400 $m^2$ area was divided into five units, consisting of a central 2 × 2 m unit in addition to four quadrants defined by the axis of the housemound. One 2 × 2 m excavation unit, or Sub-operation, was placed in each of the five areas and numbered sequentially, with Sub-operation 1 located at the center of the housemound. Sub-operations 2 through 5 were placed randomly within each of the four quadrants. Additional Sub-operations were excavated to expose features or, as time allowed, to supplement the sample recovered from a given house lot. While the initial Sub-operations (Sub-operations 1 through 5) measured 2 × 2 m, additional Sub-operations were of varying size, depending on the excavation strategy. (Love 2004, Love and Guernsey 2011)

Sub-operations were excavated in 10 cm arbitrary levels, except where it was possible to discern natural or cultural strata. Features were excavated as discrete units, also in 10 cm arbitrary levels. Sediments were either dry- or wet- screened through 3, 6, or 12 mm wire mesh, with 10 L from each Sub-operation processed by a combination of flotation and screening through 1 mm wire mesh. Artifacts were initially sorted in the field, and later washed and subjected to a more thorough sort by artifact type (e.g., ceramics, obsidian, jade) in the La Blanca laboratory. After drying, each artifact type was bagged in zip-top plastic bags and labeled with provenience information, prior to being cataloged. Depending on portability, artifacts were either stored in the laboratory in La Blanca, or brought back to CSUN. In particular, obsidian artifacts were brought to the laboratory at CSUN for analysis.

## Laboratory Methods

To provide a comparative analysis between elite and non-elite households for the present study, obsidian artifacts from a sample of household contexts were analyzed: Operations 32, 34, 35, 36, and 38. This selection provided five separate household contexts, two of which showed preliminary signs of elite status (Operations 32 and 38), two that showed preliminary signs of non-elite status (Operations 35 and 36), and Operation 34, which appeared to share some characteristics associated with elite households and others with non-elite households. Each household has at least five Sub-operations, and four of the five Operations had more (Table 3): The sample size was thus large enough to provide sufficient data for comparative analysis. Once I had chosen the five Operations to include in the study, the obsidian artifacts were analyzed in the CSUN anthropology laboratory. The obsidian included in the present study was sorted, counted, weighed, and catalogued in order to address the research questions outlined for this project.

**Table 3. Numbe r of Sub-operations in each operation included in the study.**

| Operation | 32 | 34 | 35 | 36 | 38 |
|---|---|---|---|---|---|
| No. of Sub-operations | 9 | 16 | 6 | 7 | 5 |

### *Analysis of Artifact Types*

For each Operation, all available obsidian artifacts from each associated Sub-operation were examined. Data on weight and count of artifacts and were collected by level for each artifact type by Sub-operation, and then were later compiled for intra-household comparison. Using criteria discussed above, obsidian from each level was first sorted by artifact type into three categories: prismatic blades, flake industry material, and bipolar cores. I used the definition of a prismatic blade presented in Chapter one to classify artifacts as blades. The obsidian artifact assemblage from La Blanca is highly fractured: virtually all blades are damaged in some way, and a high percentage of blades are broken, so that they are no longer twice as long as they are wide. For this reason, following Kerley (1989), for the purposes of this analysis, the most important diagnostic trait of a blade was the trapezoidal cross section; if an artifact displayed this key characteristic and it could be reasonably concluded that it was, in fact, a prismatic blade, then it was categorized as such (Figure 5). Artifacts with evidence of flake removal were classified as bipolar cores. Artifacts that could not be categorized as either blades or cores were classified as flake industry material, which includes simple flake tools as well as debitage (Figure 6). Individual artifacts of each type were counted and weighed as a lot per level to at least two hundredths of a gram (g). Using data from project excavations, the density in g per cubic meter of each artifact type was calculated for each Operation.

**Figure 5. Six prismatic blades from Operation 32.**

**Figure 6. Flake industry material from Operation 32.**

*Visual Sourcing of Obsidian*

The second step in the analysis was to determine the geological sources of obsidian used to produce a sample of artifacts from Operations 32, 36, and 38. This sample allowed me to examine a artifacts from two elite contexts (Operations 32 and 38) and one non-elite context (Operation 36). I familiarized myself with the basic characteristics of obsidian from El Chayal, San Martin Jilotepeque, Tajumulco, and Ixtepeque. Distinguishing physical characteristics of obsidian from the four sources included color, inclusions, and overall quality (M. W. Love, personal communication 2007). I then examined a sample of artifacts from Operations 32, 36, and 38 and made a preliminary determination of the geological source of the material used to produce each artifact. All of these steps were completed in the archaeological curation lab at CSUN.

To determine the reliability of visual sourcing, a sample of 101 prismatic blades that I had visually sourced was chemically analyzed to definitively determine the source of the material used to produce them. The results of the chemical sourcing were then compared to the results from the visual source analysis to determine the accuracy of visual sourcing. The time-of-flight (TOF) ICP-MS instrument with laser ablation at the Institute for Integrated Research in Materials, Environments, and Society (IIRMES), at California State University, Long Beach under the direction of Dr. Hector Neff was used to determine the obsidian source of the 101 blades. This process accurately assesses the trace elements found in each sample; these data were then compared to elemental profiles from sources in Guatemala (El Chayal, San Martin Jilotepeque, and Ixtepeque) and the geological source was identified by Dr. Neff.

### *Analysis*

Based on the analyses described above, the following was established:

1. The density of obsidian present in each household context.
2. The density and percent of total that blades accounted for in each household context.
3. The density of flake industry material present in each household context.
4. The density of bipolar cores present in each household context.
5. The percent of artifacts from each of the four sources recovered from samples of three household contexts.

# Chapter 4. Results

## Obsidian in Operations 32, 34, 35, 36, and 38

A total of 13,442 obsidian artifacts with a combined weight of 7,112.56 g were analyzed for the current project (Tables 4 – 7). These artifacts were recovered from 215.65 $m^3$ of sediment that were excavated from 43 Sub-operations from Operations 32, 34, 35, 36, and 38. Density of obsidian, calculated in g of obsidian per $m^3$of excavated deposit ($g/m^3$), averaged 32.98 $g/m^3$ for the five household contexts included in this study. Of this, 11,733 artifacts weighing 5,549.58 g were categorized as flake industry material, averaging 25.73 g of flake industry material per $m^3$ of excavated deposit. Bipolar cores included 125 artifacts weighing 263.88 g, averaging 1.22 g of cores per $m^3$ of excavated deposit. A total of 1,584 prismatic blades weighing 1,299.10 g were recovered, averaging 6.02 g of blades per $m^3$ of excavated deposit. Of the total obsidian present in the five Operations analyzed, prismatic blades were 18.26 percent by weight, flake industry material 78.03 percent by weight, and cores 3.71 percent by weight. The results are summarized in Tables 2-5. Although artifacts were counted, density of obsidian was used in analysis to control for the range of size of artifacts and the variation in excavated deposit of the five household contexts. Thus, counts are included in the tables yet omitted from the following discussion.

**Table 4.** **Summary of Obsidian Artifact Data for Operations 32, 34, 35, 36, and 38**

| Operation | Volume of Excavated Deposit ($m^3$) | Total Count of Obsidian Artifacts | Total Weight of Obsidian Artifacts (g) | Total Density of Obsidian Artifacts ($g/m^3$) |
|---|---|---|---|---|
| **32** | 54.94 | 5,749 | 2,157.42 | 39.27 |
| **34** | 56.10 | 3,632 | 2,237.24 | 39.88 |
| **35** | 41.47 | 1,007 | 756.71 | 18.25 |
| **36** | 41.10 | 1,699 | 1,032.89 | 25.13 |
| **38** | 22.04 | 1,355 | 928.31 | 42.12 |
| **TOTAL** | **215.65** | **13,442** | **7,112.56** | **32.98** |

**Table 5.** **Summary of Flake Industry Data for Operations 32, 34, 35, 36, and 38**

| Operation | Count of Flake Industry Material | Weight of Flake Industry Material (g) | Density of Flake Industry Material ($g/m^3$) | Percent Flake Industry Material by Weight |
|---|---|---|---|---|
| **32** | 5,185 | 1,679.68 | 30.57 | 77.86 |
| **34** | 3252 | 1,853.09 | 33.03 | 82.83 |
| **35** | 774 | 533.37 | 12.86 | 70.49 |
| **36** | 1,449 | 778.16 | 18.93 | 75.34 |
| **38** | 1,073 | 705.29 | 32.00 | 75.98 |
| **TOTAL** | **11,733** | **5,549.58** | **25.73** | **N/A** |

**Table 6.** **Summary of Prismatic Blade Data for Operations 32, 34, 35, 36, and 38**

| Operation | Count of Prismatic Blades | Weight of Prismatic Blades (g) | Density of Prismatic Blades ($g/m^3$) | Percent Prismatic Blades by Weight |
|---|---|---|---|---|
| **32** | 517 | 380.28 | 6.92 | 17.63 |
| **34** | 345 | 303.84 | 5.42 | 13.58 |
| **35** | 218 | 194.30 | 4.69 | 25.68 |
| **36** | 237 | 216.78 | 5.27 | 20.99 |
| **38** | 267 | 203.90 | 9.25 | 21.96 |
| **TOTAL** | **125** | **1,299.10** | **6.02** | **N/A** |

**Table 7.** **Summary of Bipolar Core Data for Operations 32, 34, 35, 36, and 38**

| Operation | Count of Bipolar Cores | Weight of Bipolar Cores (g) | Density of Bipolar Cores ($g/m^3$) | Percent Cores by Weight |
|---|---|---|---|---|
| **32** | 47 | 97.46 | 1.77 | 4.52 |
| **34** | 35 | 80.31 | 1.43 | 3.59 |
| **35** | 15 | 29.04 | 0.70 | 3.84 |
| **36** | 13 | 37.95 | 0.92 | 3.67 |
| **38** | 15 | 19.12 | 0.87 | 2.06 |
| **TOTAL** | **125** | **263.88** | **1.22** | **N/A** |

*Summary of Obsidian Artifacts Analyzed*

The density of obsidian recovered from the five household contexts analyzed fall into two ranges. Operations 32, 34 and 38 had similar densities of obsidian artifacts, with approximately 40 g per $m^3$ excavated, while Operations 35 and 36 had about 18 and 25 g per $m^3$, respectively (Table 4; Figure 7). The densities of flake industry material present in g per $m^3$fall into the same two general categories: Operations 32, 34 and 38, which all have close to 30 g per $m^3$, and Operations 35 and 36 that have about 13 and 19 g per $m^3$, respectively (Table 5; Figure 8). Because of the large amount of flake industry material present, it is to be expected that the density of flake industry material and the density of total obsidian present are similar.

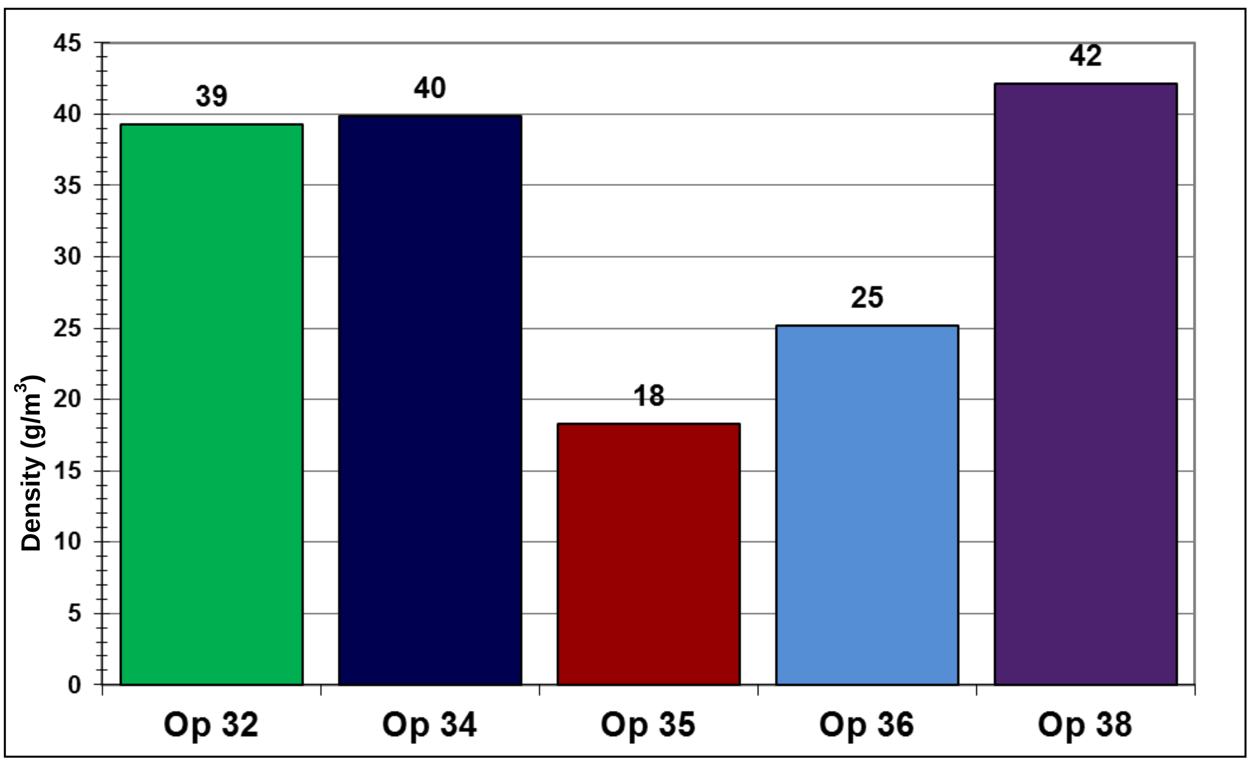


**Figure 7. Density of obsidian present in Operations 32, 34, 35, 36, and 38.**

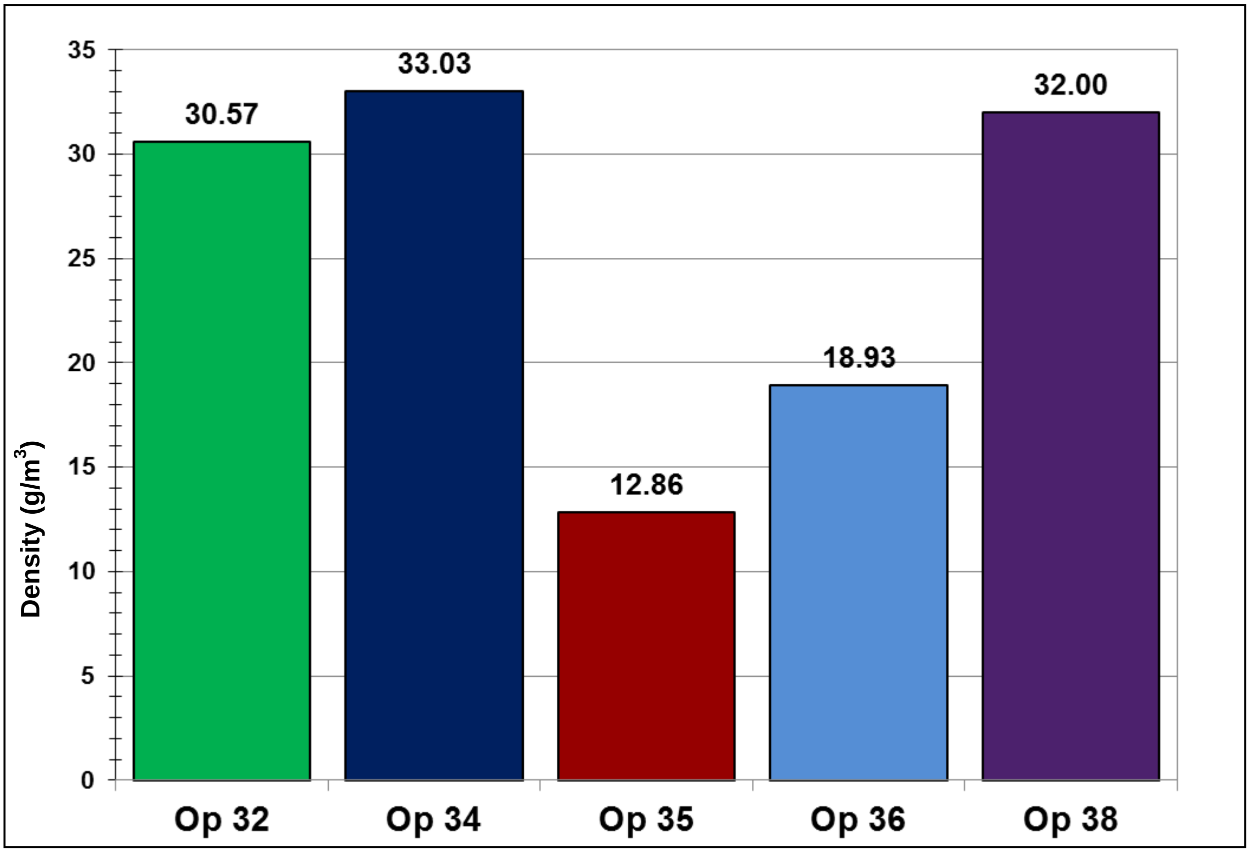

**Figure 8. Density of flake industry material present in Operations 32, 34, 35, 36, and 38.**

The distribution of the density of blades recovered from the five Operations differs somewhat from the density both of total obsidian and of flake industry material. Operations 34, 35, and 36 have remarkably similar densities of prismatic blades, clustering around 5 g per $m^3$. Operation 32 has a slightly higher density of blades, with close to 7 g per $m^3$. Operation 38 has the highest density, at just over 9 g per $m^3$ (Table 6; Figure 9).

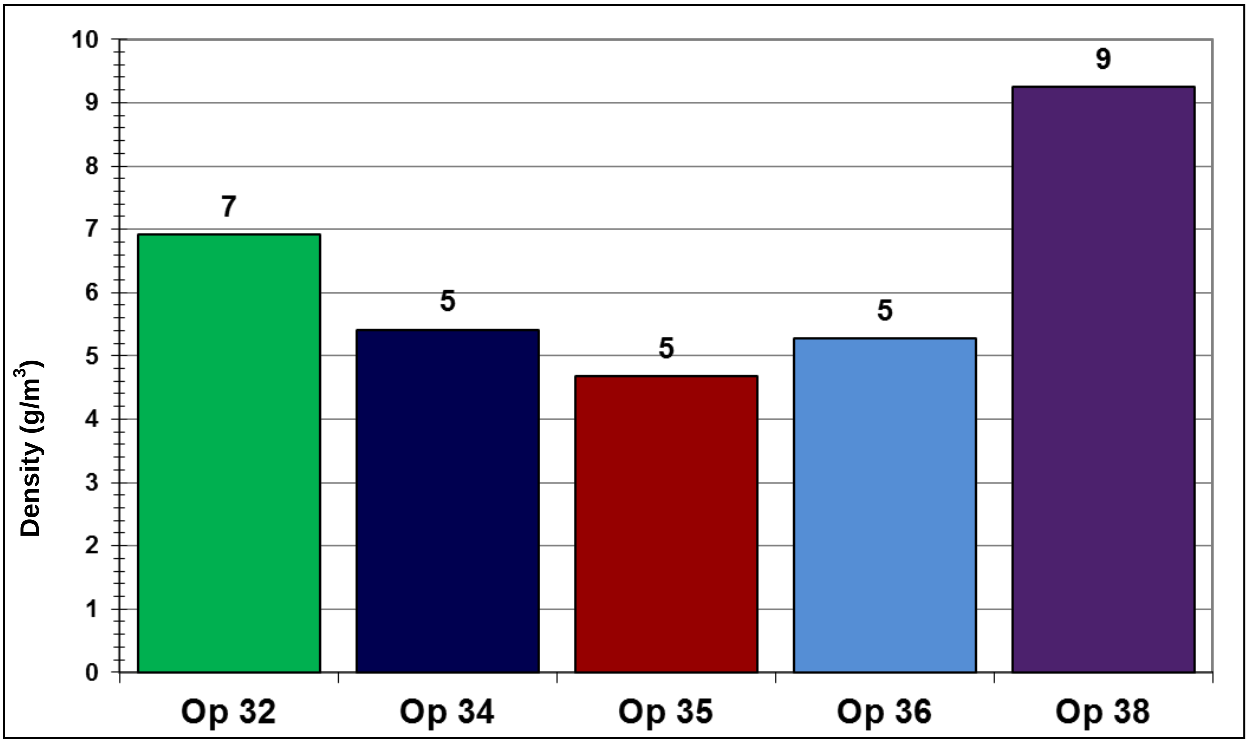


**Figure 9. Density of prismatic blades present in Operations 32, 34, 35, 36, and 38.**

Bipolar cores accounted for an extremely small portion of the total obsidian assemblage from La Blanca. No Operation yielded more than 50 cores. The total weight of all cores for each Operation weighed less than 50 g. It is thus not surprising that densities of cores vary little among all five Operations, roughly between 1 and 2 g per $m^3$(Table 7; Figure 10). However, there are some notable differences in the density of cores. Operations 35, 36, and 38 all have less than 1 g/$m^3$, while Operations 32 and 34 have considerably more: Operation 32 has 1.77 g/$m^3$, over twice as much as is present in Operation 35.

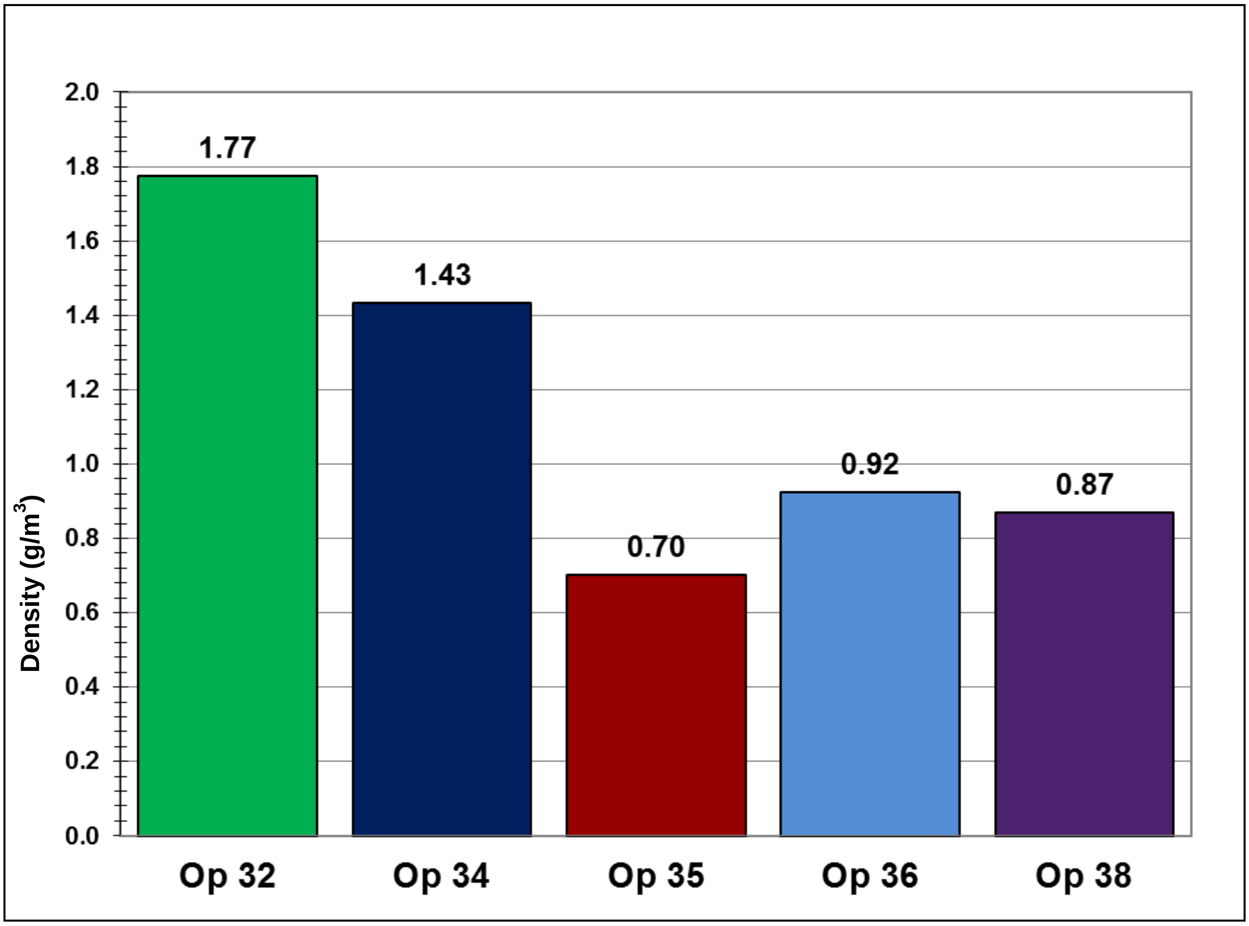


**Figure 10. Density of bipolar cores present in Operations 32, 34, 35, 36, and 38.**

The percent of each artifact type present as a percentage of the total weight of obsidian varies less among households than the density of obsidian present, (Figure 11). The percentage of prismatic blades present ranged from about 13.5 to 25.5 percent. The household with the highest percentage of blades is Operation 35, while Operation 34 contained the smallest percentage. Bipolar cores comprised less than five percent of the total amount of obsidian recovered from all five Operations. Flake industry material represented between approximately 70 and 80 percent of the total of obsidian present; since over 95 percent of the obsidian recovered from each of the five household contexts is comprised of prismatic blades and flake industry material, it is unsurprising that Operation 35, the household with the highest percentage of blades, has the lowest percentage of flake industry material at 70.49 percent, and Operation

34, the household with the lowest percentage of blades, has the highest percentage of flake industry material at 82.83 percent.

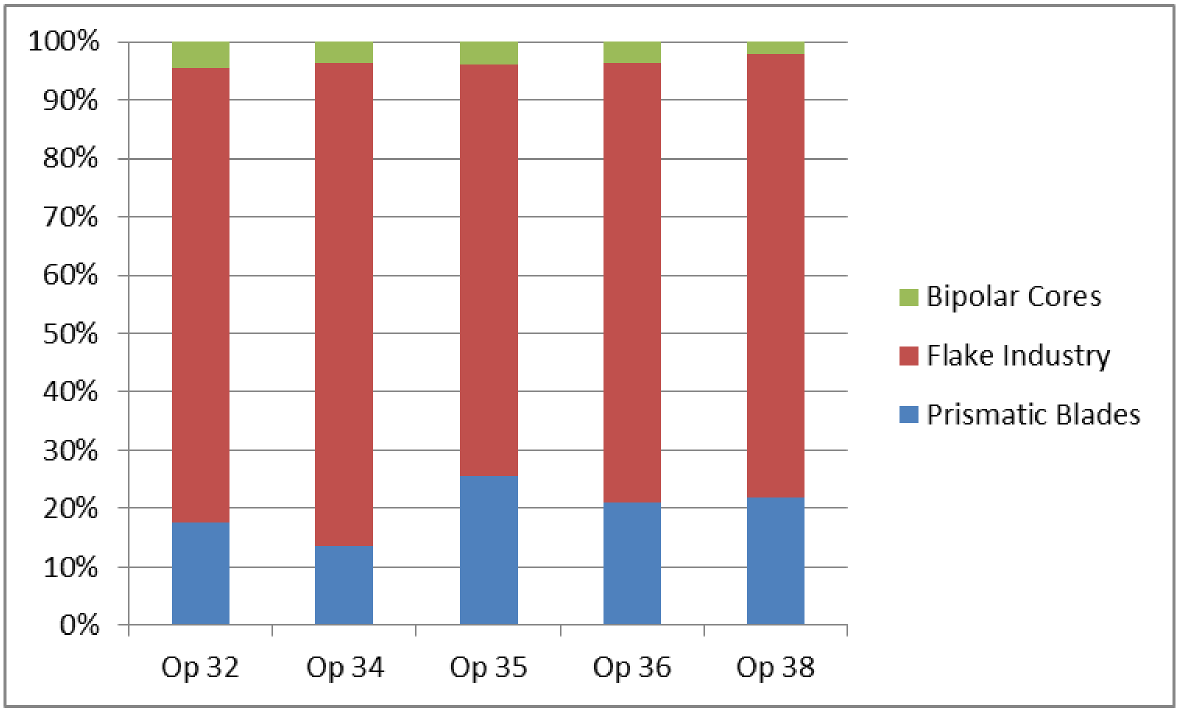


**Figure 11. Percent of artifact types by weight of total obsidian in Operations 32, 34, 35, 36, and 38.**

**Source Analysis of Obsidian Sample from Operations 32, 36, and 38**

To test the accuracy of visual sourcing, as discussed in the methods chapter, a sample of 101 prismatic blades from Operation 32 were chemically sourced and the results were compared to the results of the visual sourcing of the same blades (Table 8; Figure 12). Note that the sources of the material used to manufacture two of the blades were unidentifiable by chemical analysis, so the results of chemical and visual sourcing of 99 blades were compared. Visual sourcing had an overall accuracy rate of 85 percent. However, when the percentage of blades correctly identified is separated by source, the results varied. Prismatic blades manufactured from El Chayal obsidian were correctly identified 96 percent of the time, while those produced from San

Martin Jilotepeque obsidian were correctly identified only 50 percent of the time, and only 33 percent of Ixtepeque obsidian blades were correctly identified. A Chi-squared analysis indicates that my identification of obsidian from El Chayal is accurate, while my identification of San Martin Jilotepeque obsidian is not, although the sample size (n = 18) may be too small. The sample size of blades manufactured from Ixtepeque obsidian is too small to perform a Chi-squared test (n=3). My most frequent error was misidentifying both San Martin Jilotepeque and Ixtepeque obsidian as El Chayal obsidian.


**Figure 12. Prismatic blades recovered from Operation 32 and the source of the obsidian from which they were produced, as determined by chemical sourcing (SMJ = San Martin Jilotepeque, EC = El Chayal, and Ix = Ixtepeque).**

**Table 8. Results of visual versus chemical source analysis.**

| Source | Number of Samples | Number Correctly Visually Identified | Percent Correctly Visually Identified | Chi-squared Test Results |
|---|---|---|---|---|
| **El Chayal** | 77 | 74 | 96 | Visual Sourcing Accurate |
| **San Martin Jilotepeque** | 18 | 9 | 50 | Visual Sourcing Likely Not Accurate (Sample Size Likely Too Small) |
| **Ixtepeque** | 3 | 1 | 33 | Sample Size Too Small |
| **Total** | 99 | 84 | 85 | |

The results of my visual source analysis of obsidian from a sampling of artifacts within two elite contexts (Operations 32 and 38) and one non-elite contexts (Operation 36) indicate that between 60 and 70 percent of obsidian recovered from all three Operations is from El Chayal (Figure 13). Operation 38 contained a notably higher percentage of obsidian from San Martin Jilotepeque, with 28.43 percent as compared to 13.86 percent in Operation 32 and 14.45 percent in Operation 36. Operation 32 contained a higher percentage of obsidian from Ixtepeque (2.47percent) than the other two Operations, which each contained less than 1percent. The proportion of obsidian from Tajumulco varied from about 10, 14, and 20 percent.

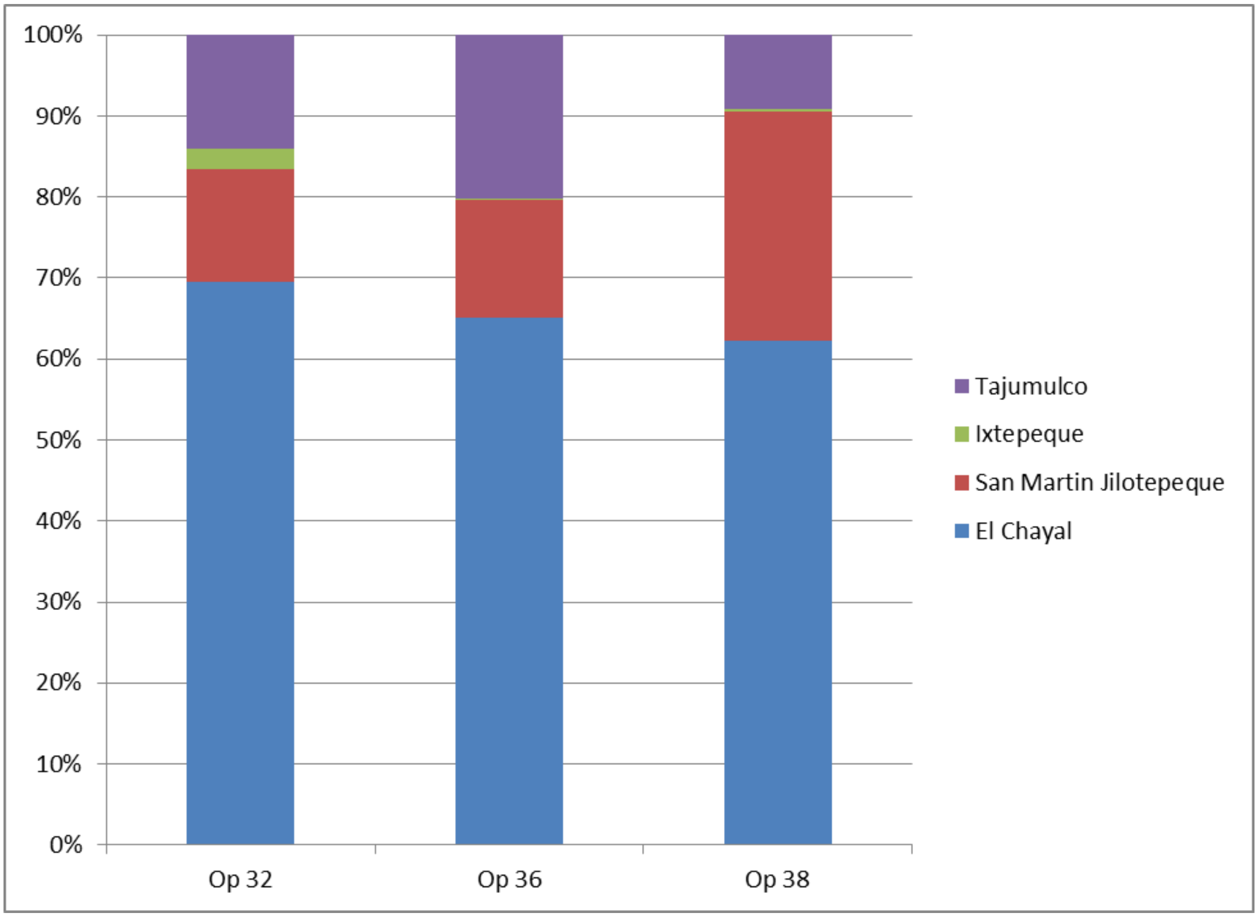

**Figure 13. Percent of sample of artifacts (all types) from Operations 32, 36, and 38 assigned to each of four known sources as visually sourced.**

Operation 36 has consistently more obsidian from Tajumulco than either Operation 32 or 38, and Operation 32 has more obsidian from Ixtepeque. The majority of artifacts of each type are produced from El Chayal obsidian. Operation 38 has more blades that were produced from obsidian from San Martin Jilotepeque, and Operation 32 had more artifacts that were produced from Ixtepeque obsidian. The percent of each artifact type from the four sources in the samples from Operations 32, 36, and 38 is similar to the percent of total obsidian from each source in the samples (Figures 14-16).

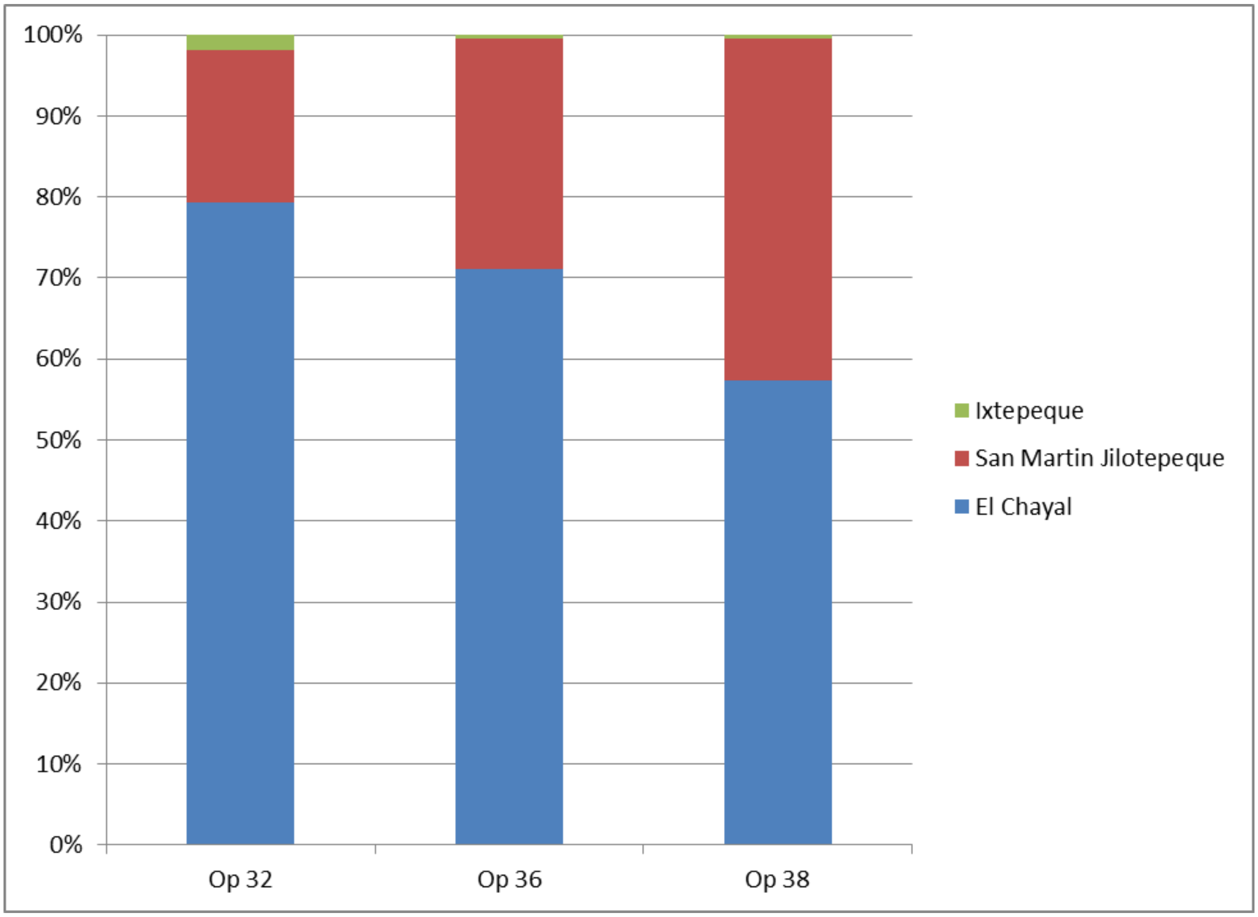

**Figure 14. Percent of sample of prismatic blades visually assigned to each of three known sources.**

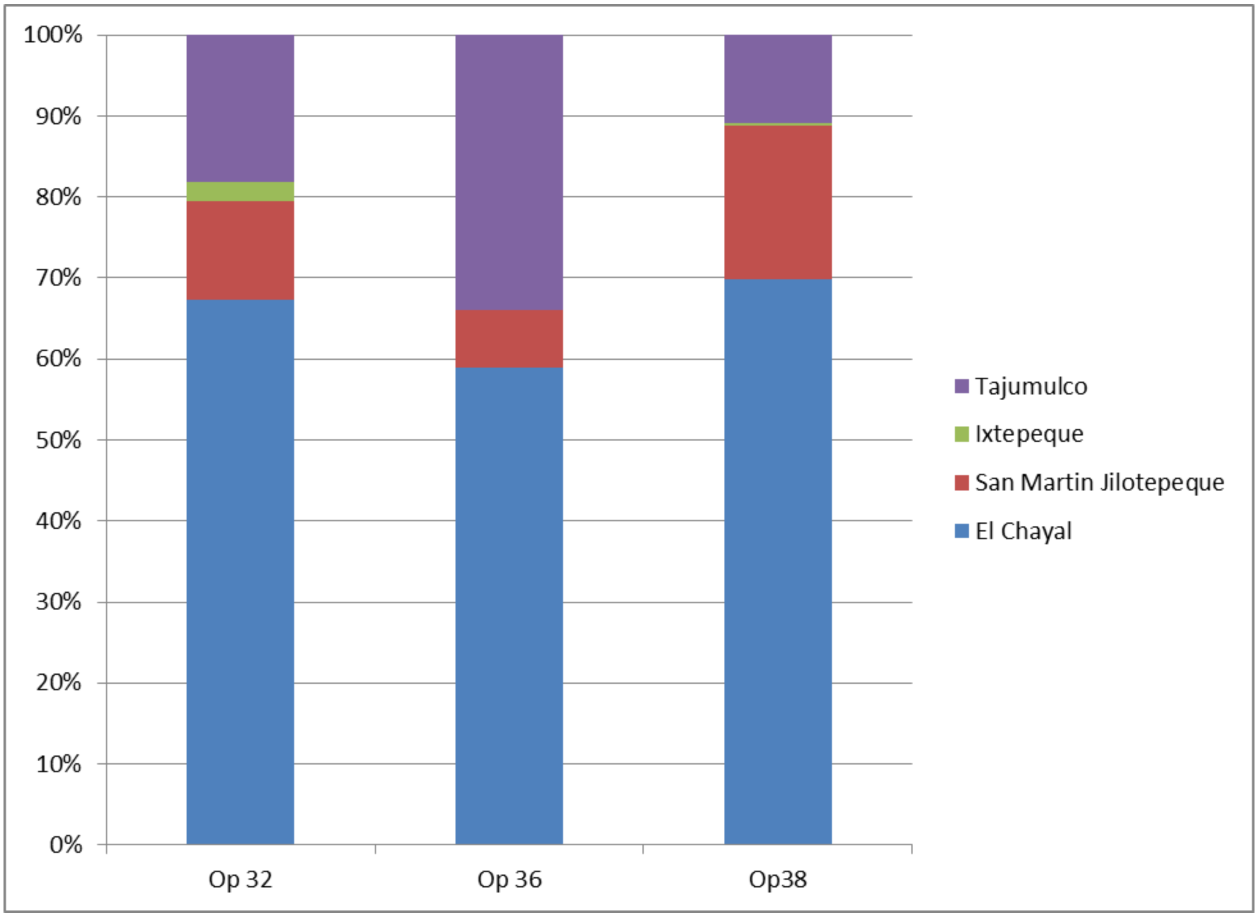


**Figure 15. Percent of sample of flake industry material visually assigned to each of four known sources.**

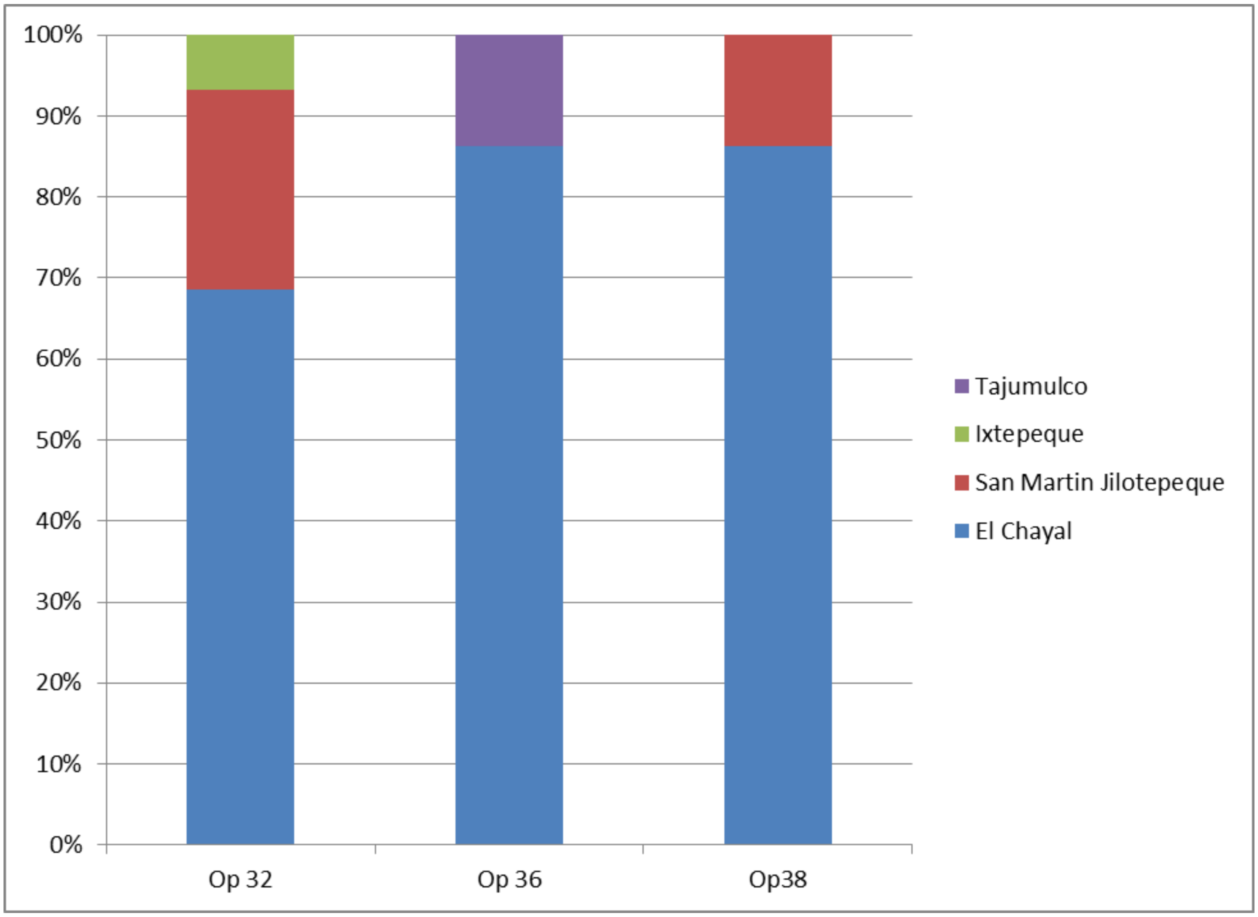


**Figure 16. Percent of sample of bipolar cores assigned to each of four known sources as visually sourced.**

# Chapter 5. Discussion

The results of the current project indicate that there are some notable differences among the five households included in the study that may indicate differential access to obsidian. The households represented by Operations 32, and 38 (elite households) and Operation 34 (possibly an elite household) may have had increased access to this obsidian as compared to Operations 35 and 36 (possible non-elite households). In contrast, it does not appear that the elite households had better access to prismatic blades than the non-elite households: there appears to be little to no difference in access to prismatic blades for elites and non-elites.

When the amount of jade present, one indicator of elite status, is compared to my results, no clear pattern emerges (Table 9). While Operation 32 has a the highest density of jade as well as a relatively high density of obsidian, and Operations 35 and 36 have low densities of both Jade and obsidian, Operation 34 has a low density of jade but a high density of obsidian. However, there does appear to be some correlation between jade and the total amount of obsidian present, as well as between jade and the density of blades present (Figures 16 and 17). No data is yet available regarding jade recovered from operation 38. It is possible that Operation 34 is unusual – when data on the density of jade in Operation 38 and other indicators of elite status are available, it may clarify my results.

**Table 9. Comparison of results of current study with density of Jade recovered from Operations 32, 34, 35, 36, 38.**

| Op. | Jade (g/m3) | Total Obsidian (g/m3) | Blade Density (g/m3) | Percent Blades | Percent El Chayal | Percent San Martin Jilotepeqe | Percent Ixtepeque | Percent Tajumulco |
|---|---|---|---|---|---|---|---|---|
| 32 | 0.32 | 39.27 | 6.92 | 17.63% | 69.58% | 13.86% | 2.47% | 14.09% |
| 34 | 0.1 | 39.88 | 5.42 | 13.58% | N/A | N/A | N/A | N/A |
| 35 | 0.03 | 18.25 | 4.69 | 25.68% | N/A | N/A | N/A | N/A |
| 36 | 0.09 | 25.13 | 5.28 | 20.99% | 65.16% | 14.45% | 0.19% | 21.21% |
| 38 | N/A | 42.12 | 9.25 | 21.96% | 62.17% | 28.43% | 0.33% | 9.08% |

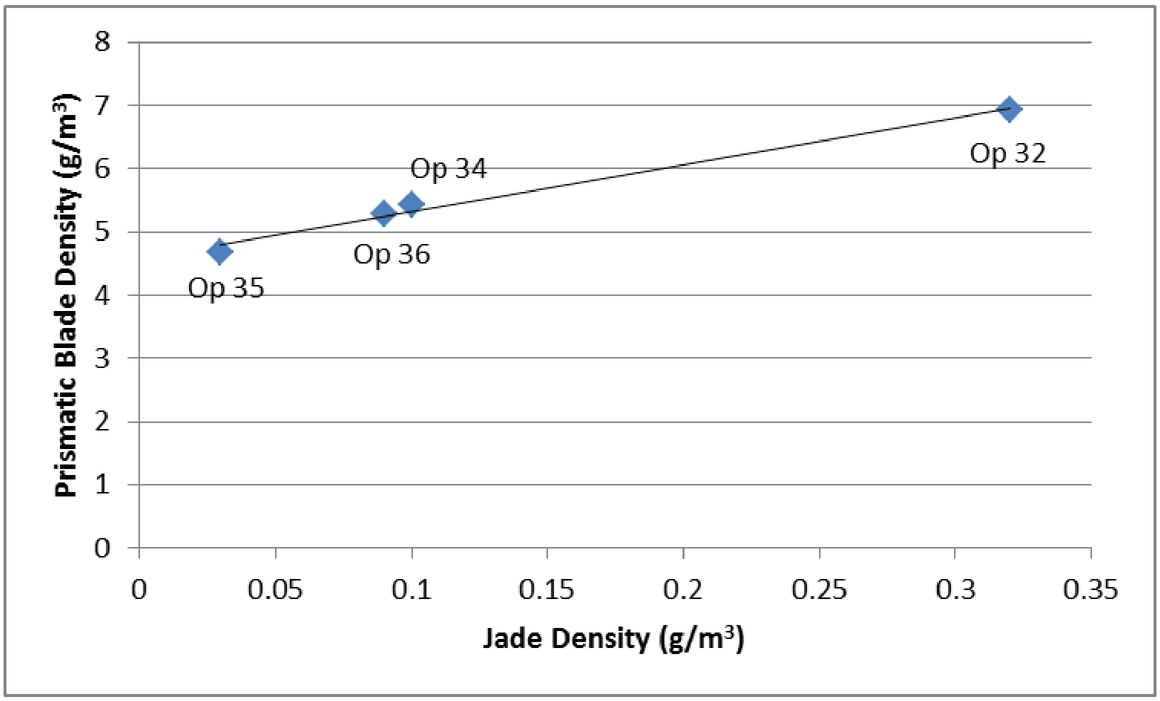


**Figure 17. Correlation between density of jade and prismatic blades in Operations 32, 34, 35, and 36.**

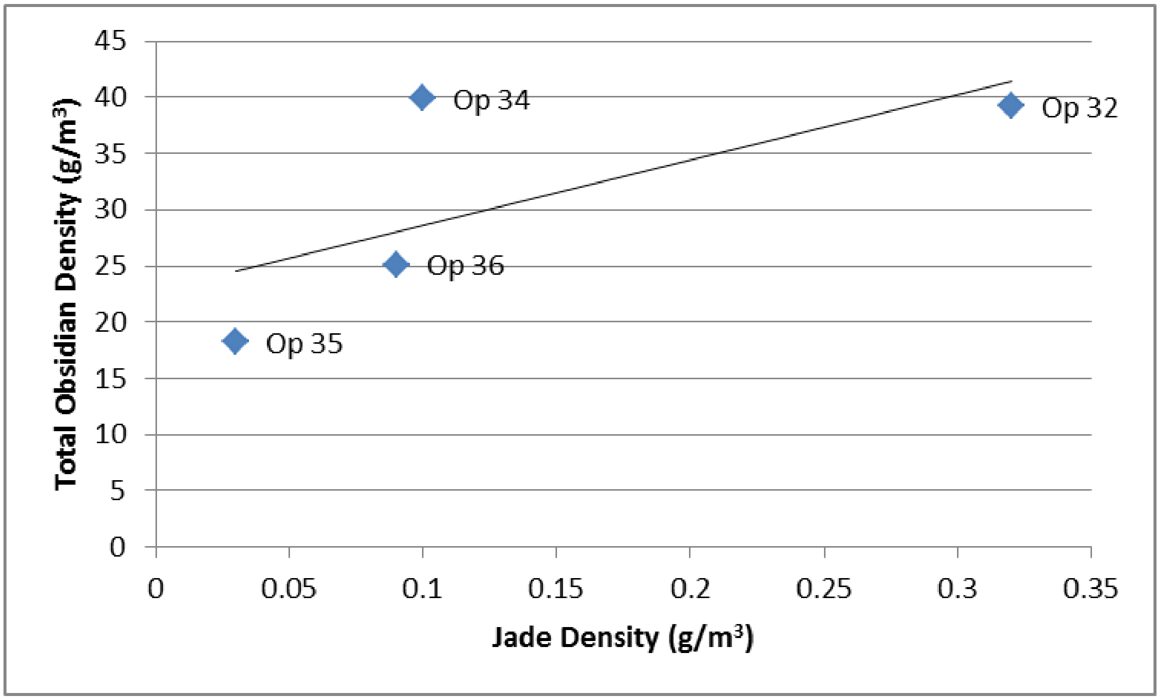


**Figure 18. Correlation between density of jade and total obsidian in Operations 32, 34, 35, and 36.**

My analysis indicates that, although elites may have consolidated control over access to obsidian to a degree, their control was limited. It appears that non-elite households retained power enough to ensure close-to-equal access to high-quality prismatic blades. Further, although the results of the visual source analysis proved to be accurate only 85 percent of the time, they indicate that the similar percentages of obsidian from all four sources are present in Operations 32, 36, and 38. This may indicate that elites were as of yet unable to assert much control over any particular trade network.

In contrast, it is possible that, rather than indicating absence of control, the somewhat even distribution of prismatic blades may be indicative of redistribution by a central authority. According to Fowler et al (1987:157), such an even distribution of obsidian from different sources throughout both elite and non-elite areas "argues for tight control of the flow of obsidian" by a "centralized administrative authority." Thus it is possible that, upon further analysis, evidence will point to the existence of a redistributive political body that ensured the equal access to obsidian blades.

## Suggestions for Future Research

The analysis presented herein represents the first step in understanding the distribution of obsidian artifacts at La Blanca and the relationship of this distribution to the development of social stratification in Middle Formative Mesoamerica. Virtually an unlimited number of other avenues of research are possible using this artifact class, as well as the entire artifact assemblages from La Blanca and El Ujuxte. Some of these research possibilities are presented in this section.

### *Lithic Analysis: Prismatic Blade Production at La Blanca?*

Perhaps the most logical next step in the analysis of obsidian at La Blanca is to analyze obsidian recovered from the site to discern whether prismatic blades were produced at La Blanca. Love and Guernsey (2011) indicate that there may be evidence of blade manufacture at La Blanca. It seems probable that prismatic blades were produced locally rather than imported as finished products. Crabtree (1968:455) notes the inconvenience of transporting blades as finished products:

> If they strike against each other or hit any hard substance, they will break or lose their sharp edge…For transporting for storing, they must be kept separated, or wrapped individually. This necessary protection of edges may explain the wide distribution of utilized cores, for it would be much easier to transport a preformed core to the place of utilization than to make several hundred blades at the source of material and then transport them to the occupation site.

This can also be applied to the notion of transporting blades for any reason, including trade.

Although no cores were definitively identified as prismatic blade cores in the present study, the absence of blade cores may not indicate that blades were not produced at the site.

Clark and Bryant (1997:117) studied a Mesoamerican prismatic blade workshop refuse pit that produced a high volume of prismatic blades. They recovered only six core fragments out of over 11,000 artifacts, including over 5,000 prismatic fragments. Although this is as yet inexplicable, Clark and Bryant (1997:124) note that "clearly, most of the exhausted cores are missing from the workshop debris" and thus looking primarily for exhausted cores as evidence of blade production might not be the method that will produce the most accurate results.

It is possible to examine the debitage present in the artifact assemblage to determine whether prismatic blades were produced at La Blanca. Numerous studies have been performed to establish the production sequence of prismatic blades (see Clark 1985; Clark 1987; Clark and Bryant 1997; Fowler et al 1987; Kerley 1989). Clark & Bryant (1997) examined the remains of a prismatic blade workshop at Ojo de Agua, Chiapas, Mexico, and Healan, Kerley, and Bey (1983) studied blade debitage from Tula, Hidalgo, Mexico. At both of these sites, specialists produced blades from preformed polyhedral cores. These authors have identified and defined a characteristic typology of waste and products associated with the production sequence of prismatic blademaking; if the obsidian assemblage from La Blanca were examined more fully, it is possible that evidence for prismatic blade production might be identified.

Some of the key categories of debitage that may be found in the La Blanca assemblage include (Adapted from Clark & Bryant [1997] and Healan, Kerley, and Bey [1983]):

*Platform faceting flakes:* flakes removed by percussion from percussion cores to prepare it; probably one of the first steps in preparing the percussion core.

*Irregular pressure blades:* blades of irregular form with percussion scars on their dorsal surface, most from the first removals of pressure blades from the blade core; probably considered a waste product, as large amounts of them were recovered from the trash pits.

Healan, Kerley, and Bey (1983), Clark (1985) and Clark and Bryant (1987) also argue that may be possible to identify tools associated with blademaking, although many such items would be invisible archaeologically. Heelan et al (1983:142) agree, urging researchers to look for flint knapping materials, including bone, antler, and stone tools, with flakes of obsidian in them. Fowler (1987) studied obsidian artifacts from of El Mirador, dating from the Middle and Late Formative periods, which nearly all resulted from or were directly related to the production of prismatic blades at the site, including core-blade debitage, polyhedral cores, macroblades, small percussion blades, and prismatic blades. Thus, it is likely that upon further inspection debitage analysis of La Blanca obsidian will provide evidence that blades were locally produced.

If prismatic blades were produced at La Blanca, it would also be interesting to investigate in what form obsidian was imported to the site. Although it is possible that blades were transported as finished products from a site near the obsidian source (for example Kaminaljuyu, located less than 20 km from El Chayal, see Hester and Shafer 1992:247), this seems unlikely given the difficulty and danger of transporting finished blades. It would have been much easier to transport prepared cores, and the problem of breakage would be virtually eliminated. Furthermore, according to Healan et al (1983:143), while some of the debitage produced from initial core formation is usable, much of this is waste material, and it would be more efficient to reduce the cores at the quarry rather than transport excess weight over long distances. Thus it would be easier and cheaper to transport prepared cores.

Another argument for the importation of prepared cores rather than finished prismatic blades is that this was common practice at other sites in Mesoamerica. For example, Clark and Bryant (1997:133) studied the artifact assemblage from Ojo de Agua and concluded that that obsidian cores were reduced to polyhedral cores before they were imported to the site. Although the context of the workshop debris is slightly later than the artifacts from La Blanca, it is located very close to La Blanca and the obsidian used to produce the blades came from EL Chayal.

Clark (1987) investigated the site of La Libertad, a regional center during the Middle Formative in Mesoamerica. Again, at this site, prismatic blades were produced locally from macrocores imported from highland Guatemala (Clark 1987). Macrocores were pre-formed by percussion before transport, most likely at or near the quarry site, and could be reduced to prismatic blade cores with relatively little waste once they arrived at their final destination (Clark 1987).

Bove (1989) studied at total of 7,382 obsidian artifacts from surface collections from 20 Formative Period sites, and artifacts from El Bálsamo and Monte Alto. This area is located closer to the Obsidian sources San Martín Jilotepeque and El Chayal than La Blanca. In fact, it is possible that the centers he studied were stops on the transport route of obsidian moving from San Martín Jilotepeque and El Chayal to La Blanca. He contends that Los Cerritos-South and other primary centers in the study area showed evidence of production of macrocores and further reduction into polyhedral cores and blade production, especially when the percentage of cortex was studied (Bove 1989). This provides evidence of a possible source of prepared cores for La Blanca and other regional polities.

It seems likely that the inhabitants of La Blanca were producing blades from imported pressure cores rather than from raw obsidian nodules. If this were the case, then the artifact assemblage should reflect it. The incidence of cortex ought to be low, and there should be evidence of blade production but no evidence of core preparation. Further research may reveal that at La Blanca, although they were not controlling access to a specific trade network, elites were able to control prismatic blade production and redistribute the finished products.

*Blade Production and Craft Specialization*

Linked to the question of localized blade production is the process of production. Using ethnohistoric accounts from Spanish sources and native illustrations, John Clark (1982) replicated the Mesoamerican technique of producing prismatic blades with a specialized tool while seated on the ground, and his study revealed that it takes a great deal of skill to produce prismatic blades. Clark (1987:269) later argues that because blade making requires a unique skill set and access to suitable materials and workspace, "blades were probably made by specialists."

He further asserts that that it would be both ridiculous and nearly impossible for blades to be produced at the individual household level (Clark 1987). He argues that the average households probably would use at most between 20 and 50 blades per year, and producing only that many per year would be insufficient to retain the skill level required in blade manufacture (Clark 1987:272). A third argument for the production of blades by specialists lies in the value of obsidian; because it was relatively expensive to procure, it is unlikely that individuals not skilled at producing blades would be allowed to use the obsidian without ensuring a quality finished product (Clark 1987:272-3).

The prismatic blades recovered from La Blanca may have been produced by some type of craft specialists. This, however, does not preclude elites from exerting control over their production. Rather, it may have provided them with yet more opportunity to exert control over access to blades. If blades were manufactured by specialists on site, local elites may have controlled their production. Local elites may have had some authority over the skilled craftspeople that manufactured blades. Elites may have also restricted access to the knowledge of how to produce prismatic blades.

Craft specialization is a key development in social evolution, and in many instances, elites have able to directly control either the specialists themselves or the products of their labor. Cathy Costin (1991:211, emphasis in original) maintains that "elite-sponsored production is *attached* production. It involves the control, patronage, and sponsorship of artisans by elite individuals and institutions." She identifies five types of attached production, including both "intensified household production" wherein domestic labor is used to produce surplus goods, and "dispersed corvée" which is defined by part-time labor producing for the elite (Costin 1991:211). The other three categories that she describes involve the organization of labor at a level not demonstrated at La Blanca; the amount of obsidian found at La Blanca does not support the notion of large-scale production (Costin 1991:211).

It is possible that there were craft specialists producing prismatic blades at La Blanca. Such specialists may have been members of an elite household, which would categorize their labor as Costin's (1991) "intensified household production," and evidence of blade manufacture should be restricted to elite contexts. In contrast, it is also possible that craft specialization at La Blanca was "dispersed corvée" production and some non-elite households produced blades for La Blanca elites (Costin 1991). If this were the case, then evidence of production should be found in association with non-elite households, while higher proportions of the finished products will be recovered from elite households.

*Comparative Analysis: La Blanca and El Ujuxte*

Finally, after analysis specific to the artifact assemblage recovered from La Blanca is complete, the results of the current study will contribute to the comparative analysis of La Blanca and El Ujuxte. It will be possible to gain a greater understanding of the changing ways in which elites were able assert control over social, ideological, and economic aspects of their respective polities. It will be interesting to see when and how elites were able to transform the sociopolitical structure of their society into an institutionalized state. A future comparative study of data from La Blanca and El Ujuxte will be an important means to understand the development of social complexity in Mesoamerica as well as to shed light on how elites were able to consolidate control.

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